Geosyntec consultants

engineers | scientists | innovators

Detailed Site Investigation

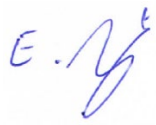
Phillip Drive, South West Rocks, NSW, 2431

ECON Environmental Pty Ltd
12 October 2022

AU122217 Final R01

Quality Management

Document Distribution

Issue/Revision	Issue 1	Revision 1	Revision 2
Remarks	DRAFT	FINAL	
Date	30 September 2022	12 October 2022	
Prepared by	Edward Munnings	Edward Munnings	
Signature	DRAFT		
Reviewed by	Lange Jorstad	Lange Jorstad Certified Environmental Practitioner (CEnvP) Site Contamination Specialist	
Signature	DRAFT		
File reference	AU122217 R01 Draft ESA ECON South West Rocks 30Sep22	AU122217 R01 Final ESA ECON South West Rocks 12Oct22	
Distribution	• ECON Environmental Pty Ltd • Geosyntec Electronic File	• ECON Environmental Pty Ltd • Geosyntec Electronic File	

This report was prepared in accordance with the scope of services set out in the contract between Geosyntec Consultants Pty Ltd (ABN 23 154 745 525) and the client.

Geosyntec Consultants Pty Ltd
ABN 23 154 745 525
www.geosyntec.com.au

Executive Summary

This report, prepared by Geosyntec Consultants Pty Ltd (Geosyntec), documents a Detailed Site Investigation (DSI) commissioned by ECON Environmental Pty Ltd (ECON) for a property located at Phillip Drive, South West Rocks (the site).

It is understood that the site is proposed to be developed into a residential and retail complex and that a DSI was required to characterise the contamination status of the site and address contamination-related items presented in a Statement of Facts and Contentions (SOFAC) filed with The Land and Environment Court by Kempsey Shire Council, dated 29 August 2022. Specifically, this DSI was completed in response to Contention 4 (Contamination), and the particulars therein (summarised in Section 1.2).

The site is legally identified as Lot 2 in DP 1091323, occupies an area of approximately 4.8 ha. Historically, the site has comprised vegetated vacant land, with clearing of some areas in the 1960's and 2000's. The Site location is presented in Figure 1, Appendix A. It is noted that DSI investigation efforts were focussed on the proposed development area, as shown in Figure 3B.

The objectives of the DSI were to:

- Characterise the contamination status of the site in accordance with relevant guidelines, including assessment of per-and-poly fluoroalkyl substances (PFAS) and other contaminants in soils and groundwater
- Comment on the suitability for the site for proposed residential and retail development
- Address the contamination-related items listed in the SOFAC

The scope of works completed during this assessment included a desktop review, site walkover, drilling of eight (8) boreholes, sampling of soils from boreholes and shallow samples, conversion of boreholes to groundwater wells, groundwater sampling, estimation of groundwater flow direction across the site by surveying the wells, laboratory analyses of soil and groundwater samples, assessment of results against relevant site suitability criteria and preparation of this report.

Based on the findings of this assessment, Geosyntec concludes the following:

- Surface conditions consisted of unsealed surface over the entire site, with grass cover over most of the site and low shrubs present in the southern elevated areas. Trees were scattered across the site, with the highest coverage in the southern and south-eastern areas.
- Fill/topsoil materials were encountered in three boreholes in the south-western portion of the site (GBH1, 2 and 3), with other boreholes encountering natural soil immediately. The thickness of the fill/topsoils where present generally ranged between 0.05m and 0.3m.
- Underlying natural soils generally comprised sands to depths ranging from 1.8m to 3.0 m bgl, followed by cemented sands ('coffee rock') with further underlying layers of uncemented sands in some locations.
- No anthropogenic materials were observed in site soils during drilling works. No potentially asbestos containing fibre cement fragments were observed during drilling.
- A possible hydrocarbon odour was noted at approximately 2.7m in borehole GBH1, with slight sulfur odour noted after approximately 3m. PID readings across all boreholes ranged between 0.4 and 1.8ppm, close to background levels. No soil staining was observed in soils during drilling.
- Ground conditions encountered during this current investigation were generally similar to those reported in the previous investigations outlined in Section 4.1.
- Offsite activities observed during the site walkover included residential land use to the south and east, with reserve land to the west and north. No potentially contaminating activities were observed.

- All soil chemical results were reported below adopted site suitability criteria for residential land use, with the exception of a minor exceedance of zinc in GBH3_0.01-0.3 (duplicate), above the adopted conservatively calculated EIL, which can be discounted based on duplicate results from this location and the fact that vegetation in the location appeared to be in healthy condition.
- All groundwater results were reported below adopted criteria with the exception of PFAS, and marginal exceedances by some heavy metals.
- The former Caltex Terminal is identified as a possible source of PFAS detected in groundwater at the site for the following reasons:
  a) The former Terminal Site is the only site identified in the vicinity of the subject site likely to have historically employed potentially PFAS-containing firefighting foams.
  b) No potentially PFAS-contaminating historical activities were identified for the site itself.
  c) Groundwater flow direction was inferred to be to the north / northeast. Accordingly, the site is located downgradient from the former Caltex Terminal.
  d) Concentrations of PFAS compounds in groundwater were highest in offsite upgradient wells

- Concentrations of heavy metals above adopted groundwater criteria were generally located in the central and eastern portions of the site, including detections along boundary well locations (e.g., mercury and nickel in GMW5, copper and zinc in GMW3 and 8). These concentrations of metals are not considered to originate from the site and are likely representative of regional groundwater conditions. The concentrations only slightly exceed the conservative ecological criteria and are considered to present low risk to current and future site users.

Based on the above, it is concluded that the site is suitable for the proposed residential and retail development noting the following:

health-based criteria at
if the proposed

development requires dewatering, then appropriate management measures should be specified in a future management plan and adopted to minimise risks such as drawing higher PFAS concentrations onto other portions of the site where development is proposed. Considerations may include:

a) Monitoring of groundwater levels and quality in appropriate wells (e.g. GMW1 & GMW2) during construction phases, to assess whether elevated PFAS concentrations remain in the far-western part of the site and do not migrate eastward to areas inside the proposed development footprint

c) If targeted dewatering is required in other portions of the site, preparation of a dewatering management plan specifying how groundwater flow and effluent will be assessed and managed

- Existing advice relating to acid sulfate soils (ASS) from previous reports (i.e. RGS, 2021) should be considered.

- The former Caltex Terminal, located in a hydraulically up-gradient position relative to the site, is a possible source of PFAS identified in site groundwater. Concentrations within the site were recorded below relevant human health criteria and are not considered to affect the suitability of the site for the proposed residential and retail land use.
- The contamination-related items listed in the SOFAC have been addressed as follows:

  a) *PFAS: Assessment of PFAS in site soils and groundwater is required given detection of PFAS at the former Caltex Terminal to the south of the site, and the general groundwater flow direction to the northeast towards the site.*

     This item has been addressed through the DSI scope of works, with PFAS assessment conducted for site soils and groundwater.

  b) *Desktop study: A detailed desktop study is required including review of previous assessments and other records, including further consideration of available hydrogeological information.*

     This item has been addressed through completion of a detailed desktop study as well as collection of site-specific hydrogeological data as part of the groundwater assessment, including inferred groundwater flow.

  c) *Site History: A detailed review of site history including information not only from historical aerial photographs and publicly available records, but also from previous assessments and any other available records.*

     This item has been addressed through the completion of a detailed review of site history using public records, previous assessments and other available information.

  d) *Previous Investigations: Review of information relating to the former Caltex Terminal is required, including any available data relating to past contamination and/or confirmation of successful remediation.*

     This item has been addressed through the review of the available GTA (1995) report, review of available data and consideration of results from the current DSI. Although validation documentation for the former Caltex terminal site was not available, currently available data for the subject site is considered sufficient to inform suitability of the site for the proposed land use.

  e) Site Walkover Inspection Observations: Detailed observations of the site and adjacent land obtained from a site walkover inspection is required.

     This item has been addressed by the completion of an appropriately detailed site walkover with findings presented in this DSI

  f) Conceptual Site Model (CSM): A CSM is required which identifies all potential source-pathway-receptor linkages present with respect to current and proposed land use, including those via groundwater. This is required to consider the site history and environmental setting.

     This item has been addressed by the compilation of a CSM which takes into account a range of potentially contaminating activities, exposure pathways and receptors, based on available information regarding the history of the site and surrounds. This includes discussion based on the CSM and findings of the DSI.

Table of Contents

Appendices

1 Introduction

1.1 Background

This report, prepared by Geosyntec Consultants Pty Ltd (Geosyntec), documents a Detailed Site Investigation (DSI) commissioned by ECON Environmental Pty Ltd (ECON) for a property located at Phillip Drive, South West Rocks (the site).

It is understood that the site is proposed to be developed into a residential and retail complex and that a DSI was required to characterise the contamination status of the site and address contamination-related items presented in a Statement of Facts and Contentions (SOFAC) filed with The Land and Environment Court by Kempsey Shire Council, dated 29 August 2022. Specifically, this DSI was completed in response to Contention 4 (Contamination), and the particulars therein (summarised in Section 1.2).

The site is legally identified as Lot 2 in DP 1091323, occupies an area of approximately 4.8 ha. Historically, the site has comprised vegetated vacant land, with clearing of some areas in the 1960's and 2000's. The Site location is presented in Figure 1, Appendix A. It is noted that DSI investigation efforts were focussed on the proposed development area, as shown in Figure 3B.

1.2 Objective

The objectives of the DSI were to:

- Characterise the contamination status of the site in accordance with relevant guidelines, including assessment of per-and-poly fluoroalkyl substances (PFAS) and other contaminants in soils and groundwater
- Comment on the suitability for the site for proposed residential and retail development
- Address the following contamination-related items listed in the SOFAC (summarised from the detailed items listed in the SOFAC):
    a) PFAS: Assessment of PFAS in site soils and groundwater is required given detection of PFAS at the former Caltex Terminal to the south of the site, and the general groundwater flow direction to the northeast towards the site.
    b) Desktop study: A detailed desktop study is required including review of previous assessments and other records, including further consideration of available hydrogeological information.
    c) Site History: A detailed review of site history including information not only from historical aerial photographs and publicly available records, but also from previous assessments and any other available records.
    d) Previous Investigations: Review of information relating to the former Caltex Terminal is required, including any available data relating to past contamination and/or confirmation of successful remediation.
    e) Site Walkover Inspection Observations: Detailed observations of the site and adjacent land obtained from a site walkover inspections is required.
    f) Conceptual Site Model (CSM): A CSM is required which identifies all potential source-pathway-receptor linkages present with respect to current and proposed land use, including those via groundwater. This is required to consider the site history and environmental setting.

1.3 Scope of Work

The scope of works completed during this assessment included:

- Site background searches and review of previous investigations and other available information relating to the site.
- Preparation of a site-specific Job Hazards Analysis/Safe Work Method Statement (JHA/SWMS).
- A site walkover to observe current site conditions and identify any potential sources of site contamination.
- Drilling of boreholes at eight (8) locations.
- Collection of soil samples from encountered soils, field screening of samples based on visual and olfactory observations and logging of the soil lithology at each location.
- Collection of shallow soil samples from four (4) locations.
- National Association of Testing Authorities (NATA) accredited laboratory analysis of sixteen (16) soil samples (plus two QA/QC samples) for a broad suite of analytes including PFAS, 8 priority heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), and polycyclic aromatic hydrocarbons (PAHs).
- Assessment of new and relevant historical soil results against relevant land use criteria published in the National Environment Protection Council (NEPC) (2013) National Environment Protection (Assessment of Site Contamination) Measure (NEPM) (NEPM (2013)) and National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (HEPA) (2020) PFAS National Environmental Management Plan Version 2.0 (NEMP (2020)).
- Completion of the eight (8) boreholes as groundwater monitoring wells.
- Development and sampling of the eight (8) groundwater wells.
- NATA accredited laboratory analysis of eight (8) groundwater samples (plus two QA/QC samples) for PFAS, priority heavy metals, TRH, BTEX and PAHs.
- Assessment of new and historical groundwater results against Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018) (ANZG, 2018), NEPM (2013) and NEMP (2020) groundwater / water assessment criteria.
- Estimation of groundwater flow direction across the site by surveying the wells.
- Preparation of this report in general accordance with NSW EPA (2020) Consultants Reporting on Contaminated Land - Contaminated Land Guidelines.

2 Site Identification and Description

2.1 Site Identification

The site location is shown in Figure 1, with the site layout plan showing the sampling locations shown in Figure 2, Appendix A. Information in the following section was sourced from the Lotsearch report obtained for the site (Appendix H) and publicly available records. The site identification and land use details include:

Table 2.1: Site Identification

Title	Details
Street Address:	Lot 2 Phillip Drive, South West Rocks NSW 2431
Property Description:	Lot 2 in DP 1091323
Current Site Ownership:	Chrisbeck Pty Limited
Geographical Coordinates (Approx. centre of site):	Lat: -30.890944° Long: 153.060009°
Property Size:	Approximately 4.8 ha
Local Government Area:	Kempsey Shire Council
Zoning – Existing:	R3 – Medium Density Residential (Kempsey Local Environmental Plan (2013))

2.2 Proposed Development

The proposed development comprises a combination of retail and medium density residential land use. Development plans are presented in Appendix B.

2.3 Surrounding Land Use

Land uses immediately adjoining the Site are described as follows:

Table 2.3: Immediate Site Surrounds

Title	Details
North:	Vegetated reserve followed by Saltwater Creek, more vegetated reserve then Trial Bay Front Beach and Trial Bay.
East:	Vegetated reserve and a low density residential property, Saltwater Creek and Phillip Drive, followed by holiday park and vegetated reserve.
South:	Low density residential properties, Phillip Drive, vacant land (former Caltex terminal site), Waianbar Avenue and more low density residential properties
West:	Vegetated reserve followed by Saltwater Creek.

3 General Site Condition and Surrounding Environment

The site condition information is summarised using available information presented in the Lotsearch Report (as included in Appendix H) and publicly available records.

Table 3.1: General Site Conditions

Title	Details
Topography and Drainage:	The site generally slopes to the north / northeast towards Saltwater Creek.
Boundary Condition:	The site was bound by construction fencing along the south-eastern boundary on Phillip Drive and by residential properties along the southwestern boundary. The northern, eastern and western site boundaries were unfenced.
Vegetation:	The site was observed to contain grasses and shrubs with trees scattered throughout the site.
Visible Signs of Contamination:	No visible signs of contamination were observed during site investigation activities.
Visible Signs of Plant Stress:	Observed vegetation generally appeared to be in healthy condition.
Presence of Drums, Wastes and Fill Materials:	None observed.
Odours:	None noted during site walkover.
Condition of Buildings & Roads:	No roads or building located within site boundary.
Quality of Surface Water:	Minor observed surface water pooled in the low lying portion of the site was noted to be turbid. No odours or sheen noted.
Flood Potential:	Unknown, but considered possible given low lying portions of the site and proximity to Saltwater Creek.
Relevant Local Sensitive Environments:	Residential properties to the immediate south and across Phillip Drive. Adjoining / nearby vegetated reserve, Saltwater Creek, Trial Bay. Holiday Park to the east.
Other Relevant Information:	N/A

4 Site History

A summary of the information relating to site history is provided in Table 4.1 below. Information in the Section has been sourced from available information presented in the Lotsearch Report (as included in Appendix H), publicly available records and other available information. Further site history information is presented in Section 4.1.

Table 4.1: Summary of Site History

Title	Details
Summary of Previous Land Use & Chronological List	Based on reviewed historical information, the site has comprised vegetated vacant land, with clearing of some areas in the 1960's and 2000's.
Land Titles Records	Not available for review, however given the degree of consistency other available sources and results of this investigation, the absence of land title records is not considered to affect the outcomes of this assessment.
Historical Business Directory Records	• 1991 (20m to southwest of site): MOTOR OIL & SPIRIT DEPOTS, Caltex Oil (Aust.) Pty. Ltd., Phillip Dr. Trial Bay. South-West Rocks. 2431 • 1991 (71m east of site): BUILDERS & BUILDINGS CONSTRUCTORS, Coiling J. Constructions Bldr., 155 Phillip Dr. South-West Rocks. 2431 • 1991 / 1982 (road match only, exact location not available): Lagoon View Caravan Park, general Store and Restaurant, Phillip Dr. South-West Rocks. 2431 • 1991 (road match only, exact location not available): Macleay Saw Service., Phillip Dr. South-West Rocks. 2431 • 1982 / 1970 (road match only, exact location not available): Scalfe. S. Plmbr., Phillip Dr. South-West Rocks. 2431 • 1991 (road match only, exact location not available): MOTOR OIL & SPIRIT DEPOTS, Golden Fleece Petroleum Products, Phillip Dr., South-West Rocks 2431 • 1982 (road match only, exact location not available): MOTOR OIL & SPIRIT DEPOTS, Shell Co. of Aust. Ltd., Phillip Dr., South-West Rocks 2431 • 1970 (road match only, exact location not available): VETERINARY SURGEONS, McNiven, A. R., Phillip Drv., South-West Rocks, 2431 • No records of Dry Cleaners, Motor Garages & Service Stations or Cattle Dip Premises onsite or within site buffer
Council Records:	Not available for review, however given the degree of consistency other available sources and results of this investigation, the absence of council records is not considered to affect the outcomes of this assessment.
EPA Records:	List of NSW contaminated sites notified to EPA: • Residential area and Reserve opposite Former Caltex Terminal (On-site): Phillip Drive, South West Rocks, Other Petroleum Activity, Regulation under CLM Act not required • Former Trial Bay Caltex Depot (20m southwest of site): Phillip Drive, South West Rocks, Other Petroleum Activity, Under assessment • Former Shell Trial Bay Depot (65m west of site): Phillip Drive, South West Rocks, Other Petroleum Activity, Regulation under CLM Act not required Contaminated Land: Records of Notice: • No records in buffer Licensed Activities under the POEO Act 1997: • Kempsey Shire Council South West Rocks Sewage Treatment Works (821m to southwest of site): Belle O'Connor Street, Sewage treatment processing by small plants Former Licensed Activities under the POEO Act 1997, now revoked or Surrendered: • Four licences for application of herbicides (28m to southeast of site): Waterways throughout NSW

Title	Details
Summary of Aerial Photographs (on site and adjacent sites):	**1942:** The site comprises vegetated vacant land. The surrounding area consists of vegetated vacant land with Trial Bay Front Beach to the north. Saltwater Creek runs horizontally to the north of the site, between the site boundary and Trial Bay. A small dirt road appears to run along the south boundary of the southern portion of the site in the general position of the present day Phillip Drive. Saltwater Lagoon is located south east of the site. **1956:** The site and surrounding area appears relatively unchanged with the exception of the road on the southern bounding appears to have been widened. **1967:** Clearing of vegetation appears evident in the western portion of the site. To the south of the site, the petroleum terminal has been constructed including storage towers, other buildings and an apparent pond to the southwest. The remaining surrounding area appears relatively unchanged. **1975:** The site and surrounding area appears relatively unchanged with the exception of small dwellings constructed to the immediate south-west of the site. **1980:** The site and surrounding area appears relatively unchanged with the exception of further development of dwellings to the immediate south-west of the site and to the east and southeast of the site. **1991:** The site appears relatively unchanged. Further dwellings appear to have been constructed to the southwest and southeast of the site, with clearing of vegetation and possible earthworks to the south of the site. **1997:** The site appears relatively unchanged. Demolition and removal of the petroleum terminal to the south has occurred, with further residential construction evident to the south and east. Further clearing and earthworks are evident to the south. **2003:** The site and surrounding area appears relatively unchanged, noting some possible clearing of pathways within the site running north and east through the centre of the site. Further residential construction and development is visible to the south and east. **2010:** The site and surrounding area appears relatively unchanged, noting some possible clearing / mowing of the site surface in the west of the site. Further residential construction and development to the south. **2014:** The site and surrounding area appear relatively unchanged. **2020:** The site and surrounding area appear relatively unchanged.
SafeWork NSW Dangerous Goods Licenses/ USTs/ ASTs:	No records reviewed. Given the site itself does not have historical use as a petroleum facility, USTs are considered unlikely to be present.
Inventory of Chemicals and Wastes and their Location:	No chemicals or wastes observed onsite.
Description of Manufacturing / Industrial Processes and Location:	No records of manufacturing or industrial processes onsite were identified.
Product Spill and Loss History:	No records of product spillage or loss within the site. Contamination associated with the former Caltex Terminal o the south of the site is discussed below in Section 4.1 Previous Assessments
Discharges to Land, Air & Water:	No records of discharges to land, air or water were identified.
Complaint History:	No records of complaints relating to the site contamination status or site activities were identified.
Sewer and Service Plans:	Not reviewed.
Local Site Knowledge:	N/A.
Local Literature Review:	Refer to Section 4.1 Previous Assessments.
Permits, Licenses and Approvals:	No records identified other than those listed above under EPA Records.
Integrity Assessment	Reviewed sources of information were in general agreement. The degree of consistency suggests that the historical assessment described above has an appropriate level of accuracy.

4.1 Previous Assessments

Geosyntec was provided with several previous reports. Key findings from the most relevant of these are summarised in Table 4.2 below. Geosyntec has relied on the information in the reports as being complete and accurate and has not independently verified the results.

Table 4.2: Summary of Site History

Date	Report Objectives, Scope and Outcomes
Groundwater Technology Australia Pty Limited January 1995 Additional Drilling and Sampling for Groundwater Remediation Former Caltex Terminal Phillip Drive, South West Rocks Summary Report S8372	Background and Objective: • Groundwater technology Australia (GTA) conducted remediation activities at the former Caltex Terminal at Trial Bay. This included the installation of recovery wells and sparge wells on the formal terminal site, as well as adjacent residential properties. • During installation of recovery and sparge wells, contamination was identified in the 'coffee rock' near the boundary of the known shallow contamination plume. GTA subsequently conducted a drilling and sampling program across the former terminal as well nearby land on Phillip Drive, residential land, reserve land and Lot 2 Phillip Drive (the site subject to the current DSI). • The objective of the investigation was to assess levels and extent of deeper contamination within the coffee rock. The Scope of Work included: • Drilling of 30 boreholes and installation of 42 monitoring wells in four generally parallel lines on the former terminal. Along Phillip Drive, at the rear of the residential properties on Phillip Drive, Lot 2 Phillip Drive (the site) and reserve land. 9 of these were located in the subject site, Lot 2 Phillip Drive. • Field testing for volatile organic compounds (VOCs) • Sampling of selected soils • Measurement of groundwater parameters and sampling of groundwater • Laboratory analysis of soil and groundwater samples for petroleum hydrocarbons and lead • Sampling of selected soils in two boreholes for analysis of acid sulfate soils Key Findings Relating to Lot 2 Phillip Drive (the site): • Encountered overall geology included (noting that the summarised general soil descriptions include observations from areas outside of the site, including the former terminal and Phillip Drive): - Topsoil/Fill (road gravel) to 0.2/0.9 (not always present); - Sand (natural) light brown/cream to 2/3.5m; - Cemented and partially cemented sand (coffee rock) to 9.5/13.5m; - Sand light grey to 20m; - Sand dark grey to 23.5m+ • Groundwater flow direction was inferred to be to the north • VOCs were not detected, or were detected at low concentrations (<20ppm) in samples from wells located on Lo2 Phillip Drive (DMW13, 17, 24, 25 and 27) • Soil results indicated that total petroleum hydrocarbons (TPH), BTEX, PAH and lead were reported below laboratory practical quantitation limits (PQL) or below criteria applicable at the time of reporting for samples from boreholes within the site (DMW13, 15, 16, 17, 24, 25, 26 and 27). • Groundwater results indicated that TPH was reported below laboratory practical quantitation limits (PQL) or criteria applicable at the time of reporting (Dutch (1994) Intervention Level) for samples from wells within the site, with the exception of DMW17. Concentrations of BTEX in wells within the site were below criteria applicable at the time of reporting. Concentrations of PAH for wells within the site were below criteria applicable at the time of reporting (ANECC 1992) with the exception of DMW16. Lead was detected above applicable draft drinking water standards at the time of reporting in well DMW25, within the site. • Five soil samples (depths of 2.5m, 3.5m, 4.0m, 5.5m and 7m) from borehole location DMW17 (within Lot 2 Phillip Drive) were assessed for acid producing potential. It was reported that results indicated 'no actual or potential acid sulphate soils in the upper 7m at the locations investigated', confirming previous analysis for acid sulphate soils (previous report referred to in GTA (1995) was not available for review).

Date	Report Objectives, Scope and Outcomes
	• The investigation identified that the BTEX groundwater plume encroached onto part of the western portion of the proposed development area within the site, albeit at concentrations below site suitability criteria (see below). Soil and groundwater chemical results from boreholes and wells within the site are included in Results Summary Tables (Appendix C) and compared against current guidelines for screening purposes, however it is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data. It is noted that comparison against current guidelines finds that concentration of contaminants of potential concern are generally below adopted site suitability criteria, noting that TPH C6-C9, roughly equivalent to TRH F1 fraction, was reported at 1400 µg/L/kg in well DMW17, above the current NEPM (2013) Health Screening Level for Residential A/B land use of 1000 µg/L for TRH F1.
Regional Geotechnical Solutions Pty Ltd 16 September 2021 Rise Developments Proposed Residential Development Lot 2 Phillip Drive, South West Rocks Preliminary Geotechnical Assessment RGS32813.1 – AB	Background and Objective: • Regional Geotechnical Solutions Pty Ltd (RGS) completed geotechnical investigations for a proposed residential development at the site. The Scope of Work included: • A site walkover and mapping of site features • Excavation of 18 test pits across the site to depths up to 2.2m • Drilling of 4 boreholes to depths up to10.26 to 30.0m • Geotechnical field and laboratory testing, including acid sulfate soils screening for 60 samples. Key Findings Relating to Lot 2 Phillip Drive (the site): • Surface conditions recorded in the report noted that: - Some minor cut to fill works appeared to have been conducted int the north-western portion of the site. - The northern area of the site had been affected by clearing. - The southern area comprised open bushland. - The eastern areas had not been affected by earthworks. • Subsurface conditions in the southern elevated areas were summarised as generally comprising: - Topsoil: Comprising Silty SAND, fine to medium grained, dark brown / grey to 0.2m; overlying - Aeolian Sand: fine to medium grained, pale grey / white, loose to medium dense root affected to 0.9m; overlying - Aeolian Sand: fine to medium grained, pale grey / white, medium dense to 2.4m; overlying - Marine Sand: fine to medium grained, dark brown, very dense (indurated) to at least 10m. - Groundwater in these areas was encountered between 0.8m and 2.2m and appeared to be perched above the dense sand layer. • Subsurface conditions in the low lying areas were summarised as generally comprising: - Topsoil: Comprising Silty SAND, fine to medium grained, grey and root affected to 0.2m; overlying - Marine / Aeolian Sand: fine to medium grained, pale grey, dark grey and orange/brown, medium to very dense to about 11m and 16m; overlying - Marine Sandy Clay: high plasticity, pale grey, firm to stiff (about 1m to 2m in thickness); overlying - Marine Sand: fine to medium grained, pale grey, medium dense to very dense to about 28m; overlying - Estuarine Clay: high plasticity, dark grey, stiff to 30m. - Groundwater in these areas was encountered between 0.5m and 1.0m depth. • Findings from Acid Sulfate Soil Testing as presented in RGS (2021) are summarised below: - The net acidity concentration's exceeded the ASS Assessment Guidelines Action Criteria of 18 moles H+/ tonne for both the test pits and boreholes undertaken in the low lying areas of the site. - On the basis of the laboratory testing results summarised in Table 6, all of the materials within the low lying areas are considered ASS (see report for details). - An ASS Management Plan would therefore be required for works such as services installations and pile excavations that disturb the alluvial sand soils in this area at a rate of 10 kg/m3 in the soils within 2m of the ground surface and at a rate of 26 kg/m3 in soils below 2m from ground level.

Date	Report Objectives, Scope and Outcomes
	- Based on site features and the lab testing, the upper aeolian sand profiles are not considered to be ASS.
ECON Environmental Pty Ltd (28 June 2022) Preliminary Site Investigation, Lot 2 in DP1091323, Phillip Drive, South West Rocks NSW 2431 22-1333	Background and Objective: • The objective of the investigation was to assess the potential for site contamination, based on historical and current land use practices, and to evaluate its suitability for its intended land use and proposed development. The Scope of Work included: • Desktop historical searches • A site inspection including a walkover the entire site • Representative soil sampling (10 samples using a hand auger, 8 of which were within the proposed development area, BH3-10) up to 0.7m below ground level (bgl) • Laboratory analysis of soil samples for heavy metals, TRH, BTEX, PAH, phenols, pesticides and asbestos Key Findings Relating to Lot 2 Phillip Drive (the site): • Observations from the site inspection included the following: - The majority of the site was covered by low lying native grasses, shrubs with large trees scattered around the boundary of the subject site, with no vegetation distress observed, and no evidence of potential environmental areas of concern, - No oil staining, no odours, and no visible fragments of ACM were detected on surface soils within the investigative areas, • Subsurface conditions were summarised as comprising the following: - Fill SAND to sandy loam, moist, dark brown to white, with traces of sand, fine gravel, and rocks, 0.0-0.7m bgl - Natural Soils (residual) SAND. Coarse grained, yellow-brown to white 0.7m bgl • Observations during drilling of boreholes included: - No hydrocarbon staining was observed within any of the borehole locations, - No hydrocarbon odours were encountered within any of the borehole locations, - No fibre-containing fragments or sheeting were observed in any of the borehole samples. • Chemical results for soils were below adopted site suitability criteria for NEPM (2013) Health Investigation Level (HIL) 'A' land use. • No asbestos was detected in any of the analysed samples ECON (2022) PSI soil analytical results for samples within the proposed development area at the site have been included in the current assessment, and are presented in Results Summary Tables (Appendix C). A preliminary review of sample collection methodology and QA/QC conducted by ECON has been completed by Geosyntec, with the collected data considered to be of appropriate quality for the purposes of inclusion in the current assessment, however it is noted that no detailed QA/QC review has been conducted, and Geosyntec has not independently verified or validated the reliability of this data.
ECON Environmental Pty Ltd (24 August 2022) Preliminary Site Investigation for PFAS, Lot 2 in DP1091323, Phillip Drive, South West Rocks NSW 2431 22-1369A	Background and Objective: • The objective of the investigation was to assess the site for historical PFAS contamination. Relevant Components of the Scope of Work included: • Collection of 15 (fifteen) soil samples (Three (3) of which were within the proposed development area, PS1-3) at various depths within the western portion of the site, in addition to sampling location offsite to the west, using a hand auger. Decontamination included triple-rinsing with PFAS-free water between locations. • Laboratory analysis of soil and groundwater samples for PFAS compounds. Key Findings Relating to Lot 2 Phillip Drive (the site): • Observations from the site inspection included the following: - The majority of the site was covered by low lying native grasses, shrubs and some scattered large trees within the southern portion of the subject site

Date	Report Objectives, Scope and Outcomes
	- To the north of the subject site are coastal wetlands areas which borders the subject site for the majority of its northern boundary. - Low density residential homes border the subject site to the southwest, and Phillip Drive borders the subject site to the southeast. - No vegetation distress was observed, and no evidence of potential areas of concern was detected during the inspection, - No oil staining, no odours, and no visible fragments of ACM were detected on surface soils within the investigative areas, • Subsurface conditions were summarised as comprising the following: - Fill SAND to sandy loam, moist, dark brown/grey to white at depth, with traces of fine gravel and rocks, 0.0-0.3m bgl - Natural Soils SAND. Coarse grained, yellow brown to white 0.3-2.3m bgl - Natural Soils ROCK. Very dark coffee rock, 3.0-9.0m (based on previous drillers logs) • Observations during drilling of boreholes included: - No hydrocarbon staining was observed within any of the borehole locations, - No hydrocarbon odours were encountered within any of the borehole locations, - No fibre-containing fragments or sheeting were observed in any of the borehole samples. • PFAS results for soils were below adopted NEMP (2020) site suitability criteria for HIL 'A' land use.
General comments	Encountered subsurface conditions are generally consistent across the previous investigations, noting that: • Varying surface and shallow soils are present in different locations of the assessed areas (e.g. GTA reports gravels, which presumably relate to areas outside of the Lot 2 Phillip Street site) • Soils reported as 'FILL: Top 0-0.7m of topsoil material' in the ECON (2022) PSI are considered to be consistent with the soils generally described as natural (with thin layer of fill/topsoil in some of the elevated areas) in the previous reports (e.g. RGS, 2021) and the current DSI.

5 Geology, Hydrogeology and Hydrology

The geology, hydrogeology and hydrology of the Site are summarised in this section. This information has been sourced from the Lotsearch Report (as included in Appendix H) and publicly available records including Geological and Soil Landscape sheets, and the NSW Natural Resource Atlas for groundwater bores registered located in the vicinity of the site.

Table 5.1 Geology, Hydrogeology and Hydrology

Title	Details
Geology Map Conditions:	The south-western portion (approximately two-thirds) of the site is located on 'Coastal deposits – dune facies' (denoted as QP_bd), comprising Marine-deposited and aeolian-reworked coastal sand dunes; partially consolidated. The northeastern (approximately one-third) of the site is located on 'Estuarine interbarrier creek deposits' (denoted as QH_ei), comprising Fine- to medium-grained lithic-carbonate-quartz sand (marine-deposited), silt, clay, organic mud, peat, gravel, shell material.
Soil Map Conditions:	The southern portion (approximately three-quarters) of the site is mapped as Disturbed Terrain variant a (denoted as 9436xxa), describes as comprising 'Excavation into a range of unspecified lithologies. Sand mining is mainly in Quaternary sand dunes and Holocene gravelly alluvium. Landfill uses various rocks and soil materials, demolition rubble, industrial and household waste, and dredged estuarine sands. Depth of unconsolidated material is variable', with 'Level to hummocky terrain extensively disturbed by human activity including complete disturbance, removal or burial of soil. Variable relief and slopes. Includes quarries, tips, land reclamation and large cut and fill features. Original vegetation cleared; weeds may be abundant. (Landscape Variant xxa— Unconsolidated sandy or gravelly materials)'. The north (approximately one-quarter) of the site is mapped as Macleay Arm soil landscape (denoted as 9436ma), described as comprising 'Deep, unconsolidated Quaternary sands (Qas) comprised of mixed estuarine and barrier sands' with '60-100cm poorly drained oxyaquic and extratidal hydrosols (humic gleys and solonchaks)'.
Acid Sulfate Soils (ASS):	The northern portion (approximately half) of the site is mapped as ASS Class 2 (Acid sulfate soils in a class 2 area are likely to be found below the natural ground surface - Works below natural ground surface present an environmental risk; Works by which the water table is likely to be lowered present an environmental risk). The southern portion (approximately half) of the site is mapped as ASS Class 4 (Acid sulfate soils in a class 4 area are likely to be found beyond 2 metres below the natural ground surface)
Salinity:	There is no Dryland Salinity – National Assessment data onsite or within the site buffer.
Ground Conditions Summary from borehole records:	Refer to previous assessments above and DSI borehole logs presented in Appendix I.
Location of Fill Materials:	Based on available data, shallow fill soils / topsoils are noted to be present in some areas of the site particularly parts the elevated southern regions.
Regional Hydrogeology:	Based on available historic data and topographic information, regional groundwater flow is considered to flow generally to the north.
Summary of Publicly Listed Wells:	A search of the State Department of Primary Industries Groundwater map showed forty-four (44) groundwater wells within a 500m radius, and four (4) within a 100m radius of the subject site: • GW302106: Water Supply, final depth 12.00m bgl, standing water level (SWL) 1.00m bgl, 23m West of the site • GW306927: Water Supply, final depth 8.00m bgl, SWL unknown, 56m South of the site • GW064247: Water Supply, final depth 19.00m bgl, SWL unknown, 66m Southeast of the site • GW302870: Monitoring, final depth 3.50m bgl, SWL unknown, 86m West of the site A full list is provided in the Lotsearch Report (Attachment H).

Title	Details
Depth to Groundwater:	Recent site specific records (RGS (2021) indicate groundwater depth between 0.8m and 2.2m bgl in the southern elevated areas, and between 0.5m and 1.0m bgl in the low lying areas of the site.
Use of Water Abstraction:	Groundwater abstraction for consumption is not known to occur within the site boundary. Some publicly listed wells in the vicinity of the site are listed as being for 'water supply' purposes (see above, Summary of Publicly Listed Wells).
Nearest Water Body:	Saltwater Creek, to the north of the site, followed by Trial Bay.
Direction of Surface Water Run Off:	Surface waters are likely to infiltrate directly into site soils or flow generally to the northeast under saturated conditions, following the local topography.
Background Water Quality:	Groundwater results from previous investigations are documented in Section 4.1. Background water quality of surface waters were not available for review as part fo the current scope.
Preferential Water Courses:	Preferential flow of surface waters is generally expected to be to the northeast following local topography.
Summary of Local Meteorology:	Annual Mean Max Temp: 23.4°C Annual Mean Min Temp: 15.7°C Annual Mean Rainfall: 1488.9 mm

6 Sampling Analysis and Quality Plan

6.1 Data Quality Objectives

The data quality objectives (DQO) process is a systematic planning tool based on the scientific method for establishing criteria for data quality and for developing data collection designs. The DQO defines the experimental process required to test a hypothesis. By using the DQO process to plan the investigation effort, the relevant parties can improve the effectiveness, efficiency and defensibility of a decision in a resource and cost-effective manner.

The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. The seven-step DQO process adopted for the works was as follows:

- Step 1 – Defining the Problem. The first step in the DQO process is to 'define the problem' that has initiated the investigation;
- Step 2 – Identify the Decision. The second step in the process is to define the decision statement that the study will attempt to resolve;
- Step 3 – Identify Inputs to the Decision. In this step, the different types of information needed to resolve the decision statement are identified;
- Step 4 – Define the Study Boundaries;
- Step 5 – Develop a Decision Rule;
- Step 6 – Specify Limits on Decision Errors; and
- Step 7 – Optimise the Design for obtaining the Data.

The DQOs are detailed in Table 4.1 below, the DQIs are presented in Appendix D.

Table 6.1: Data Quality Objectives

1. State the problem	The primary objectives are to: • Identify the potential for land contamination associated with past and present land use and to determine whether the site is suitable for the proposed development from a contamination perspective. • Assess for the presence of PFAS in site soils and groundwater. • Address contamination-related items from the SOFAC by addressing the above two points. The main problems are: • There is uncertainty surrounding the contamination status of the site given previous contaminating activities at the former Caltex Terminal to the south (up hydraulic gradient) of the site. • Historic PFAS data for the site is limited with further characterisation required, including for soils and groundwater. • If contamination is present at the site which presents a risk to human health and/or the environment, are management and/or remedial actions required to reduce this risk.
2. Identify the decision	The following decisions are required to be made: • Do the chemical concentrations in soil and/or groundwater (including PFAS) pose a risk to human health and/or the environment in the context of the current and proposed site uses? • If PFAS are present in site soils and/or groundwater, does the available data indicate the former Caltex Terminal as a possible offsite source?
3. Identify inputs to the decision	The information inputs required include: • Relevant historical data, including previous assessments. • Conceptual site model presented in Section 10. • Observations made during the field works.

	• Field and chemical testing results from the fieldworks. • Adopted site criteria presented in Section 8.
4. Define the boundaries of the study	The lateral study boundaries are defined as the site boundary as shown in Figure 2 and the vertical study boundary is defined by ground surface to the maximum depth of investigative drilling which was 5 m bgl. The temporal boundary is determined by the timeframe of the investigation's scope of works.
5. Develop a decision rule	The following criteria will be adopted with respect to the decision-making process: 1. Do the chemical concentrations in soil and/or groundwater (including PFAS) pose a risk to human health and/or the environment in the context of the current and proposed site uses? • If the contaminants of concern (excluding PFAS) are less than the adopted site criteria then the decision is no, then no further action may be required. • If the contaminants of concern exceed the adopted criteria then the decision is yes and further assessment and/or remediation and/or management may be required. 2. If PFAS are present in site soils and/or groundwater, does available data indicate the former Caltex Terminal as a possible offsite source? • If PFAS concentrations demonstrate a discernible pattern (e.g. higher concentrations in proximity to the former Caltex Terminal site), the answer is yes and the former Caltex Terminal will be identified as a possible source. • If PFAS concentrations do not demonstrate a discernible pattern, the answer is uncertain and further assessment may be required to identify the potential source(s).
6. Acceptable limits on decision error	There are two main sources of false results which may cause decision errors: • Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and • Measurement errors, which occur during sample collection, handling, preparation, analysis, and data reduction. The pre-determined data quality indicators (DQIs) are discussed in Table D1, Appendix D, and relate to precision, accuracy, representativeness, comparability and completeness (PARCC parameters) as required by Step 6 of the DQO process.
7. Optimise the design for obtaining data	Based on the previous Steps 1 to 6 of the DQO process, the optimal design for obtaining the required data is presented in the following sections.

6.2 Sampling and Analysis Plan

The rationale behind the sampling and analysis plan is presented in the sections below.

6.2.1 Sampling Pattern

The selection of sampling locations was based on a combination of grid-based and targeted sampling to provide coverage of the site an allow for estimation of groundwater flow direction. It should be noted that sampling was conducted in areas accessible with a drill rig, and safely accessible by foot for surface soil samples.

Using the combined sample pool of Geosyntec (2022) and ECON (2022) sample locations, broad coverage of the site is achieved with a total of 27 samples from a total of 23 borehole or shallow sample locations. This is noted to be below the minimum sampling density of 52 to 55 samples for a site size of 4.5ha to 5 ha, respectively, as presented in the NSW EPA (2022) Sampling Design Guidelines, however given the consistency of the current data among sampling locations, consistency of current data with recent historic data (ECON (2022), as well as older historic data (GTA (1995)), and the general consistency of subsurface conditions recorded across the site, the obtained sampling density is considered to be appropriate for the purposes of this assessment. The sampling design allows a statistical assessment of contaminants of concern across the site rather than identification of a potential hotspot, which is considered appropriate given the lack of point source contamination sources from the historical land uses of the site.

Sampling locations and details are listed below in Table 6.2, with sampling locations displayed in Figure 2, Appendix A.

Table 6.2: Sampling Locations and Details

Sampling Location	Sampling Details & Rationale
Geosyntec 2022 Sample Locations	
GBH1, GBH2	Borehole locations in the west of the development area in proximity to the previous hydrocarbon plume documented in GTA (1995) and downgradient of the former Caltex Terminal to determine concentrations of PFAS and general contaminants of potential concern (COPC) in soils in this area.
GBH3	Borehole location in the south of the site in proximity to the former Caltex Terminal across Phillip Drive to determine concentrations of PFAS and general COPC in soils in this area.
GBH4, GBH5 and GBH5	Borehole locations in the south and southeast of the site to determine concentrations of PFAS and general COPC in soils in this area.
GBH6 and GHB7	Borehole locations in the north of the site to determine concentrations of PFAS and general COPC in soils in this area.
S-1, S-2, S-3 and S-4	Shallow soil sample locations to determine concentrations of PFAS across the site surface
GMW1	Groundwater well location in the west of the development area in proximity to the previous hydrocarbon plume documented in GTA (1995) and downgradient of the former Caltex Terminal to determine concentrations of PFAS and general COPC in groundwater in this area, and to assist with estimation of groundwater flow direction.
GMW1	Groundwater well location in the west of the development area in along the southern boundary, in proximity to the previous hydrocarbon plume documented in GTA (1995) and downgradient of the former Caltex Terminal to determine groundwater conditions (PFAS and general COPC) entering this portion of the site and to assist with estimation of groundwater flow direction.
GMW3	Groundwater well location along the southern site boundary to determine groundwater conditions (PFAS and general COPC) entering this portion of the site and to assist with estimation of groundwater flow direction.
GMW4, GMW5 and GMW5	Groundwater well locations in the south and southeast of the site to determine groundwater conditions (PFAS and general COPC) entering and present in this portion of the site and to assist with estimation of groundwater flow direction.
GMW6 and GMW7	Groundwater well locations in the north of the site to determine concentrations of PFAS and general contaminants of potential concern (COPC) in this portion of the site
Sample Locations from Previous Investigations	
BH3-BH10	ECON (2022) PSI borehole locations providing site coverage for assessment of general COPC
DMW13,14,15(D,M,S), 16,17,24,25(D,M,S),26, and 27	Historic GTA (1995) borehole and groundwater well locations (no longer present) to assess the nature and extent of a petroleum hydrocarbon plume originating from former Caltex Terminal to the south of the site.

6.2.2 Soil Sampling Methodology

Intrusive sampling was carried out on 5 and 6 September 2022 using a drill rig fitted with a solid flight auger, with push tube generally conducted for the first 2 to 3m until coffee rock was encountered. The following procedure was adopted:

- Ground conditions were logged with detail on stratigraphy, any discolouration, staining, odours, moisture or other indicators of contamination.

- Soil samples were collected with clean disposable nitrile gloves directly from the push tubes or auger flights with care taken to collect soil that had not come in contact with the auger stem. Samples were then placed in laboratory-supplied sample containers with Teflon sealed lid for sample containers for general COPC and PFAS-free HDPE containers for PFAS analysis.
- Samples were placed in an iced Esky to cool samples to suitably low temperatures for analysis.
- Containers were labelled with the sample number, project number and date with samples despatched under a chain of custody.
- Samples were transported to the primary laboratory, Eurofins in Sandgate, NSW, after the completion of soil sampling activities to allow technical holding times for analysis to be achieved and to minimise any interference with the samples. Inter-laboratory testing of triplicate samples was conducted by Envirolab Services in Sydney.

Surface samples S-1 to S-4 were collected on 7 September 2022 using a gloved hand and spade, with care taken to collect soil that had not come in contact with the spade.

6.2.3 PID Soil Screening

Soil samples were field-screened for volatile compounds using a calibrated PID provided by Airmet Scientific (calibration certificate provided in Appendix E). PID readings, visual and olfactory indicators were used to aid in sample selection and scheduling samples for chemical analysis.

The following is a summary of the PID screening procedure:

- Placement of a split of the soil sample into a zip-lock plastic bag, then sealed
- Measurement of background VOC concentrations in ambient air prior to each reading to account for sensor drift
- Using the point of the PID, punch a small hole in the bag. Place the tip of the PID in the bag and monitor the readout and note the maximum concentration during the recording period
- PID readings were observed at all sampling locations with screening results ranging from 0.4 to 1.8 ppm (close to background readings)

6.2.4 Groundwater Well installation Methodology

Boreholes GBH1 to GBH8 were drilled and then converted into groundwater monitoring wells GMW1 to GMW8. Each well was constructed with lengths of Class 18 50mm diameter casing. A length of machine slotted casing was positioned to intercept groundwater, with lengths of solid casing extending to the surface. The well annulus was backfilled with gravel pack to approximately 0.5m above the top of screened interval. An approximate 0.5m thick bentonite seal placed over the gravel pack to the top of the casing. The wells were extended above ground level and finished with monument covers.

Newly installed groundwater wells were developed after installation through the use of a stainless-steel bailer by removal of at least three well volumes, until sediment had been removed to the extent practicable, noting a high rate of recharge in all wells.

6.2.5 Groundwater Sampling Methodology

After installation, groundwater well standing water levels and total well depths were measured to establish the available water column and PFAS-suitable HydraSleeves were deployed in each well. The wells were then allowed to equilibrate for at least 48 hours prior to sampling. HydraSleeve sampling was conducted as follows:

- Standing water levels were measured using an interface probe.
- A grab sample was collected by removing the HydraSleeve and placement of the water sample directly into laboratory prepared sampling containers.

- Water quality parameters were recorded using a calibrated water quality meter that recorded pH, redox potential (Eh), electrical conductivity (EC), dissolved oxygen (DO) and temperature. The calibration certificate is presented in Appendix E.
- One well, GME3, did not have sufficient water column to allow a HydraSleeve sample to be collected. Instead, a dedicated HDPE clear plastic bailer was used to purge and sample the well. An equipment blank sample was collected by running laboratory supplied DI water through the newly opened bailer and into a laboratory supplied container for analysis of PFAS given the bailer used was not a purpose-built 'PFAS-free' bailer.
- GMW3 was purged using the bailer with water quality parameters recorded during purging.
- Sampling was conducted when the above physicochemical parameters had stabilised to between +/-10%.
- A new dedicated bailer was used at this well to prevent any potential cross contamination.
- Containers were labelled with the sample number, project number and date with samples despatched under a chain of custody.
- Samples were placed in an iced Esky to cool samples to suitably low temperature for transportation to the laboratory.
- Samples were transported to the primary laboratory, Eurofins in Sandgate, NSW, after the completion of groundwater sampling activities to allow technical holding times for analysis to be achieved.

6.2.6 Analytical Schedule

Soil samples were selectively analysed for PFAS, heavy metals, TRH, BTEX and PAH.

Groundwater samples were analysed for PFAS, heavy metals, TRH, BTEX and PAH.

6.2.7 Field QA/QC Sampling

The methodology for obtaining QA/QC samples was conducted as follows:

Duplicate Samples

In accordance with NEPM (2013), at least 5% of soil samples and groundwater samples were duplicates collected in the field for analysis at the primary laboratory. They were collected from the same sampling point and divided into two separate and unrelated sample containers for analysis at the same laboratory (intra-laboratory precision).

- Soil duplicate: DUP-1 = GBH3_0.1-0.3 (soil)
- Groundwater duplicate: DUP1W = GMW1 (groundwater)

Triplicate Split Samples

At least 5% of soil samples and groundwater samples were duplicates collected in the field for analysis at the secondary laboratory. They were collected from the same sampling point and divided into two separate and unrelated sample containers for analysis at the secondary laboratory (inter-laboratory precision).

- Soil triplicate: TRIP-1 = GBH3_0.1-0.3 (soil)
- Groundwater triplicate: TRIP1W = GMW1 (groundwater)

Trip Spike and Trip Blank

Trip spike and trip blank were tested as part of the soil sampling and groundwater events. Trip spike samples are held during field sampling to assess loss of volatile from samples during transit, while trip blanks are collected to assess whether contamination may have been introduced to samples during shipping and field handling activities.

Equipment Blank (Bailer)

An equipment blank sample (EB) was collected from the clear plastic bailer used to sample GMW3 by running laboratory supplied DI water through the newly opened bailer and into a laboratory supplied container for analysis of PFAS given the bailer used was not a purpose-built 'PFAS-free' bailer. This was conducted prior to use of the bailer so that any trace detections of PFAS obtained from EB could be subtracted from any positive result obtained from GMW3.

7 Evaluation of QA/QC

Field QA/QC

Soil samples were taken with clean disposable nitrile gloves directly from the auger flights with care taken to collect soil that had not come in contact with the auger stem, or spade for shallow soil samples. Samples were then placed in laboratory-supplied sample containers with Teflon sealed lid for sample containers for general COPC and PFAS-free HDPE containers for PFAS analysis.

Groundwater samples were collected using clean dedicated HydraSleeves (or bailer for GMW3) at each well to prevent any potential cross contamination and were placed into laboratory supplied containers appropriate for the selected analytes.

Trip Spike, Trip Blank and Equipment Blank (Bailer)

Trip spike recoveries were reported within the accepted limits (70-130%) for soil and groundwater trip spikes, indicating no loss of volatiles form samples during transit.

Trip blank results for soil and groundwater were below laboratory detection limits, indicating no cross-contamination during shipping and field handling activities.

EB returned PFAS results below laboratory limits of reporting (LOR) with the exception of PFOS at 0.002 µg/L, marginally above the detection limit of 0.001 µg/L. GMW3 ultimately returned PFAS results all below laboratory detection limits, and therefore the trace detection in EB does not change the outcome of the assessment and is not required to determine PFAS concentrations in GMW3.

Trip spike, trip blank and equipment blank results are presented in Appendix F.

The QA/QC results for soil and groundwater duplicate (intra-laboratory) and triplicate (inter-laboratory) samples are summarised below with results presented in Appendix F.

Based on the information referenced above, it was concluded that the soil data is of an acceptable quality to achieve the objectives of this study, with the following comments:

a. Soil Relative Percent Differences (RPDs) calculated for inter-laboratory and intra-laboratory samples for some of TRH fractions F1, F2, F3 and F4, arsenic, chromium, copper, lead, nickel and zinc are indicative of heterogeneous composition within the fill material.
b. Groundwater RPDs calculated for the inter-laboratory samples for mercury are attributable to detections being close to the detection limit.

Laboratory QA/QC

Samples were received and analysed by the primary and secondary laboratories at suitably low temperatures and within sample holding times.

Detailed QA/QC results are presented on the laboratory testing certificates presented in Appendix C and summarised in Table G-1 in Appendix G.

8 Site Assessment Criteria

Geosyntec understands that the proposed development consists of medium density residential and retail land use, including some landscaped areas.

As a conservative measure, the criteria adopted for the site comprised criteria for low density residential land use, or 'HIL A' land use type as defined in NEPM (2013).

8.1 Assessment Criteria for Soil

Soil analytical results were assessed against the guidelines listed below, with the adopted soil criteria summarised in Table 7.1:

- National Environment Protection Measure (NEPM) (2013) Health Investigation Levels: **HIL A Low Density Residential** use from Table 1A(1)
- NEPM (2013) Health Screening Levels: **HSL A & HSL B Low – High Density Residential** use for **sand soil** taken from Table 1A(3)
- NEPM (2013) Ecological Investigation Levels: **Urban Residential and Public Open Space** use from table 1B(5), noting that conservative EILs were calculated for chromium (VI), copper, lead, nickel and zinc using an ambient background concentration based on the lowest concentration obtained from the Geosyntec (2022) data, pH 4 / 4.5 (as per NEPM (2013) Tables 1B(1-5), CEC 5 and low clay content
- NEPM (2013) Ecological Screening Levels: **Urban Residential and Public Open Space** use from table 1B(6)

Assessment Criteria for PFAS in Soil

- PFAS NEMP (2020) Health Investigation Level: **HIL A Residential with Garden/Accessible soil** from Table 2
- PFAS NEMP (2020) Ecological indirect exposure, for **all land uses** from Table 3
- PFAS NEMP (2020) Ecological direct exposure for **all land uses** from Table 3

Table 8.1: Adopted Soil Site Suitability Criteria (mg/kg)

Criteria	Soil HIL A Low Density Residential	Soil HSL A&B Residential for 0m to <1m Depth and Sand Soil Type	Soil EIL Urban Residential and Public Open Space	Soil ESL Urban Residential and Public Open, Coarse Soil Type	Hydrocarbon Management Limits for Residential, parkland and public open space, Coarse Soil Type
TRH					
F1	-	45	-	180	700
F2	-	110	-	120	1,000
F3 (>C16-C34)	-	-	-	300	2,500
F4 (>C34-C40)	-	-	-	2,800	10,000
BTEX					
Benzene	-	0.5	-	50	-
Toluene	-	160	-	85	-

Criteria	Soil HIL A Low Density Residential	Soil HSL A&B Residential for 0m to <1m Depth and Sand Soil Type	Soil EIL Urban Residential and Public Open Space	Soil ESL Urban Residential and Public Open, Coarse Soil Type	Hydrocarbon Management Limits for Residential, parkland and public open space, Coarse Soil Type
Ethylbenzene	-	55	-	70	-
Xylenes (Total)	-	40	-	105	-
PAHs					
Naphthalene	-	3	170	-	-
Benzo(a)pyrene	4 (TEQ)	-	-	0.7	-
Total PAHs	300	-	-	-	-
Heavy Metals					
Arsenic	100	-	100	-	-
Cadmium	20	-	-	-	-
Chromium (VI)	100	-	190	-	-
Copper	6,000	-	60	-	-
Lead	300	-	1,100	-	-
Mercury	40	-	-	-	-
Nickel	400	-	30	-	-
Zinc	7,400	-	70	-	-
OCPs					
DDT+DDE+DDD	240	-	-	-	-
DDT	-	-	100	-	-
Aldrin and dieldrin	6	-	-	-	-
Chlordane	50	-	-	-	-
Endosulfan	270	-	-	-	-
Endrin	10	-	-	-	-
Heptachlor	6	-	-	-	-
HCB	10	-	-	-	-
Methoxychlor	300	-	-	-	-
PCB					
PCB	1				-
Phenols					
Phenol	3,000	-	-	-	-
Pentachlorophenol	100	-	-	-	-
Asbestos					
Asbestos	Presence	-	-	-	-

Table 8.2: Adopted PFAS (NEMP) Assessment Criteria for Soil (mg/kg)

Criteria	PFAS NEMP 2020 Residential with garden/accessible soil (HIL A)	PFAS NEMP 2020 Ecological direct exposure	PFAS NEMP 2020 Ecological indirect exposure
PFOA	0.1	-	10
PFHxS + PFOS	0.01	-	-
PFOS		1	0.01

8.2 Assessment Criteria for Groundwater

Groundwater analytical results were assessed against the guidelines listed below, with adopted groundwater criteria summarised in Table 7.3:

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) (2018) **Default Guideline Values (DGVs)** for 95% protection level for Marine Waters as the nearest receiving waterway is Saltwater Creek which flows into Trial Bay.
- NEPM (2013) Groundwater Investigation Levels **(GILs) for Fresh Waters** taken from Table 1C. Note that the values are consistent with ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
- NEPM (2013) Groundwater HSLs: **HSL A & HSL B Low – High Density Residential** use for **sand soil** taken from Table 1A(4). Whilst it is noted that standing water levels recorded in some of the groundwater wells onsite were less than 2.0m bgl in several locations, and in this circumstance HSL presented in NEPM should not be applied, HSL A criteria have nonetheless been adopted as a screening tool for this investigation.

Assessment Criteria for PFAS in Groundwater

- PFAS NEMP (2020) Tolerable daily intake (TDI) from Table 1.
- PFAS NEMP (2020) Drinking water quality guideline value from Table 1.
- PFAS NEMP (2020) Recreational water quality guideline value from Table 1.
- PFAS NEMP (2020) Interim marine 99% species protection (high value conservation systems) from Table 5. NEMP (2020) Table 5 Freshwater Note 3 states ‘The WQGs advise that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and bio-magnify in wildlife.’ NEPM (2020) Table 5 interim marine Note 2 states ‘The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction.’
- PFAS NEMP (2020) Interim marine 95% species protection is also used an additional screening criterion.

Table 8.3: Adopted Groundwater Site Suitability Criteria

Groundwater Assessment Criteria	ANZG (2018) DGVs / NEPM (2013) GILs, for Marine Waters, 95% (µg/L)	Groundwater HSL A&B Residential, Sand Soil Type (mg/L), 2m to <4m
Heavy Metals		
Arsenic	13 / 24^	-
Cadmium	55 (ANZG) / 7 (NEPM)	-
Chromium (VI)	27 / 4.4^^	-
Copper	1.3	-
Lead	4.4	-
Mercury	0.4 (ANZG) / 0.1 (NEPM)	-
Nickel	70 (ANZG) / 7 (ANZG)	-
Zinc	15	-
Cyanide (as un-ionised Cn)	4	-
PAHs		
Benzo (a) Pyrene	0.2**	-
BTEXN & TRH		
Benzene	700 (ANZG) / 500 (NEPM)	800
Toluene	180	NL
Ethylbenzene	80	NL
Xylenes (o)	75 (ANZG-unknown protection level) / 350 (NEPM)	-
Xylenes (m+p)	200 (NEPM – as p-xylene only)	-
Xylenes (Total)	-	NL
Naphthalene	70 (ANZG) / 50 (NEPM)	NL
F1	-	1,000
F2	-	1,000

*Fresh Waters Investigation Level used in absence of Marine Investigation Level.
**Low Reliability value used in absence of Marine/Fresh Waters Investigation Levels.
^ANZG 0.013mg/L = AsV ; 0.024mg/L = AsIII ^^ANZG/NEPM 27 µg/L = CrIII unknown protection level ; 4.4 µg/L = CrVI

Table 8.2: Adopted PFAS (NEMP) Assessment Criteria for Groundwater (µg/L)

Criteria	PFAS NEMP 2020 Drinking Water	PFAS NEMP 2020 Interim Marine 99%	PFAS NEMP 2020 Interim Marine 95%	PFAS NEMP 2020 Recreational Water
PFOA	0.56	19	220	10
PFHxS + PFOS	0.07	-	-	2
PFOS	-	0.00023	0.13	-

9 Field Observations and Laboratory Results

9.1 Field Observations

The key observations made during the fieldworks conducted are summarised as follows (refer to borehole logs in Appendix I):

- Surface conditions consisted of unsealed surface over the entire site, with grass cover over most of the site and low shrubs present in the southern elevated areas. Trees were scattered across the site, with the highest coverage in the southern and south-eastern areas.
- No structures were present at on the site. No observations of potential asbestos containing material, chemical spillage, staining or odours were observed on the site surface during the inspection.
- The ground conditions are documented in borehole logs presented in Appendix I;
- Fill/topsoil materials were encountered in three boreholes in the south-western portion of the site (GBH1, 2 and 3), with other boreholes encountering natural soil immediately. The thickness of the fill/topsoils where present generally ranged between 0.05m and 0.3m.
- Underlying natural soils in the southern elevated areas (GBH1, 2, 3, 4, 5 and 8) generally comprised sands to depths ranging from 1.8m to 3.0 m bgl, followed by cemented sands ('coffee rock') with further underlying layers of uncemented sands in some locations.
- Natural soils in the northern lower lying areas comprised silty sands underlain by sands to end depth (5m bgl) in GBH6 and 2.5m bgl in GBH7, which was underlain by coffee rock and sands.
- No anthropogenic materials were observed in site soils during drilling works.
- A possible hydrocarbon odour was noted at approximately 2.7m in borehole GBH1, with slight sulfur odour noted after approximately 3m.
- PID readings across all boreholes ranged between 0.4 and 1.8ppm, close to background levels.
- No soil staining was observed in soils during drilling.
- No potentially asbestos containing fibre cement fragments were observed during drilling.
- Ground conditions encountered during this current investigation were generally similar to those reported in the previous investigations outlined in Section 4.1.
- Offsite activities observed during the site walkover included residential land use to the south and east, with reserve land to the west and north. No potentially contaminating activities were observed.

9.2 Soil Results

Historic analytical data from the ECON (2022) investigations and GTA (1995) are considered along with data collected as part of the current DSI in the results section of this report for completeness, noting that external data is presented as reported in their respective reports, with no independent verification or validation of the reliability of this data.

Geosyntec (2022) Results

The soil analytical results reported concentrations of the contaminants of potential concern below the adopted site assessment criteria with the exception of the following:

- Sample GHB3_0.1-0.3 (duplicate) which reported zinc at a concentration of 170 mg/kg, above NEPM (2013) conservatively calculated EIL criteria.

PFAS were reported below detection limits for all tested soils samples.

Historic Results

Historical results from ECON (2022) investigations and GTA (1995) are also noted to be below adopted criteria, with ECON (2022) PFAS results reported below laboratory LOR.

9.3 Groundwater Observations

The following section presents an overview of field observations of groundwater encountered during groundwater sampling activities. Copies of groundwater monitoring event (GME) field sheets are provided in Appendix K.

- Standing water levels corrected based on stick-up height were measured between +0.08m bgl in GMW7 (indicating saturated ground conditions) and 2.51m bgl in GMW5.
- Based on the relative groundwater levels obtained from groundwater sampling and surveying, groundwater direction flow was inferred in a north-easterly direction. Relative groundwater depth summary data are displayed below in Table 9.1 and inferred groundwater flow direction withy contours is presented in Figure 5.
- No phase separated hydrocarbon (PSH), hydrocarbon sheen or odour was observed during groundwater sampling.
- A sulfur/organic type odour was noted from GMW1.
- Groundwater quality field parameters are summarised below: in Table 9.2.

Table 9.1 Relative Groundwater Depth Summary Data

Well ID	Relative Level, TOC (m)*	Standing Water Level, TOC (m)	Relative Groundwater Depth (m)
GMW1	3.5	1.07	2.43
GMW2	4.43	1.38	3.05
GMW3	6.23	2.39	3.84
GMW4	5.05	1.64	3.41
GMW5	5.96	2.51	3.45
GMW6	2.34	1.13	1.21
GMW7	2.5	0.44	2.06
GMW8	6.98	2.71	4.27

*Calculated based on RL of natural ground level + well stick-up height.

Table 8.2 Groundwater Physiochemical Parameters

Well ID	pH	Temp (°C)	Conductivity (mS/cm)	Dissolved Oxygen (ppm)	Redox (mV)	Comments
GMW1	5.94	17.2	0.091	2.63	-125.1	Clear to slightly turbid, sulfidic/organic odour, no sheen
GMW2	6.36	17.9	0.069	2.46	-128.1	Clear to slightly turbid, sulfidic odour no sheen
GMW3	5.70	16.3	0.046	9.42	116.3	Turbid, no odour or sheen
GMW4	4.85	19.1	0.121	4.1	81.1	Clear, brown, no odour or sheen
GMW5	5.16	19.9	0.113	2.49	129.6	Slightly turbid, no odour or sheen
GMW6	6.20	17.5	0.077	3.92	101.4	Slightly turbid, no odour or sheen
GMW7	6.14	19.5	0.127	2.28	99.7	Turbid, no odour or sheen
GMW8	5.29	18.7	0.116	3.29	-9.8	Very turbid/brown, no odour or sheen

Groundwater conditions were neutral to slight acidic (pH 4.85 to 6.36), which likely reflects the acid generating potential of the soils and limited buffering capacity. Both reducing and oxidising conditions were recorded in groundwater. Groundwater conductivity was generally consistent across the site, ranging between 0.046 mS/cm and 0.127 mS/cm, indicating fresh groundwater conditions.

9.4 Groundwater Results

Historic analytical data from the ECON (2022) investigations and GTA (1995) are considered along with data collected as part of the current DSI in the results section of this report for completeness, noting that external data is presented as reported in their respective reports, with no independent verification or validation of the reliability of this data.

Geosyntec (2022) Results

The groundwater analytical results reported concentrations of the contaminants of potential concern below the adopted site assessment criteria with the exception of the following:

- PFOS in wells GMW1, 2, 5, 7 and 8, was reported at concentrations ranging between 0.003 µg/L and 0.022 µg/L, above the very conservative NEMP (2020) interim marine DGV for 99% species protection. It is noted that results below the laboratory LOR in wells GMW3, 4 and 6 do not preclude the possibility of concentrations above the 99% protection level in these wells, given that the detection limit (0.001 µg/L) is higher than this criterion (0.00023 µg/L)
- Copper in wells GMW3, 7 and 8, reported at concentrations ranging between 0.003 mg/L and 0.009 mg/L, slightly above adopted ANZG (2018) / NEPM (2013) marine criteria of 0.0013 mg/L.
- Mercury in well GMW5, reported at a concentration of 0.0003 mg/L, marginally above adopted ANZG (2018) / NEPM (2013) marine criteria of 0.0001 mg/L.
- Nickel in wells GMW5, 6, 7 and 8, reported at concentrations ranging between 0.008 mg/L and 0.027 mg/L, slightly above adopted NEPM (2013) marine criteria of 0.007 mg/L.
- Zinc in wells GMW3 and 8, reported at concentrations of 0.026 mg/L and 0.061 mg/L, respectively, slightly above adopted ANZG (2018) / NEPM (2013) marine criteria of 0.015 mg/L.

Historical Results

Historical groundwater analytical results reported concentrations of the contaminants of potential concern below the adopted site assessment criteria with the exception of the following:

GTA (1995)

- Lead in wells DMW14, 17, 25M and 25S, reported at concentrations ranging between 0.005 mg/L and 0.015 mg/L, some of which were marginally above adopted NEPM (2013) marine criteria of 0.0044 mg/L. It is noted that the laboratory LOR for this historical data is 0.005mg/L, which is greater than the adopted criteria.
- Although not a discrete exceedance given the use of different hydrocarbon fractions as to what are presented in NEPM (2013), GTA (1995) well DMW17 reported a concentration of TPH fraction C6-C9 of 1400 µg/L. If treated as the roughly equivalent NEPM (2013) TRH fraction >C6-C10 (F1), this could be considered an exceedance of the NEPM (2013) HSL for F1, of 1000 µg/L. This result has conservatively been included for completeness.

10 Conceptual Site Model and Discussion

Activity & Potential Contaminants	Potentially Affected Media	Potential Human and Ecological Receptors	Potential Exposure Pathways	Discussion
Historical contaminating activities from the former Caltex Terminal to the south of the site. PFAS, TRH/TPH, BTEX, PAH, Lead	• Soil • Groundwater • Surface Water • Soil vapour	Potential human receptors may include: • Current site occupants and visitors. • Future occupants, construction workers, intrusive maintenance workers, site users and visitors. Potential ecological receptors may include those present in: • Adjoining reserve areas • Saltwater Creek and Saltwater Lagoon • Trial Bay	Potential exposure pathways include: • Accidental ingestion of soil or groundwater. • Accidental inhalation of soil. • Dermal contact with soil and/or groundwater. • Vapour intrusion into future site buildings and inhalation by occupants. • Leaching or migration of contaminants into the underlying groundwater. • Uptake by nearby ecological receptors	Remediation of the former Caltex Terminal is known to have occurred based on available information in GTA (1995), with the use of recovery and sparging wells. Although no specific site validation documentation was available for review, risk to current and future human receptors is considered to be low for the following reasons: • The site (Lot 2 Phillip drive) is listed as not requiring regulation under the CLM Act on the NSW EPA Contaminated Site Register. • Concentrations of COPC, including hydrocarbons and PFAS were reported below adopted human health criteria in soils and groundwater at the site, including locations downgradient from the former Caltex Terminal. This indicates minimal current impact from the former terminal site. • The historical GTA (1995) detection of TPH fraction above currently applicable guidelines in DMW17 is not considered to represent a risk based on the following: - This locations is outside of the currently proposed development footprint - 27 years have passed since the above concentration was reported and significant natural attenuation would be expected to have occurred since then, especially since the contamination source in the former Caltex Terminal was remediated - Recent monitoring documented in this report did not identify any concentrations similar to the above historical result This discounts vapour intrusion as a viable pathway of exposure based on available data.

- Historical GTA (1995) detections of lead above currently applicable criteria are not considered to be relevant at this current stage of investigation, as current data demonstrate that lead falls below applicable groundwater criteria.
- The potential presence of contaminated soils and groundwater should still be considered for any proposed excavation and construction activities. Measures should be adopted during site works to avoid any accidental ingestion or inhalation of potential contaminants in soil and/or groundwater.

The former Caltex Terminal was identified as a possible source of PFAS detected in site groundwater for the following reasons:

- The former Terminal Site is the only site identified in the vicinity of the subject site likely to have historically employed potentially PFAS-containing firefighting foams.
- No potentially PFAS-contaminating historical activities were identified for the site itself.
- Groundwater flow direction was inferred to be to the north / northeast. Accordingly, the site is located downgradient from the former Caltex Terminal.

Potential fill materials of unknown origin or quality Heavy metals (cadmium, arsenic, copper, lead, mercury, zinc, nickel, chromium); TRH/TPH, BTEX, PAH, OCP, asbestos.	• Soil • Groundwater • Surface water	Potential human receptors may include: • Current site occupants and visitors. • Future occupants, construction workers, intrusive maintenance workers, site users and visitors. Potential ecological receptors may include those present in: • Adjoining reserve areas • Saltwater Creek and Saltwater Lagoon • Trial Bay	Potential exposure pathways include: • Accidental ingestion of soil or groundwater. • Accidental inhalation of soil. • Dermal contact with soil and/or groundwater. • Vapour intrusion into future site buildings and inhalation by occupants. • Leaching of fill materials to the underlying groundwater. • Uptake by nearby ecological receptors	Shallow fill/topsoils are present at the site at depths between 0-0.2m in some locations. All soil chemical results were reported below adopted site suitability criteria for residential land use, with the exception of zinc in GBH3_0.01-0.3 (duplicate), above the adopted conservatively calculated EIL. This exceedances is not considered to pose a risk to current or future ecological receptors (vegetation) at the site given that the primary sample GBH3_0.1-0.3 reported a concentration below adopted criteria, indicating that the higher concentration is rather reflective of soil heterogeneity rather than a true exceedance. It is also noted that vegetation the area appeared to be in healthy condition. All groundwater results were reported below adopted criteria with the exception of PFAS, which is attributable to previous offsite activities rather than fill soils at the site, and some heavy metals. Heavy metals were not represented in site soils generally at background concentrations, which suggests an offsite source or regional groundwater conditions. Based on the above, risk to human or ecological receptors from site fill soils is considered to be low and acceptable.
Chemical leakage / spillage from onsite or offsite activities (parked vehicles onto the site surface, construction activities on near TRH, PAHs and BTEX.	• Soil • Groundwater • Surface water	Potential human receptors may include: • Current site occupants and visitors. • Future occupants, construction workers, intrusive maintenance workers, site users and visitors. Potential ecological receptors may include those present in: • Adjoining reserve areas • Saltwater Creek and Saltwater Lagoon • Trial Bay	Potential exposure pathways include: • Accidental ingestion of soil or groundwater. • Accidental inhalation of soil. • Dermal contact with soil and/or groundwater. • Vapour intrusion into future site buildings and inhalation by occupants. • Leaching of fill materials to the underlying groundwater. • Uptake by nearby ecological receptors	Concentrations of heavy metals above adopted groundwater criteria were generally located in the central and eastern portions of the site, including detections along boundary well locations (e.g. mercury and nickel in GMW5, copper and zinc in GMW3 and 8). These metals concentrations were reported in wells on the up-hydraulic gradient property boundary and are not considered to originate from the site and are likely representative of regional groundwater conditions. The concentrations only slightly exceed the conservative ecological criteria and are considered to present low risk to current and future site users.

11 Conclusions

Based on the findings of this assessment, Geosyntec concludes the following:

- Surface conditions consisted of unsealed surface over the entire site, with grass cover over most of the site and low shrubs present in the southern elevated areas. Trees were scattered across the site, with the highest coverage in the southern and south-eastern areas.
- Fill/topsoil materials were encountered in three boreholes in the south-western portion of the site (GBH1, 2 and 3), with other boreholes encountering natural soil immediately. The thickness of the fill/topsoils where present generally ranged between 0.05m and 0.3m.
- Underlying natural soils generally comprised sands to depths ranging from 1.8m to 3.0 m bgl, followed by cemented sands ('coffee rock') with further underlying layers of uncemented sands in some locations.
- No anthropogenic materials were observed in site soils during drilling works. No potentially asbestos containing fibre cement fragments were observed during drilling.
- A possible hydrocarbon odour was noted at approximately 2.7m in borehole GBH1, with slight sulfur odour noted after approximately 3m. PID readings across all boreholes ranged between 0.4 and 1.8ppm, close to background levels. No soil staining was observed in soils during drilling.
- Ground conditions encountered during this current investigation were generally similar to those reported in the previous investigations outlined in Section 4.1.
- Offsite activities observed during the site walkover included residential land use to the south and east, with reserve land to the west and north. No potentially contaminating activities were observed.
- All soil chemical results were reported below adopted site suitability criteria for residential land use, with the exception of a minor exceedance of zinc in GBH3_0.01-0.3 (duplicate), above the adopted conservatively calculated EIL, which can be discounted based on duplicate results from this location and the fact that vegetation in the location appeared to be in healthy condition.
- All groundwater results were reported below adopted criteria with the exception of PFAS, and marginal exceedances by some heavy metals.
- The source of PFAS detected in site groundwater is considered to be the former Caltex Terminal for the following reasons:
    a) The former Terminal Site is the only site identified in the vicinity of the subject site likely to have historically employed potentially PFAS-containing firefighting foams.
    b) No potentially PFAS-contaminating historical activities were identified for the site itself.
    c) Groundwater flow direction was inferred to be to the north / northeast. Accordingly, the site is located downgradient from the former Caltex Terminal.
- Concentrations of PFOS exceeded the 99% species protection level required to be adopted based on NEMP (2020), indicating that PFAS in groundwater may have potential to impact nearby ecological receptors via the bioaccumulation pathway. It is noted that none of the PFOS concentrations in groundwater

exceeded the DGV for 95% species protection, suggesting a limited potential for direct toxicity effects for aquatic ecological receptors.

- Concentrations of heavy metals above adopted groundwater criteria were generally located in the central and eastern portions of the site, including detections along boundary well locations (e.g., mercury and nickel in GMW5, copper and zinc in GMW3 and 8). These concentrations of metals are not considered to originate from the site and are likely representative of regional groundwater conditions. The concentrations only slightly exceed the conservative ecological criteria and are considered to present low risk to current and future site users.

Based on the above, it is concluded that the site is suitable for the proposed residential and retail development noting the following:

a) Monitoring of groundwater levels and quality in appropriate wells GMW1 & GMW2) during construction phases, to assess whether elevated PFAS concentrations remain in the far-western part of the site and do not migrate eastward to areas inside the proposed development footprint

c) If targeted dewatering is required in other portions of the site, preparation of a dewatering management plan specifying how groundwater flow and effluent will be assessed and managed

- Existing advice relating to acid sulfate soils (ASS) from previous reports (i.e. RGS, 2021) should be considered.
- The former Caltex Terminal, located in a hydraulically up-gradient position relative to the site, is a possible source of PFAS identified in site groundwater. Concentrations within the site were recorded below relevant human health criteria and are not considered to affect the suitability of the site for the proposed residential and retail land use.
- The contamination-related items listed in the SOFAC have been addressed as follows:

a) PFAS: Assessment of PFAS in site soils and groundwater is required given detection of PFAS at the former Caltex Terminal to the south of the site, and the general groundwater flow direction to the northeast towards the site.

This item has been addressed through the DSI scope of works, with PFAS assessment conducted for site soils and groundwater.

b) Desktop study: A detailed desktop study is required including review of previous assessments and other records, including further consideration of available hydrogeological information.

This item has been addressed through completion of a detailed desktop study as well as collection of site-specific hydrogeological data as part of the groundwater assessment, including inferred groundwater flow.

c) Site History: A detailed review of site history including information not only from historical aerial photographs and publicly available records, but also from previous assessments and any other available records.

This item has been addressed through the completion of a detailed review of site history using public records, previous assessments and other available information.

d) *Previous Investigations: Review of information relating to the former Caltex Terminal is required, including any available data relating to past contamination and/or confirmation of successful remediation.*

   This item has been addressed through the review of the available GTA (1995) report, review of available data and consideration of results from the current DSI. Although validation documentation for the former Caltex terminal site was not available, currently available data for the subject site is considered sufficient to inform suitability of the site for the proposed land use.

e) Site Walkover Inspection Observations: Detailed observations of the site and adjacent land obtained from a site walkover inspection is required.

   This item has been addressed by the completion of an appropriately detailed site walkover with findings presented in this DSI

f) Conceptual Site Model (CSM): A CSM is required which identifies all potential source-pathway-receptor linkages present with respect to current and proposed land use, including those via groundwater. This is required to consider the site history and environmental setting.

   This item has been addressed by the compilation of a CSM which takes into account a range of potentially contaminating activities, exposure pathways and receptors, based on available information regarding the history of the site and surrounds. This includes discussion based on the CSM and findings of the DSI.

12 References

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

AS 4482 (1999) Guide to the sampling and investigation of potentially contaminated soil. Standards Australia, Sydney.

HEPA (2020) PFAS National Environmental Management Plan, Version 2.0, January 2020 [NEMP 2.0].

NEPM (2013) National Environment Protection (Assessment of Site Contamination) Measure, Schedule A and Schedules B(1)-B(9). National Environment Protection Council, Adelaide.

NHMRC/NRMMC (2011) Australian Drinking Water Guidelines. National Health and Medical Research Council and National Resource Management Ministerial Council of Australia and New Zealand.

NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines. NSW EPA, Sydney.

NSW EPA (2014) NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste

NSW EPA (2015) Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997. NSW DECC, Sydney.

NSW EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition). NSW EPA, Sydney.

NSW EPA (2020) Consultants Reporting on Contaminated Land - Contaminated Land Guidelines.

WA DoH (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

13 Limitations

This report has been prepared by Geosyntec Consultants Pty Ltd (“Geosyntec”) for use by the Client who commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the Client and other parties. The findings of this report are based on the scope of work outlined in Section 1. The report has been prepared specifically for the Client for the purposes of the commission, and use by any explicitly nominated third party in the agreement between Geosyntec and the Client. No warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party (other than where specifically nominated in an agreement with the Client).

This report relates to only this project and all results, conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be reproduced without prior approval by the Client, or amended in any way without prior written approval by Geosyntec.

Geosyntec’s assessment was limited strictly to identifying environmental conditions associated with the subject property area as identified in the scope of work and does not include evaluation of any other issues.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigation.

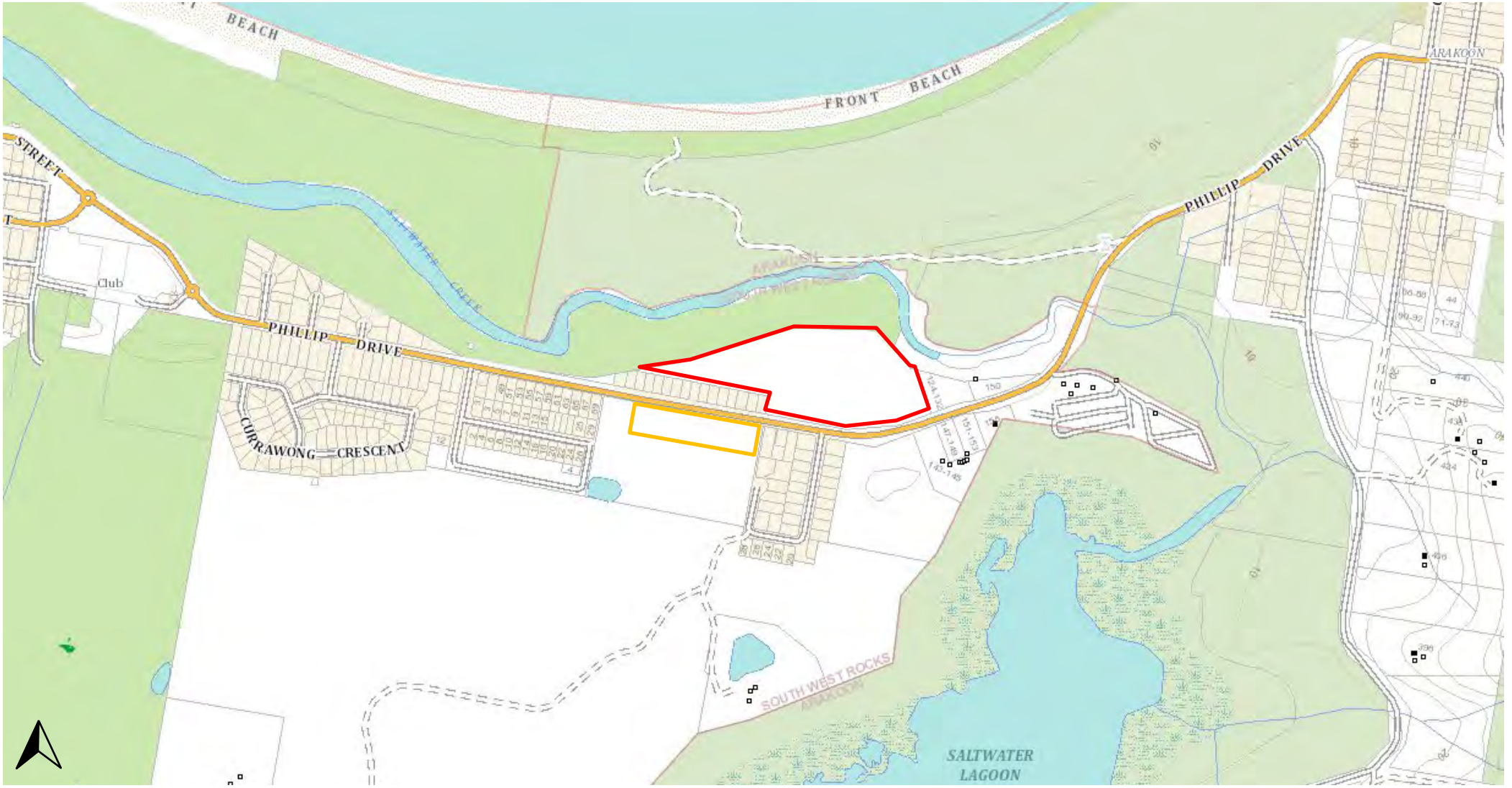
This report does not comment on any regulatory obligations based on the findings. This report relates only to the objectives stated and does not relate to any other work conducted for the Client.

The absence of any identified hazardous or toxic materials on the site should not be interpreted as a guarantee that such materials do not exist on the site.

All conclusions regarding the site are the professional opinions of the Geosyntec personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Geosyntec has not independently verified and assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Geosyntec, or developments resulting from situations outside the scope of this project.

Geosyntec is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The Client acknowledges that this report is for its exclusive use.

Appendix A Figures



LEGEND

- Approximate Site Boundary
- Approximate Boundary of Former Caltex Terminal Site

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Six Maps

Approx. 100 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 1: Site Location Plan

DSI

Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants

LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations
- Geosyntec (2022) Shallow Soil Sample Approximate Locations
- ECON (2022) PFAS Soil Sample Approximate Locations
- ECON (2022) PSI Soil Sample Approximate Locations
- ECON (2022) Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 2: Site Layout Plan

DSI

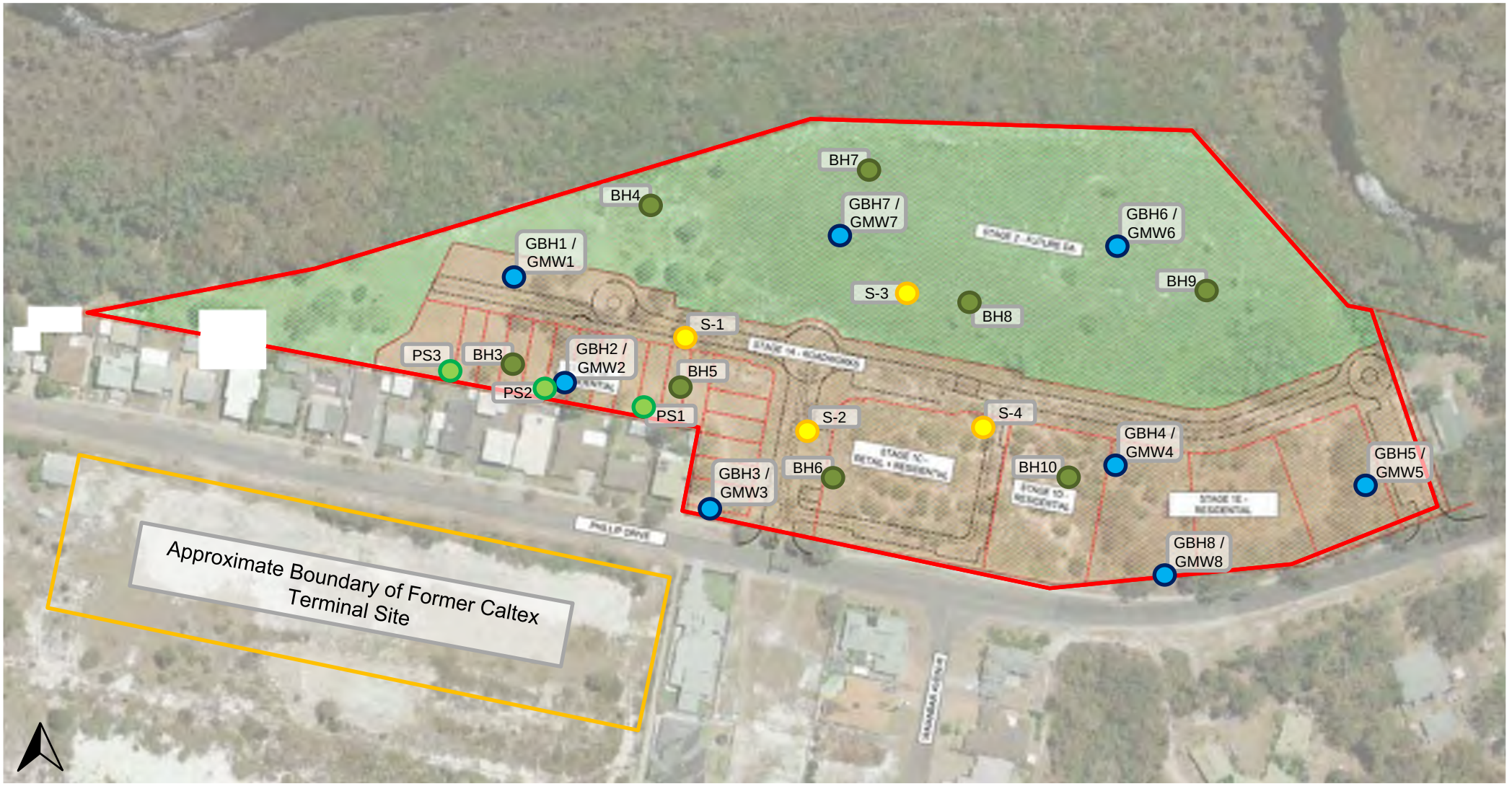
Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants



LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations
- Geosyntec (2022) Shallow Soil Sample Approximate Locations
- ECON (2022) PFAS Soil Sample Approximate Locations
- ECON (2022) PSI Soil Sample Approximate Locations
- ECON (2022) Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 3A: Site Layout Plan in Context of Proposed Development

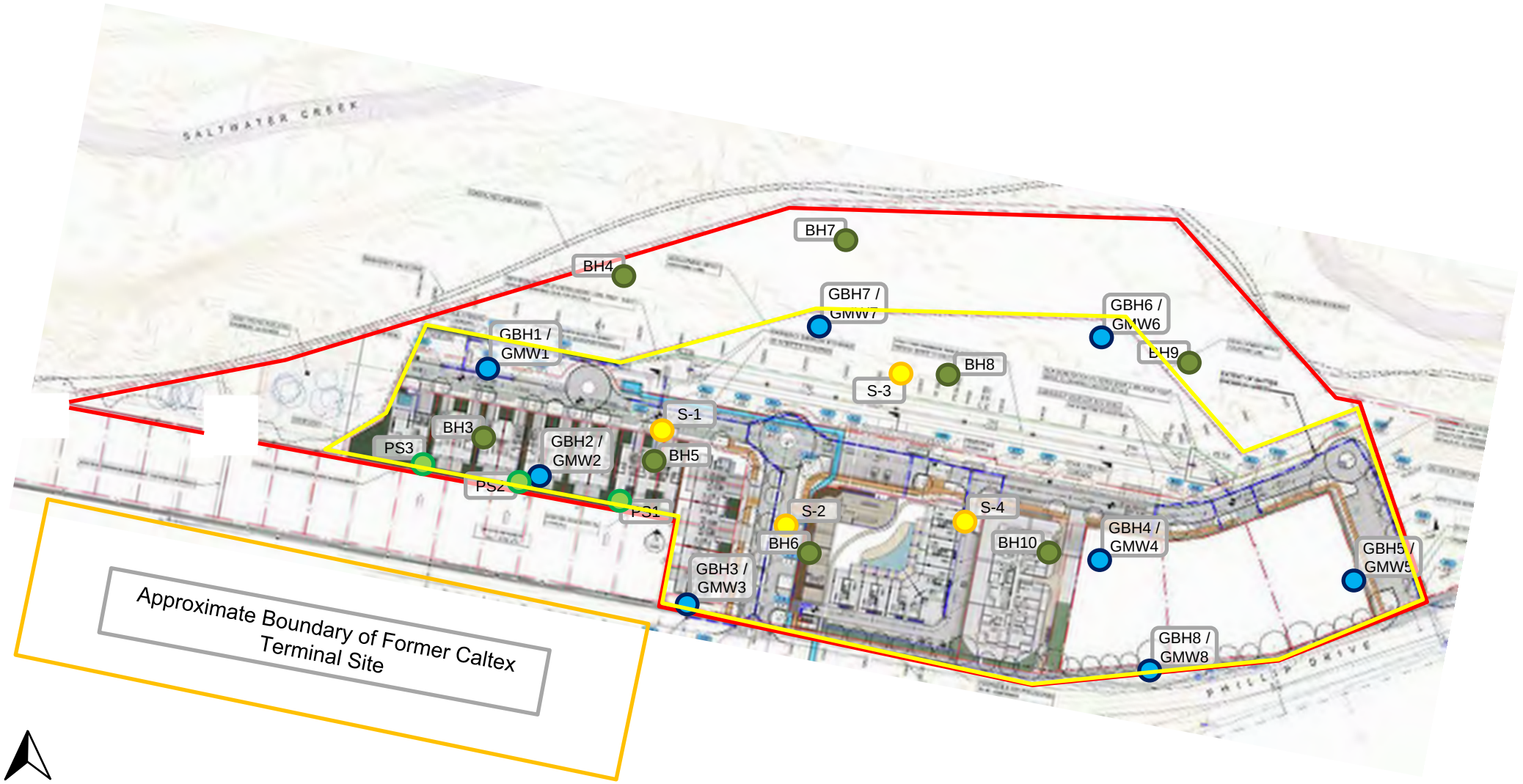
Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants



LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations
- Geosyntec (2022) Shallow Soil Sample Approximate Locations
- ECON (2022) PFAS Soil Sample Approximate Locations
- ECON (2022) PSI Soil Sample Approximate Locations
- ECON (2022) Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 3B: Site Layout Plan in Context of Proposed Development

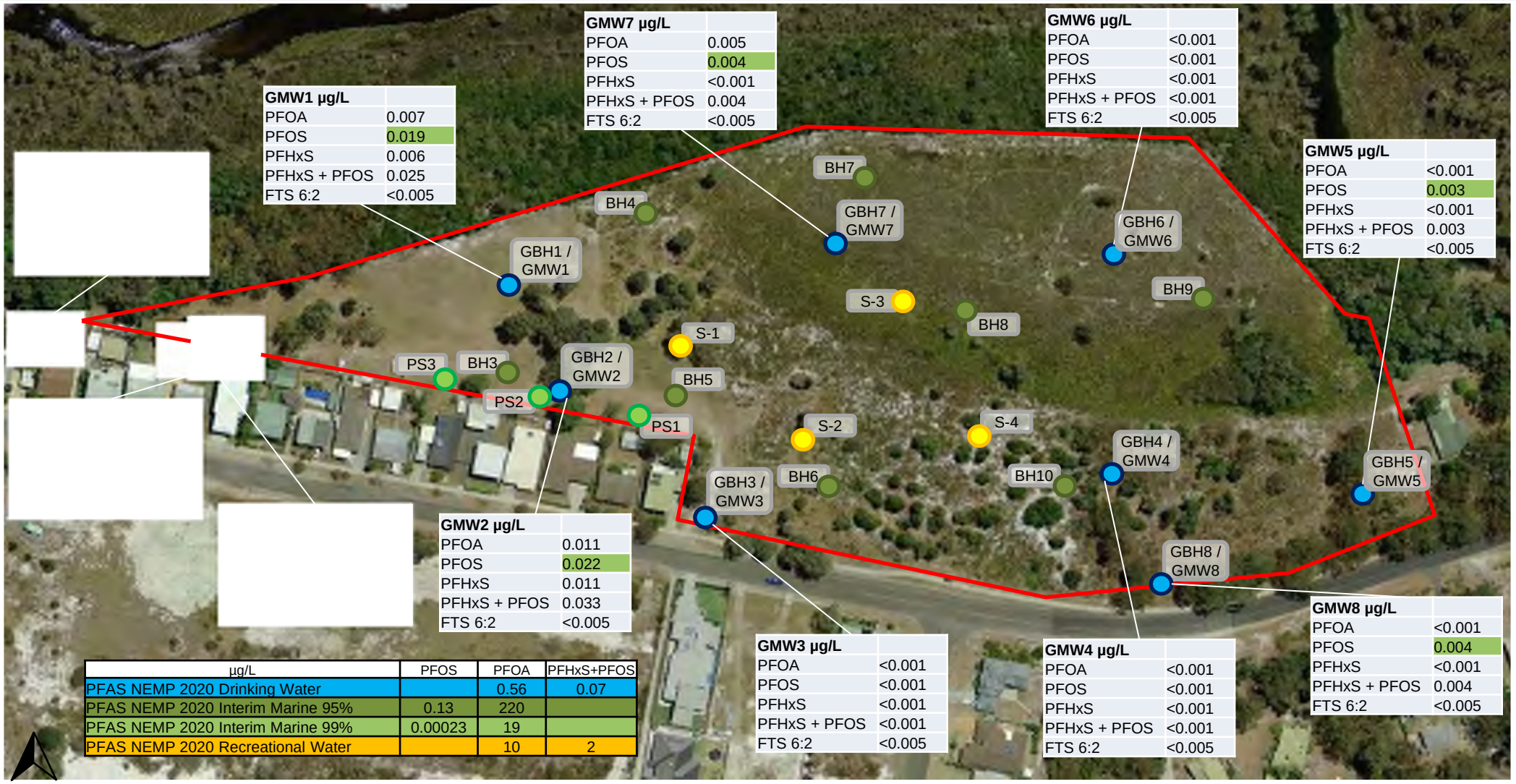
Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants



µg/L	PFOS	PFOA	PFHxS+PFOS
PFAS NEMP 2020 Drinking Water		0.56	0.07
PFAS NEMP 2020 Interim Marine 95%	0.13	220	
PFAS NEMP 2020 Interim Marine 99%	0.00023	19	
PFAS NEMP 2020 Recreational Water		10	2

LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations
- Geosyntec (2022) Shallow Soil Sample Approximate Locations
- ECON (2022) PFAS Soil Sample Approximate Locations
- ECON (2022) PSI Soil Sample Approximate Locations
- ECON (2022) Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 4A: Site Layout Plan – PFAS Groundwater Results

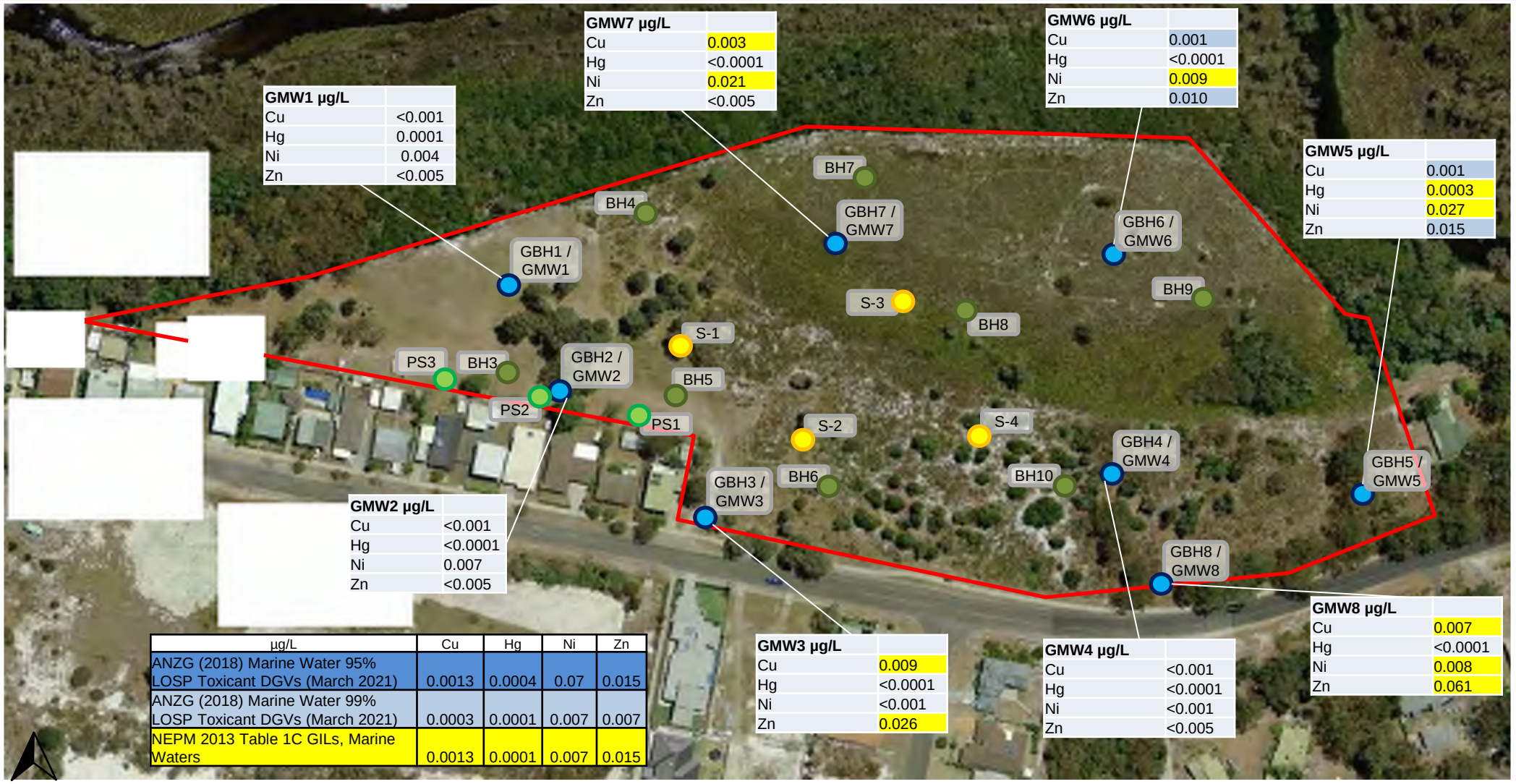
Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants



µg/L	Cu	Hg	Ni	Zn
ANZG (2018) Marine Water 95% LOSP Toxicant DGVs (March 2021)	0.0013	0.0004	0.07	0.015
ANZG (2018) Marine Water 99% LOSP Toxicant DGVs (March 2021)	0.0003	0.0001	0.007	0.007
NEPM 2013 Table 1C GILs, Marine Waters	0.0013	0.0001	0.007	0.015

LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations
- Geosyntec (2022) Shallow Soil Sample Approximate Locations
- ECON (2022) PFAS Soil Sample Approximate Locations
- ECON (2022) PSI Soil Sample Approximate Locations
- ECON (2022) Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 4B: Site Layout Plan – Metals Groundwater Results

Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants

LEGEND

Approximate Site Boundary

GMW1 2.43mAHD — RL of Water Level

Geosyntec (2022) Borehole / Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 5: Estimated Groundwater Flow Direction

Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants

LEGEND

- Approximate Site Boundary
- Approximate Footprint of Stage 1 Development Impact
- Geosyntec (2022) Borehole / Groundwater Well Approximate Locations

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

Approx. 30 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 6: Locations of Relevant GTA (1995) Boreholes and Groundwater Wells

Site Address: Waianbar Avenue Stage 1, South West Rocks, NSW 2431

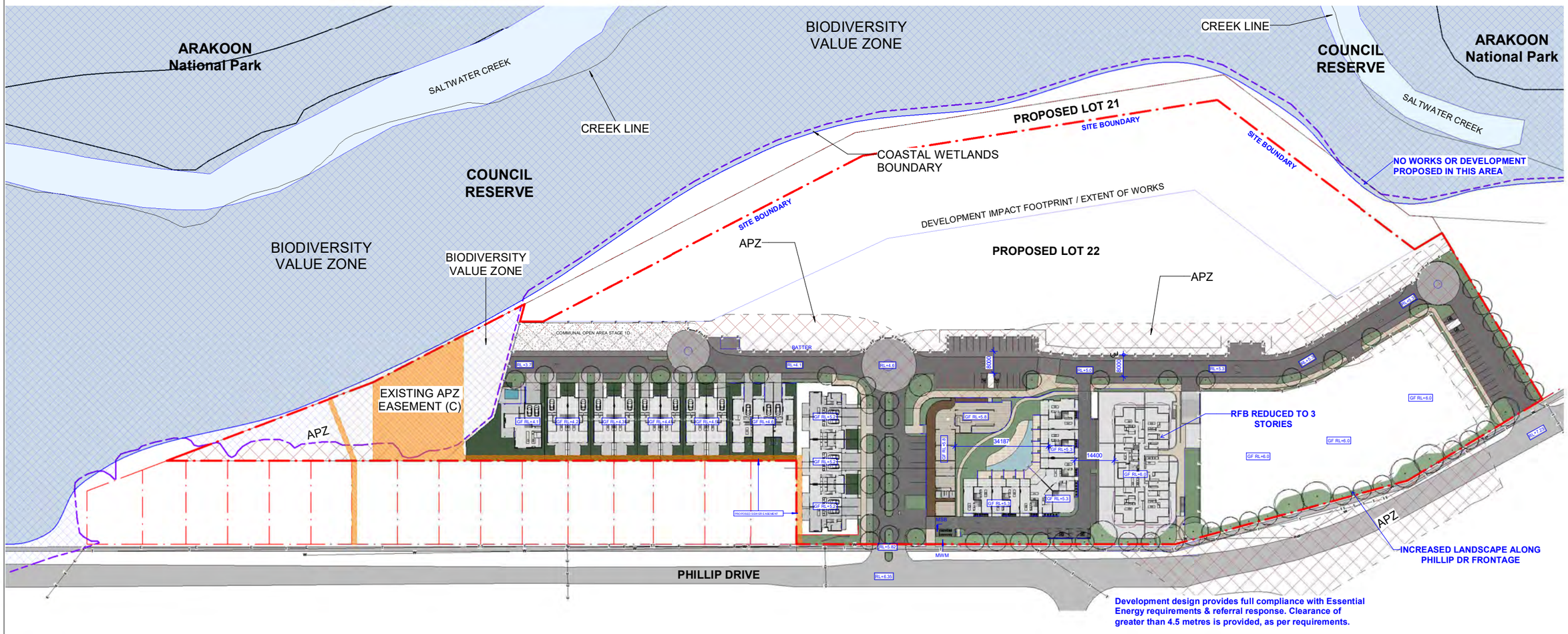
Client: ECON Environmental Pty Ltd

Job Number: AU122217

Date: September 2022

Geosyntec consultants

Appendix B Development Plans



PROPOSED AMENDMENT OF DA2200404 TO CARRY OUT PROPOSED WORKS ON ONE LOT WITHOUT SUBDIVISION

Date	REV	Description
19.09.22	D	
24.06.22	C	RFI
01.04.22	B	FINAL DA SUBMISSION
21.02.22	A	PRE-DA MEETING

RISE PROJECTS

ADDRESS:
57/6-8 Herbert Street, St Leonards NSW 2065

PH: (02) 8094 1209
ABN: 79 160 683 929
WEBSITE: www.riseprojects.com.au

DRAWN BY: Author | CHECKED: Checker

ADDRESS:

**LOT 2 PHILLIP DRIVE,
SOUTH WEST ROCKS**

VIEW:

**PROPOSED
AMENDMENT TO
DA2200404**

JOB No : **RP 260**

NORTH:

SCALE : A1/1 : 750

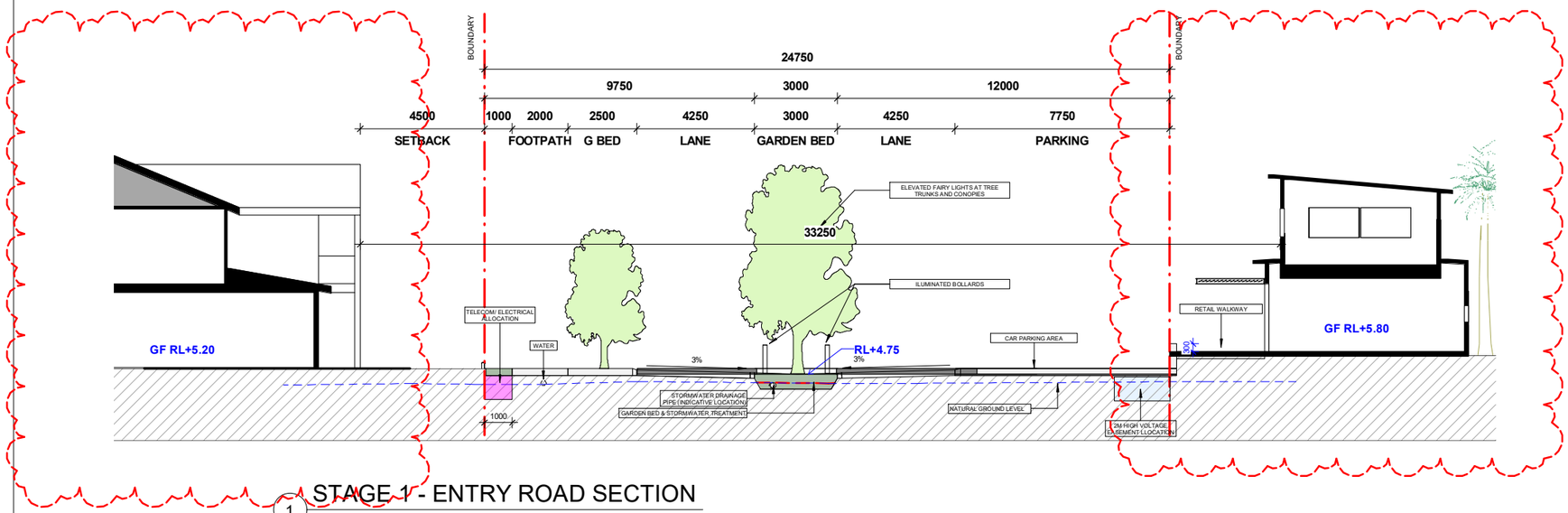
DATE: 19.09.22

DWG No: SHEET 2

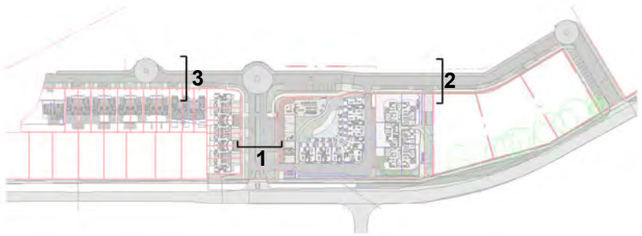
REV: D

BIM 360://South West Rocks - 2 Phillip Drive/The Rocks DA1 - Central (consolidation).rvt

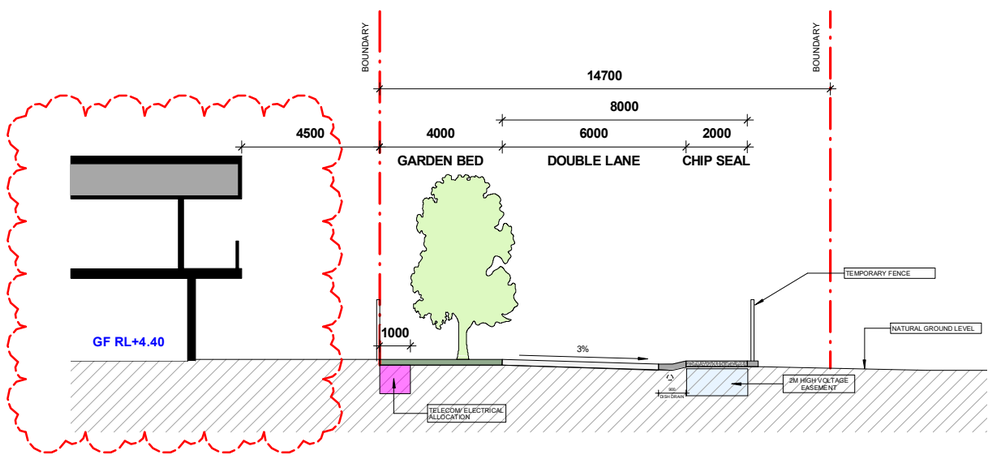
***ROAD SECTIONS ARE INDICATIVE.**
REFER TO CIVIL ENGINEERING DOCUMENTATION



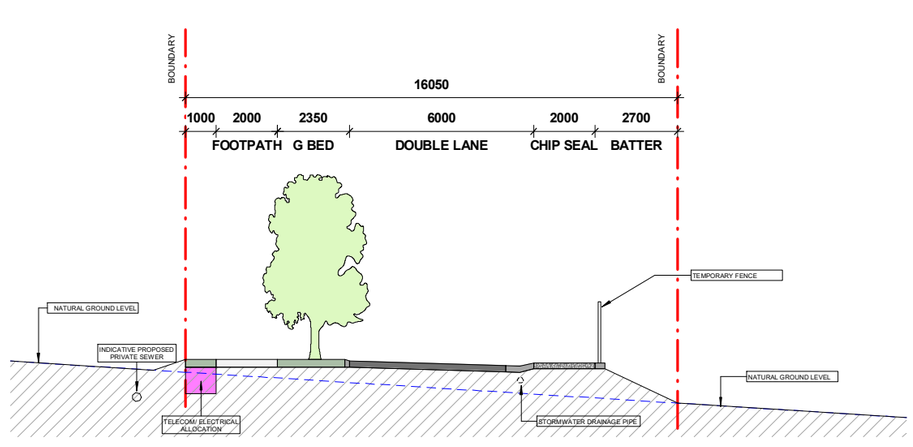
1 STAGE 1 - ENTRY ROAD SECTION
A1@ 1 : 100 /A3@ 1:200



KEYPLAN



3 TOWNHOUSE DRIVEWAY SECTION
A1@ 1 : 100 /A3@ 1:200



2 STAGE 1 - EAST-WEST ROAD SECTION
A1@ 1 : 100 /A3@ 1:200

Date	REV	Description
19.09.22	C	
01.04.22	B	FINAL DA SUBMISSION
21.02.22	A	PRE-DA MEETING

RISE PROJECTS

ADDRESS:
57/6-8 Herbert Street, St Leonards NSW 2065

PH: (02) 8094 1209
ABN: 79 160 683 929
WEBSITE: www.riseprojects.com.au

DRAWN BY: A.S | CHECKED:

ADDRESS:

LOT 2 PHILLIP DRIVE, SOUTH WEST ROCKS

VIEW:

STAGE 1 - INDICATIVE STREET SECTIONS

JOB No : **RP 260**

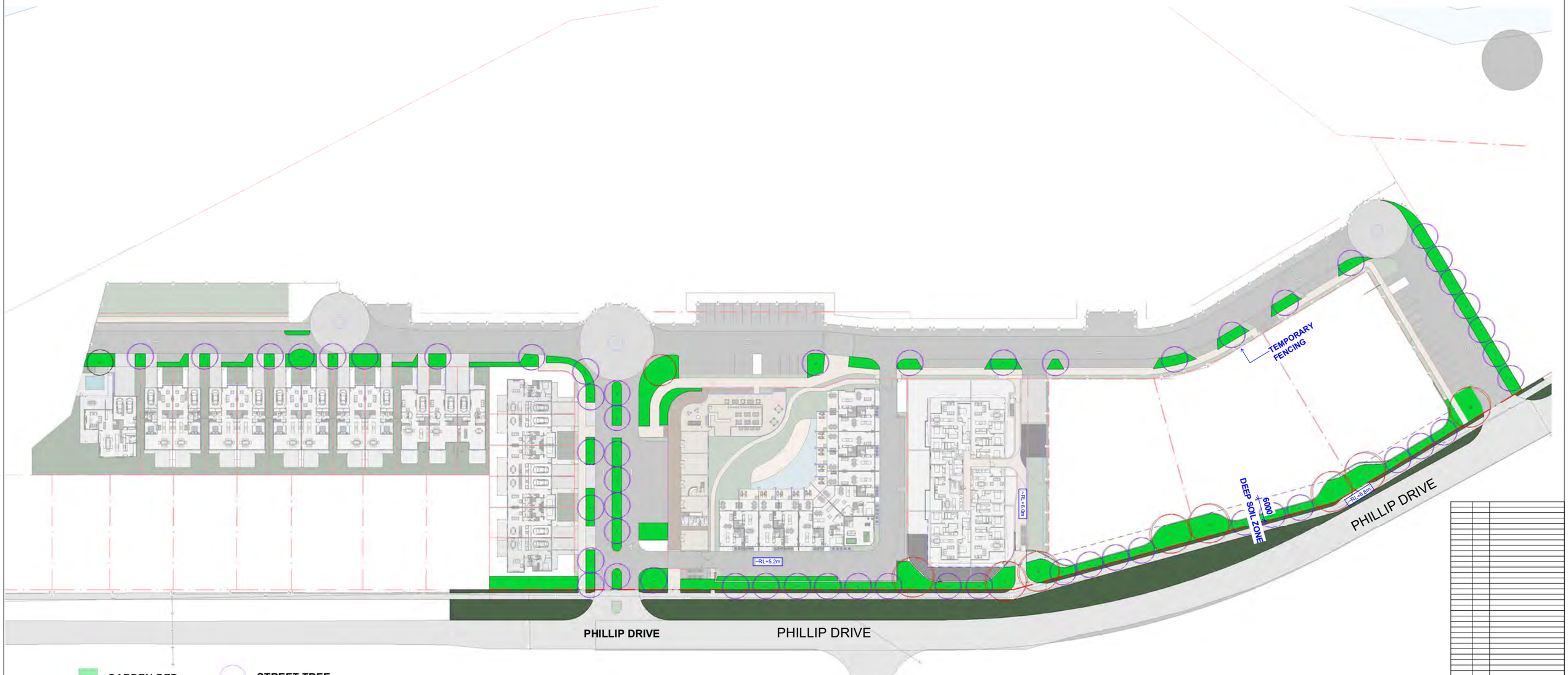
NORTH:

SCALE : A1/As indicated

DATE: 19.09.22

DW No. DA04.03

REV: C



GARDEN BED

TURF

EXISTING TREE

STREET TREE

LARGE VILLAGE GREEN TREE

Date	REV	Description
19.09.22	C	
01.04.22	B	FINAL DA SUBMISSION
21.02.22	A	PRE-DA MEETING

RISE PROJECTS

ADDRESS:
57/6-8 Herbert Street, St Leonards NSW 2065

PH: (02) 8094 1209
ABN: 79 160 683 929
WEBSITE: www.riseprojects.com.au

DRAWN BY: A.S CHECKED:

ADDRESS:

LOT 2 PHILLIP DRIVE, SOUTH WEST ROCKS

VIEW:

STAGE 1 - LANDSCAPE PLAN

JOB No : **RP 260**

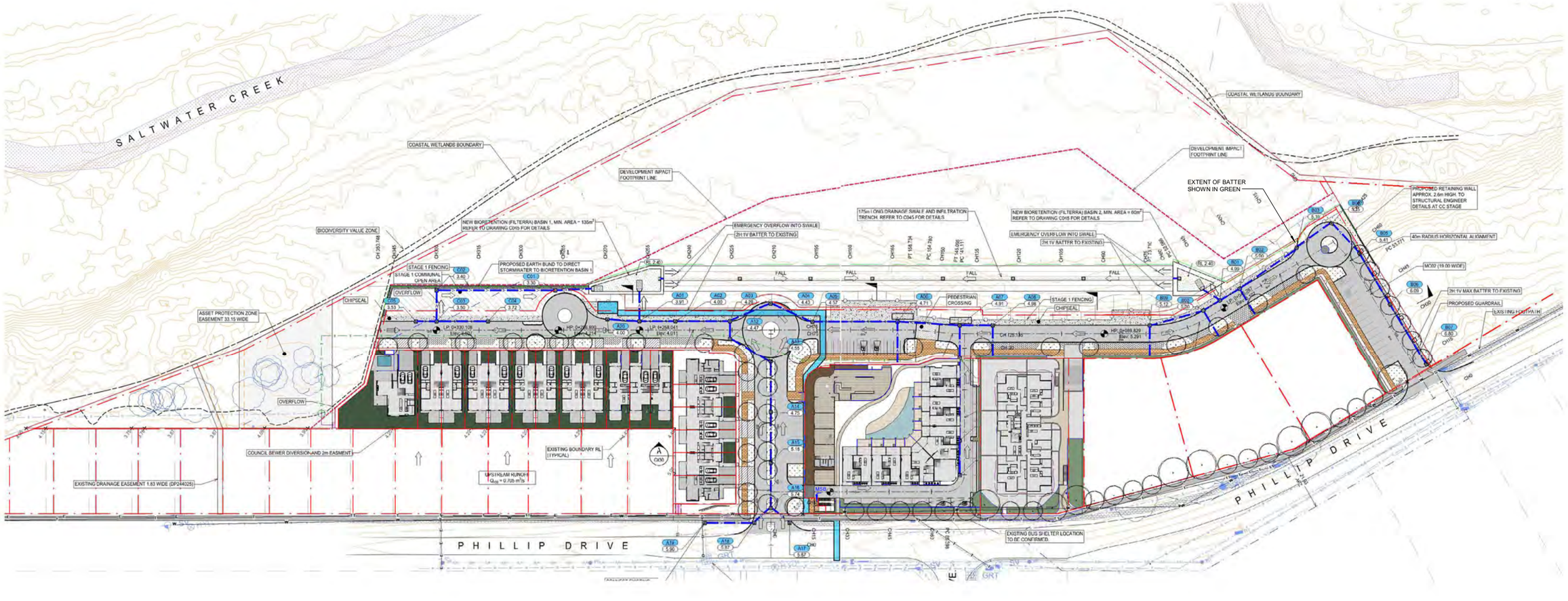
SCALE : A1/ 1 : 500

DATE: 19.09.22

NORTH:

DW No. DA04.04

REV: C



Date	REV	Description
19.09.22	A	

RISE PROJECTS

ADDRESS:
57/6-8 Herbert Street, St Leonards NSW 2065

PH: (02) 8094 1209
ABN: 79 160 683 929
WEBSITE: www.riseprojects.com.au

DRAWN BY: Author | CHECKED: Checker

ADDRESS:

LOT 2 PHILLIP DRIVE, SOUTH WEST ROCKS

VIEW:

SITE PLAN - CIVIL WORKS

JOB No : **RP 260**

NORTH:

SCALE : A1/1 : 750

DATE: 19.09.22

DW No. DA11.01

REV: A

BIM 360://South West Rocks - 2 Phillip Drive/The Rocks DA1 - Central (consolidation).rvt

Appendix C Results Summary Tables

AU122217

Soil Results

Geosyntec consultants

		Perfluoroalkane Carboxylic Acids	(n:2) Fluorotelomer Sulfonic Acids	Perfluoroalkane Sulfonic Acids		PFAS			Metals									
		Perfluorooctanoic acid (PFOA)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of PFAS (PFOS + PFOA)	Arsenic	Cadmium	Chromium (VI)	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
		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
EQL		0.005	0.01	0.005	0.005	0.005	0.005	0.005	2	0.4	5	5	5	5	0.1	5	5
PFAS NEMP 2020 Ecological direct exposure		10			1												
PFAS NEMP 2020 Ecological indirect exposure					0.01												
PFAS NEMP 2020 Residential with garden/accessible soil (HIL A)		0.1				0.01											
PFAS NEMP 2020 Residential with minimal opportunities for soil access (HIL B)		20				2											
NEPM 2013 Table 1B(5) EIL - Urban Res & Public Open Space (see below for calculations)									100		190*	190*	60	1100		30	70
NEPM 2013 Table 1A(1) HILs Res A Soil									100	20	100	100	6,000	300	40	400	7,400
NEPM 2013 Table 1A(1) HILs Res B Soil									500	150			30,000	1,200	120	1,200	60,000
Field ID	**Date**																
Geosyntec (2022) Results																	
GBH1_0.05-0.15	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
GBH1_0.6-0.7	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
GBH1_2.7-2.8	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	<5
GBH2_0.2-0.3	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	<5
GBH2_1.6-1.7	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
GBH3_0.1-0.3	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	5.5	58	35	<0.1	<5	74
DUP-1 (GBH3_0.1-0.3)	**5/09/2022**	-	-	-	-	-	-	-	3.9	<0.4	-	12	26	8.6	<0.1	<5	170
GBH3_1.8-2.0	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
GBH4_0.1-0.2	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	<5
GBH5_0.05-0.15	**5/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	8.1
GBH6_0.15-0.35	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	<5
GBH7_0.05-0.15	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	<5	<0.1	<5	<5
GBH8_0.05-0.15	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<2	<0.4	-	<5	<5	84	<0.1	<5	<5
S-1 (0.05-0.15)	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
S-2 (0.05-0.15)	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
S-3 (0.05-0.15)	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
S-4 (0.05-0.15)	**6/09/2022**	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-
ECON (2022) PSI Results																	
BH3 (0.2-0.3)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH4 (0.6-0.7)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH5 (0.1-0.2)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH6 (0.3-0.4)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH7 (0.3-0.4)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH8 (0.1-0.2)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
BH9 (0.1-0.2)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	3	-	<5	<5	<0.1	<2	<5
BH10 (0.3-0.4)	**30/05/2022**	-	-	-	-	-	-	-	<5	<1	<2	-	<5	<5	<0.1	<2	<5
GTA (1994) Investigation Results^																	
DMW13_3.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW13_8.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW14_5.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW14_7.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW15_3.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW15_7.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW16_2.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW16_6.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW17_5.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW17_6.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<12	-	-	-
DMW24_3.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<6	-	-	-
DMW24_5.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<6	-	-	-
DMW25_9.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<6	-	-	-
DMW25_3.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	<6	-	-	-
DMW26_5.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
DMW26_6.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
DMW27_4.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-
DMW27_7.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-

Notes as reported in GTA (1995)
ND: not detected
TR: Trace (below practical quantitation limit)

^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

***Results for Chromium (III + VI) are presumed to comprise Chromium (VI) entirely as a conservative measure**

EIL Calculations (conservative):	ABC:	0	0	0	0	0	0
Assumes pH 4 / 4.5 (as per NEPM (2013) Tables 1B(1-5), CEC 5, low clay content	ACL:	190	60	1100	30	70	
EIL (sum ABC + ACL):		**190**	**60**	**1100**	**30**	**70**	

AU122217

Soil Results

Geosyntec consultants

	BTEX							TRH							TPH Fractions (GTA 1995 historic data only)			
	Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction
	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
EQL	0.5	0.1	0.1	0.1	0.2	0.1	0.3	20	20	50	50	100	100	100	20	50	100	100
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil								700		1,000		2,500	10,000					
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand	3	0.5 | 0.5 | 0.5 | 0.5	160 | 220 | 310 | 540	55			40 | 60 | 95 | 170		45 | 70 | 110 | 200		110 | 240 | 440						
>=0m, <1m	3	0.5	160	55			40		45		110							
>=1m, <2m		0.5	220				60		70		240							
>=2m, <4m		0.5	310				95		110		440							
>=4m		0.5	540				170		200									
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space	170																	
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil, >=0m, <2m		50	85	70			105		180	120	120	300	2,800					
Field ID	**Date**																	
Geosyntec (2022) Results																		
GBH1_0.05-0.15	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH1_0.6-0.7	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH1_2.7-2.8	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GBH2_0.2-0.3	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	120	<100	120	-	-	-	-
GBH2_1.6-1.7	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH3_0.1-0.3	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	110	<100	110	-	-	-	-
DUP-1 (GBH3_0.1-0.3)	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	68	68	260	200	528	-	-	-	-
GBH3_1.8-2.0	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH4_0.1-0.2	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	120	<100	120	-	-	-	-
GBH5_0.05-0.15	**5/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GBH6_0.15-0.35	**6/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GBH7_0.05-0.15	**6/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	220	120	340	-	-	-	-
GBH8_0.05-0.15	**6/09/2022**	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	160	110	270	-	-	-	-
ECON (2022) PSI Results																		
BH3 (0.2-0.3)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	150	150	-	-	-	-
BH4 (0.6-0.7)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH5 (0.1-0.2)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH6 (0.3-0.4)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH7 (0.3-0.4)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH8 (0.1-0.2)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH9 (0.1-0.2)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
BH10 (0.3-0.4)	**30/05/2022**	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<50	<50	<100	<100	<50	-	-	-	-
GTA (1994) Investigation Results^																		
DMW13_3.0	**October 1994**	-	ND	ND	ND	-	-	0.2	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW13_8.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW14_5.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	13	ND	ND	ND
DMW14_7.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW15_3.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW15_7.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW16_2.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW16_6.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW17_5.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW17_6.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW24_3.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW24_5.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW25_9.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW25_3.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	TR	ND
DMW26_5.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW26_6.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW27_4.5	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW27_7.0	**October 1994**	-	ND	ND	ND	-	-	ND	-	-	-	-	-	-	-	ND	ND	ND	ND

Notes as reported in GTA (1995)
ND: not detected
TR: Trace (below practical quantitation limit)

^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

AU122217

Soil Results

Geosyntec consultants

	PAH																			
	Acenaphthene	Acenaphthylene	Anthracene	Benzo(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	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of total)
	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
EQL	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	0.5
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																				
>=0m, <1m														3						
>=1m, <2m																				
>=2m, <4m																				
>=4m																				
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space														170						
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil, >=0m, <2m					0.7															
NEPM 2013 Table 1A(1) HILs Res A Soil																	3	3	3	300
NEPM 2013 Table 1A(1) HILs Res B Soil																	4	4	4	400
Field ID	**Date**																				
Geosyntec (2022) Results																					
GBH1_0.05-0.15	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH1_0.6-0.7	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH1_2.7-2.8	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH2_0.2-0.3	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH2_1.6-1.7	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH3_0.1-0.3	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
DUP-1 (GBH3_0.1-0.3)	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH3_1.8-2.0	**5/09/2022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GBH4_0.1-0.2	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH5_0.05-0.15	**5/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH6_0.15-0.35	**6/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH7_0.05-0.15	**6/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GBH8_0.05-0.15	**6/09/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
ECON (2022) PSI Results																					
BH3 (0.2-0.3)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH4 (0.6-0.7)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH5 (0.1-0.2)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH6 (0.3-0.4)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH7 (0.3-0.4)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH8 (0.1-0.2)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH9 (0.1-0.2)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
BH10 (0.3-0.4)	**30/05/2022**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5
GTA (1994) Investigation Results^																					
DMW13_5.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW14_7.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW15_6.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW16_3.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW17_6.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW24_3.0	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08*
DMW25_1.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14*
DMW26_7.5	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*
DMW27_6.1	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND*

Notes as reported in GTA (1995)
ND: not detected
TR: Trace (below practical quantitation limit)

***Historical data reported as 'PAH' only - assumed to be generally equivalent to total PAHs for the purpsoe fo data review.**
^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

AU122217

Soil Results

Geosyntec consultants

		Organochlorine Pesticides								PCB	Phenols		Asbestos
		DDT + DDE + DDD	ALDRIN & DIELDRIN	CHLORDANE	ENDOSULFAN	ENDRIN	HEPTACHLOR	HCB	METHOXYCHLOR	PCB	PHENOL	PENTACHLOROPHENOL	Asbestos Presence / Absence
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%w/w
EQL		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.001%
NEPM 2013 Table 1A(1) HILs Res A Soil		240	6	50	270	10	6	10	300	1	3000	100	
NEPM 2013 Table 1A(1) HILs Res B Soil		600	10	90	400	20	10	15	500	1	45000	130	
Field ID	**Date**												
ECON (2022) PSI Results													
BH3 (0.2-0.3)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH4 (0.6-0.7)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH5 (0.1-0.2)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH6 (0.3-0.4)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH7 (0.3-0.4)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH8 (0.1-0.2)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH9 (0.1-0.2)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)
BH10 (0.3-0.4)	**30/05/2022**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.5	<2	<0.001 (No Asb. Dectected)

AU122217

Groundwater Results

Geosyntec consultants

	Perfluoroalkane Carboxylic Acids	(n:2) Fluorotelomer Sulfonic Acids	Perfluoroalkane Sulfonic Acids		PFAS			Metals								Herbicides
	Perfluorooctanoic acid (PFOA)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of PFAS (PFOS + PFOA)	Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Lead (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Dinoseb
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
EQL	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	100
ANZG (2018) Marine Water 95% LOSP Toxicant DGVs (March 2021)								0.013	0.0055		0.0013	0.0044	0.0004	0.07	0.015	
PFAS NEMP 2020 Drinking Water	0.56				0.07											
PFAS NEMP 2020 Interim Marine 95%	220			0.13												
PFAS NEMP 2020 Interim Marine 99%	19			0.00023												
PFAS NEMP 2020 Recreational Water	10				2											
NEPM 2013 Table 1C GILs, Marine Waters								0.013	0.0007		0.0013	0.0044	0.0001	0.007	0.015	
Field ID	**Date**																
Geosyntec (2022) Results																	
GMW1	**11/09/2022**	0.007	<0.005	0.006	0.019	0.025	0.032	0.026	<0.001	<0.0002	0.003	<0.001	<0.001	0.0001	0.004	<0.005	<100
DUP1W (GMW1)	**11/09/2022**	-	-	-	-	-	-	-	<0.001	<0.0002	0.003	<0.001	<0.001	<0.0001	0.004	<0.005	<100
GMW2	**11/09/2022**	0.011	<0.005	0.011	0.022	0.033	0.044	0.033	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	0.007	<0.005	<100
GMW3	**11/09/2022**	<0.001	<0.005	<0.001	<0.001**	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.001	0.009	<0.001	<0.0001	<0.001	0.026	<100
GMW4	**11/09/2022**	<0.001	<0.005	<0.001	<0.001**	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<100
GMW5	**11/09/2022**	<0.001	<0.005	<0.001	0.003	0.003	0.003	0.003	<0.001	<0.0002	<0.001	0.001	0.001	0.0003	0.027	0.015	<100
GMW6	**11/09/2022**	<0.001	<0.005	<0.001	<0.001**	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.001	0.001	<0.001	<0.0001	0.009	0.010	<100
GMW7	**11/09/2022**	0.005	<0.005	<0.001	0.004	0.004	0.009	0.009	<0.001	<0.0002	<0.001	0.003	<0.001	<0.0001	0.021	<0.005	<100
GMW8	**11/09/2022**	<0.001	<0.005	<0.001	0.004	0.004	0.004	0.004	0.001	<0.0002	0.001	0.007	<0.001	<0.0001	0.008	0.061	<100
GTA (1994) Investigation Results^ *																	
DMW13	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW14	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW15 D	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW15 M	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW15 S	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW16	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW17	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	0.006	-	-	-	-
DMW24	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	0.005	-	-	-	-
DMW25 D	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW25 M	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	0.009	-	-	-	-
DMW25 S	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	0.015	-	-	-	-
DMW26	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-
DMW27	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-

^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

*** Lead LOR noted to be greater than adopted criteria**

AU122217

Groundwater Results

Geosyntec consultants

		BTEX							TRH							TPH Fractions (historic data only)			
		Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction
		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
EQL		0.01	1	1	1	2	1	3	20	20	50	50	100	100	100	20	50	100	100
ANZG (2018) Marine Water 95% LOSP Toxicant DGVs (March 2021)		0.07	700	180	80														
ANZG (2018) Marine Water 99% LOSP Toxicant DGVs (March 2021)		0.05	500	110	50														
NEPM 2013 Table 1C GILs, Marine Waters		0.05	500																
NEPM 2013 Table 1A(4) Res HSL A & B GW for Vapour Intrusion, Sand			800 | 800 | 900							1,000 | 1,000 | 1,000		1,000 | 1,000 | 1,000						
>=2m, <4m			800							1,000		1,000							
>=4m, <8m			800							1,000		1,000							
>=8m			900							1,000		1,000							
Field ID	**Date**																		
GMW1	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100				
DUP1W (GMW1)	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GMW2	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	170	170	300	<100	470	-	-	-	-
GMW3	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GMW4	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	200	<100	200	-	-	-	-
GMW5	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	90	90	200	<100	290	-	-	-	-
GMW6	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	200	<100	200	-	-	-	-
GMW7	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	-	-	-	-
GMW8	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	170	170	200	<100	370	-	-	-	-
GTA (1994) Investigation Results^																			
DMW13	**October 1994**	-	ND	ND	ND	-	-	1.4	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW14	**October 1994**	-	TR	ND	ND	-	-	2.1	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW15 D	**October 1994**	-	ND	TR	TR	-	-	5.6	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW15 M	**October 1994**	-	TR	ND	ND	-	-	1.4	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW15 S	**October 1994**	-	2.9	TR	2.3	-	-	12	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW16	**October 1994**	-	4	TR	2	-	-	7.8	-	-	-	-	-	-	-	ND	TR	ND	ND
DMW17	**October 1994**	-	7.4	TR	3	-	-	13.3	-	-	-	-	-	-	-	1400	ND	ND	ND
DMW24	**October 1994**	-	1.2	TR	1.8	-	-	10.6	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW25 D	**October 1994**	-	TR	1	TR	-	-	7.9	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW25 M	**October 1994**	-	3.7	TR	1.5	-	-	5	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW25 S	**October 1994**	-	TR	TR	1	-	-	3	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW26	**October 1994**	-	TR	ND	ND	-	-	1.2	-	-	-	-	-	-	-	ND	ND	ND	ND
DMW27	**October 1994**	-	ND	8.2	1.3	-	-	9.7	-	-	-	-	-	-	-	ND	ND	ND	ND

Notes as reported in GTA (1995)
ND: not detected
TR: Trace (below practical quantitation limit)

^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

AU122217

Groundwater Results

Geosyntec consultants

		PAH																
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(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	Phenanthrene	Pyrene	PAHs (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/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
EQL		1	1	1	1	1	0.001	1	1	1	1	1	1	1	1	1	1	1
ANZG (2018) Marine Water 95% LOSP Toxicant DGVs (March 2021)				0.4		0.2						1.4			70	2		
ANZG (2018) Marine Water 99% LOSP Toxicant DGVs (March 2021)				0.01		0.1						1			50	0.6		
NEPM 2013 Table 1C GILs, Marine Waters															50			
NEPM 2013 Table 1A(4) Res HSL A & B GW for Vapour Intrusion, Sand																		
>=2m, <4m																		
>=4m, <8m																		
>=8m																		
Field ID	**Date**																	
GMW1	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
DUP1W (GMW1)	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW2	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW3	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW4	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW5	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW6	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW7	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GMW8	**11/09/2022**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
GTA (1994) Investigation Results^																		
DMW13	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW14	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW15 D	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW15 M	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW15 S	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1*
DMW16	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3*
DMW17	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW24	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10*
DMW25 D	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2*
DMW25 M	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW25 S	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW26	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DMW27	**October 1994**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes as reported in GTA (1995)
ND: not detected
TR: Trace (below practical quantitation limit)

***Historical data reported as 'PAH' only - assumed to be generally equivalent to total PAHs for the purpsoe fo data review.**
^It is noted that the data are presented as reported, and have not been validated or independently verified. Geosyntec cannot warrant the reliability of this near 30 year-old data

AU122217

Groundwater Results

Geosyntec consultants

		Phenols																		
		3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-chloro-3-methylphenol	4-Nitrophenol	Cresol Total	Pentachlorophenol	Tetrachlorophenols	Phenol	Phenols (Total Halogenated)	Phenols (Total Non Halogenated)
		µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mg/L
EQL		6	10	10	3	3	0.03	3	3	3	10	30	100	10	30	0.01	10	30	3	0.01	0.1
ANZG (2018) Marine Water 95% LOSP Toxicant DGVs (March 2021)																	22		400		
ANZG (2018) Marine Water 99% LOSP Toxicant DGVs (March 2021)																	11		270		
NEPM 2013 Table 1C GILs, Marine Waters																	11		400		
Field ID	**Date**																				
GMW1	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
DUP1W (GMW1)	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW2	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW3	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW4	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW5	**11/09/2022**	<10	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW6	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW7	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1
GMW8	**11/09/2022**	<6	<10	<10	<3	<3	<0.03	<3	<3	<3	<10	<30	<100	<10	<30	<0.01	<10	<30	<3	<0.01	<0.1

Appendix D Laboratory Certificates

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

CERTIFICATE OF ANALYSIS 305582

Client Details

Client	Geosyntec
Attention	Edward Munnings
Address	Suite 1, Level 9, 189 Kent Street, Sydney, NSW, 2000

Sample Details

Your Reference	**AU122217, Southwest Rocks DSI**
Number of Samples	1 Soil
Date samples received	13/09/2022
Date completed instructions received	13/09/2022

Analysis Details

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

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

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

Report Details

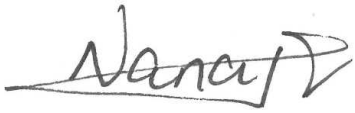
Date results requested by	20/09/2022
Date of Issue	20/09/2022

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Results Approved By
Hannah Nguyen, Metals Supervisor
Jaimie Loa-Kum-Cheung, Senior Chemist
Josh Williams, Organics and LC Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		305582-1
Your Reference	UNITS	TRIP-1
Date Sampled		05/09/2022
Type of sample		Soil
Date extracted	-	14/09/2022
Date analysed	-	19/09/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	81

svTRH (C10-C40) in Soil		
Our Reference		305582-1
Your Reference	UNITS	TRIP-1
Date Sampled		05/09/2022
Type of sample		Soil
Date extracted	-	14/09/2022
Date analysed	-	18/09/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	230
TRH C_{29} - C_{36}	mg/kg	370
Total +ve TRH (C10-C36)	mg/kg	600
TRH >C_{10} -C_{16}	mg/kg	70
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	70
TRH >C_{16} -C_{34}	mg/kg	320
TRH >C_{34} -C_{40}	mg/kg	240
Total +ve TRH (>C10-C40)	mg/kg	620
Surrogate o-Terphenyl	%	95

PAHs in Soil		
Our Reference		305582-1
Your Reference	UNITS	TRIP-1
Date Sampled		05/09/2022
Type of sample		Soil
Date extracted	-	14/09/2022
Date analysed	-	16/09/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	106

Acid Extractable metals in soil		
Our Reference		305582-1
Your Reference	UNITS	TRIP-1
Date Sampled		05/09/2022
Type of sample		Soil
Date prepared	-	15/09/2022
Date analysed	-	16/09/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	9
Copper	mg/kg	32
Lead	mg/kg	12
Mercury	mg/kg	<0.1
Nickel	mg/kg	5
Zinc	mg/kg	250

Moisture		
Our Reference		305582-1
Your Reference	UNITS	TRIP-1
Date Sampled		05/09/2022
Type of sample		Soil
Date prepared	-	14/09/2022
Date analysed	-	15/09/2022
Moisture	%	29

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	[NT]
Date extracted	-			14/09/2022	[NT]	[NT]	[NT]	[NT]	14/09/2022	[NT]
Date analysed	-			19/09/2022	[NT]	[NT]	[NT]	[NT]	19/09/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	120	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	116	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	110	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	131	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	137	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-18	[NT]
Date extracted	-			14/09/2022	[NT]	[NT]	[NT]	[NT]	14/09/2022	[NT]
Date analysed	-			18/09/2022	[NT]	[NT]	[NT]	[NT]	18/09/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	80	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	80	[NT]
Surrogate o-Terphenyl	%		Org-020	83	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date extracted	-			14/09/2022	[NT]	[NT]	[NT]	[NT]	14/09/2022	[NT]
Date analysed	-			16/09/2022	[NT]	[NT]	[NT]	[NT]	16/09/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	69	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	106	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	105	[NT]	[NT]	[NT]	[NT]	116	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			15/09/2022	[NT]	[NT]	[NT]	[NT]	15/09/2022	[NT]
Date analysed	-			16/09/2022	[NT]	[NT]	[NT]	[NT]	16/09/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

144

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec
Address	Suite 1, Level 9, 189 Kent St, Sydney
Contact Name	Edward Munninghs
Phone №	478735577
Special Directions	
Purchase Order	4100003090
Quote ID №	As per Price book 2017/18
Project №	AU122217
Project Name	Southwest Rocks DSI
Project Manager	Edward Munnings
EDD Format (ESdat, EQuIS, Custom)	Esdat
Sampler(s)	EM
Handed over by	EM
Email for Invoice	admin@geosyntec.com
Email for Results	edward.munnings@geosyntec.com

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

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Combo B7	PFAS short suite, standard detection limit	Hold
1	GBH1_0.05_0.15	5/09/22	s		X	
2	GBH1_0.6-0.7	5/09/22	s		X	X
3	GBH1_2.7-2.8	5/09/22	s	X	X	
4	GBH1_2.9-3.0	5/09/22	s			X
5	GBH2_0.1-0.2	5/09/22	s			X
6	GBH2_0.2-0.3	5/09/22	s	X	X	
7	GBH2_1.6-1.7	5/09/22	s		X	
8	GBH3_0.1-0.3	5/09/22	s	X	X	
9	GBH3_1.8-2.0	5/09/22	s		X	
10	GBH4_0.1-0.2	6/09/22	s	X	X	
	Total Counts			4	8	3

Containers: 1L Plastic | 250mL Plastic | 125mL Plastic | 200mL Amber Glass | 40mL VOA vial | 500mL PFAS Bottle | Jar (Glass or HDPE) | Other (Asbestos AS4964, WA Guidelines)

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

Sample Comments / Dangerous Goods Hazard Warning

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 305582
Date Received: 13.9.22
Time Received: 1350
Received By: PHAW
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date / /	Time :	
Eurofins | mgt Laboratory Use Only	Received By: Jaidyn Sloquer	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date 8.9.22	Time 10.44	Temperature 6.2	
	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date / /	Time :	Report № 921552	

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

2/4

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217	Project Manager	Edward Munnings	Sampler(s)	EM
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI	EDD Format (ESdat, EQuIS, Custom)	Esdat	Handed over by	EM
Contact Name	Edward Munnings					Email for Invoice	admin@geosyntec.com
Phone №	478735577					Email for Results	edward.munnings@geosyntec.com
Special Directions							
Purchase Order	4100003090						
Quote ID №	As per Price book 2017/18						

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

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)* ☐ 1 Day* ☐ 2 Day* ☐ 3 Day* ☑ 5 Day ☐ Other ( )
* Surcharges apply

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Combo B7	PFAS short suite, standard detection limit		Hold	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	GBH4_1.0-1.1	6/09/22	s				X									
2	GBH4_1.6-1.8	6/09/22	s				X									
3	GBH5_0.05-0.15	6/09/22	s	X	X											
4	GBH5_1.1-1.2	6/09/22	s				X									
5	GBH6_0.05-0.15	6/09/22	s				X									
6	GBH6_0.15-0.35	6/09/22	s	X	X											
7	GBH6_1.3-1.5	6/09/22	s				X									+305582 TJ
8	GBH7_0.05-0.15	6/09/22	s	X	X											
9	GBH7_0.5-0.7	6/09/22	s				X									
10	GBH7_2.0-2.2	6/09/22	s				X									
			Total Counts	3	3		7									

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date / /	Time :	
Eurofins | mgt Laboratory Use Only	Received By	Jaidyn Slarmm	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date 8/9/22	Time 08:54	Temperature 6.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date / /	Time :	Report №

3/4

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 6251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217	Project Manager	Edward Munnings
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI	EDD Format (ESdat, EQuIS, Custom)	Esdat
Contact Name	Edward Munninghs				
Phone №	478735577				
Special Directions					
Purchase Order	4100003090				
Quote ID №	As per Price book 2017/18				

Sampler(s)	EM
Handed over by	EM
Email for Invoice	admin@geosyntec.com
Email for Results	edward.munnings@geosyntec.com

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

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

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to direct SUITE pricing	Combo B7	PFAS short suite, standard detection limit	Hold	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA Vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	GBH8_0.05-0.15	6/09/22	s		X	X										
2	GBH8_0.8-1.0	6/09/22	s				X									
3	GBH8_3.0-3.2	6/09/22	s				X									
4	GBH8_3.5-3.7	6/09/22	s				X									
5	S-1	6/09/22	s			X										
6	S-2	6/09/22	s			X										
7	S-3	6/09/22	s			X										
8	S-4	6/09/22	s			X										#305562 TJ
9	DUP-1	5/09/22	s		X											
10	DUP-2	6/09/22	s				X									
	Total Counts				2	5	4									

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	/ /	Time	:
Eurofins | mgt Laboratory Use Only	Received By	Jaidyn Simpson	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	8/9/22	Time	10:44 am	Temperature	6.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	/ /	Time	:	Report №	

4/4

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood PL, Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217	Project Manager	Edward Munnings
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI	EDD Format (ESdat, EQuIS, Custom)	Esdat
Contact Name	Edward Munninghs				
Phone №	478735577				
Special Directions					
Purchase Order	4100003090				
Quote ID №	As per Price book 2017/18				

Sampler(s)	EM				
Handed over by	EM				
Email for Invoice	admin@geosyntec.com				
Email for Results	edward.munnings@geosyntec.com				

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

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

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE codes must be used to attract SUITE pricing. Please send to envirolab for ELS combo 3	biaxfth / recovery	Hold	Containers: 1L Plastic; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL VOA Vial; 500mL PFAS Bottle; Jar (Glass or HDPE); Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TRIP-1	5/09/22	s	X				
2	TRIP-2	6/09/22	s			X		
3	TB	5/09/22	s		X			
4	TS	5/09/22	s		X			
5								
6								
7								
8								
9								
10								
	Total Counts			1	2	1		

#315502
T.1

(1)

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	/ /	Time	:
Eurofins | mgt Laboratory Use Only	Received By	Jaidyn Sturgeon	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	8/9/22	Time	10:45	Temperature	6.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	/ /	Time	:	Report №	92195 2

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Geosyntec
Attention	Edward Munnings

Sample Login Details

Your reference	AU122217, Southwest Rocks DSI
Envirolab Reference	305582
Date Sample Received	13/09/2022
Date Instructions Received	13/09/2022
Date Results Expected to be Reported	20/09/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil
TRIP-1	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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

CERTIFICATE OF ANALYSIS 305978

Client Details

Client	Geosyntec
Attention	Edward Munnings
Address	Suite 1, Level 9, 189 Kent Street, Sydney, NSW, 2000

Sample Details

Your Reference	**AU122217**
Number of Samples	1 Water
Date samples received	16/09/2022
Date completed instructions received	16/09/2022

Analysis Details

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

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

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

Report Details

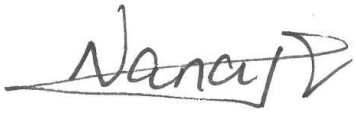
Date results requested by	26/09/2022
Date of Issue	26/09/2022

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Results Approved By
Hannah Nguyen, Metals Supervisor
Josh Williams, Organics and LC Supervisor
Steven Luong, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		305978-1
Your Reference	UNITS	TRIP-1
Date Sampled		11/09/2022
Type of sample		Water
Date extracted	-	26/09/2022
Date analysed	-	26/09/2022
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	92

svTRH (C10-C40) in Water		
Our Reference		305978-1
Your Reference	UNITS	TRIP-1
Date Sampled		11/09/2022
Type of sample		Water
Date extracted	-	21/09/2022
Date analysed	-	22/09/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	65

PAHs in Water		
Our Reference	UNITS	305978-1
Your Reference		TRIP-1
Date Sampled		11/09/2022
Type of sample		Water
Date extracted	-	21/09/2022
Date analysed	-	23/09/2022
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	70

HM in water - dissolved		
Our Reference		305978-1
Your Reference	UNITS	TRIP-1
Date Sampled		11/09/2022
Type of sample		Water
Date prepared	-	20/09/2022
Date analysed	-	20/09/2022
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	4
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	5
Zinc-Dissolved	µg/L	2
Aluminium-Dissolved	µg/L	400
Tin-Dissolved	µg/L	<1

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			26/09/2022	[NT]	[NT]	[NT]	[NT]	26/09/2022	[NT]
Date analysed	-			26/09/2022	[NT]	[NT]	[NT]	[NT]	26/09/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	102	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	91	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate toluene-d8	%		Org-023	95	[NT]	[NT]	[NT]	[NT]	89	[NT]
Surrogate 4-BFB	%		Org-023	95	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			21/09/2022	[NT]	[NT]	[NT]	[NT]	21/09/2022	[NT]
Date analysed	-			22/09/2022	[NT]	[NT]	[NT]	[NT]	22/09/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	78	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	71	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	78	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	71	[NT]
Surrogate o-Terphenyl	%		Org-020	75	[NT]	[NT]	[NT]	[NT]	78	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			21/09/2022	[NT]	[NT]	[NT]	[NT]	21/09/2022	[NT]
Date analysed	-			23/09/2022	[NT]	[NT]	[NT]	[NT]	23/09/2022	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	93	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			20/09/2022	[NT]	[NT]	[NT]	[NT]	20/09/2022	[NT]
Date analysed	-			20/09/2022	[NT]	[NT]	[NT]	[NT]	20/09/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	115	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	85	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☑ Sydney Laboratory — 179 Magowar Road, Girraween, NSW 2145 — +61 2 9900 8400 — EnviroSampleNSW@eurofins.com
☐ Brisbane Laboratory — Unit 1/21 Smallwood Place, Murarrie, QLD 4172 — +61 7 3902 4600 — EnviroSampleQLD@eurofins.com
☐ Perth Laboratory — 46-48 Banksia Road, Welshpool, WA 6106 — +61 8 6253 4444 — EnviroSampleWA@eurofins.com
☐ Melbourne Laboratory — 6 Monterey Road Dandenong South VIC 3175 — +61 3 8564 5000 — EnviroSampleVic@eurofins.com

Company	Geosyntec Consultants
Address	Suite 1, Level 9, 189 Kent St, Sydney
Contact Name	Edward Munnings
Phone №	0478735577
Special Directions	—
Purchase Order	410000309
Quote ID №	—
Project №	AU122217
Project Name	South West Rocks DSI
Project Manager	Edward Munnings
EDD Format (ESdat, EQuIS etc)	Esdat
Sampler(s)	Edward Munnings
Handed over by	—
Email for Invoice	admin@Geosyntec.com
Email for Results	Edward.Munnings@geosyntec.com

Analyses (Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing): B7; PFAS short suite TRACE; please send to Envirolab for combo 3; BTEX/ volatile TRH / heavy ... ; TB / TS

Containers (Change container type & size if necessary): 500mL Plastic red/white; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL VOA vial; 500mL PFAS Bottle; Jar (Glass or HDPE); Other (Asbestos AS4964, WA Guidelines)

Required Turnaround Time (TAT) — Default will be 5 days if not ticked. ♦Surcharge will apply
☐ Overnight (reporting by 9am)♦ ☐ Same day♦ ☐ 1 day♦ ☐ 2 days♦ ☐ 3 ☑ 5 days (Standard) ☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B7	PFAS short suite TRACE	please send to Envirolab for combo 3	BTEX/volatile TRH	TB/TS	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar	Other	Sample Comments / Dangerous Goods Hazard Warning
1	GMW1	11.9.22	W	X	X				X			X	X	X			
2	GMW2	↓	↓	X	X				X			X	X	X			
3	GMW3			X	X				X			X	X	X			
4	GMW4			X	X				X			X	X	X			
5	GMW5			X	X				X			X	X	X			
6	GMW6			X	X				X			X	X	X			
7	GMW7			X	X				X			X	X	X			
8	GMW8			X	X				X			X	X	X			
9	DUP1W			X					X			X	X				
10	TMP1W	↓	↓			X			X			X	X				
	Total Counts			9	8	1											

(1) (TB/TS)

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 305978
Date Received: 16/9/22
Time Received: 1415
Received By: AP
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal — Name: Edward Munnings — Signature: [signature] — Date: 13.9.22 — Time: 9:15am

Laboratory Use Only									
Received By	Jaidyn Stevenson	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date	13/9/22	Time	9:15 Am	Temperature 5.2
Received By	AP - ELS SYD	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date	13/9/22 16/9/22	Time	1415	Report № 923161

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Geosyntec
Attention	Edward Munnings

Sample Login Details

Your reference	AU122217
Envirolab Reference	305978
Date Sample Received	16/09/2022
Date Instructions Received	16/09/2022
Date Results Expected to be Reported	26/09/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	HM in water - dissolved
TRIP-1	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

174

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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

Company	Geosyntec
Address	Suite 1, Level 9, 189 Kent St, Sydney
Contact Name	Edward Munnings
Phone №	478735577
Special Directions	
Purchase Order	410000309
Quote ID №	As per Price book 2017/18
Project №	AU122217
Project Name	Southwest Rocks DSI
Project Manager	Edward Munnings
EDD Format (ESdat, EQuIS, Custom)	Esdat
Sampler(s)	EM
Handed over by	EM
Email for Invoice	admin@geosyntec.com
Email for Results	edward.munnings@geosyntec.com

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

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Combo B7	PFAS short suite, standard detection limit		Hold
1	GBH1_0.05_0.15	5/09/22	s		X		
2	GBH1_0.6-0.7	5/09/22	s		X		X
3	GBH1_2.7-2.8	5/09/22	s	X	X		
4	GBH1_2.9-3.0	5/09/22	s				X
5	GBH2_0.1-0.2	5/09/22	s				X
6	GBH2_0.2-0.3	5/09/22	s	X	X		
7	GBH2_1.6-1.7	5/09/22	s		X		
8	GBH3_0.1-0.3	5/09/22	s	X	X		
9	GBH3_1.8-2.0	5/09/22	s		X		
10	GBH4_0.1-0.2	6/09/22	s	X	X		
	Total Counts			4	8		3

Containers: 1L Plastic | 250mL Plastic | 125mL Plastic | 200mL Amber Glass | 40mL VOA vial | 500mL PFAS Bottle | Jar (Glass or HDPE) | Other (Asbestos AS4964, WA Guidelines)

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

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

* Surcharges apply

Sample Comments / Dangerous Goods Hazard Warning

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date	__/__/__	Time __:__
Eurofins | mgt Laboratory Use Only	Received By	Jaidyn Slogan	SYD | BNE | MEL | PER | ADL | (NTL) | DRW	Signature	[signature]	Date 8/9/22	Time 10:44 Am	Temperature 6.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date __/__/__	Time __:__	Report № 921952

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

2/4

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ **Sydney Laboratory** Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2, 91 Leach Highway, Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 2 Kingston Town Close, Oakleigh, VIC 3166 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217	Project Manager	Edward Munnings
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI	EDD Format (ESdat, EQuIS, Custom)	Esdat
Contact Name	Edward Munninghs			Sampler(s)	EM
Phone №	478735577			Handed over by	EM
Special Directions				Email for Invoice	admin@geosyntec.com
Purchase Order	410000309?			Email for Results	edward.munnings@geosyntec.com
Quote ID №	As per Price book 2017/18				

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

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Combo B7	PFAS short suite, standard detection limit		Hold	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	GBH4_1.0-1.1	6/09/22	s				X									
2	GBH4_1.6-1.8	6/09/22	s				X									
3	GBH5_0.05-0.15	6/09/22	s	X	X											
4	GBH5_1.1-1.2	6/09/22	s				X									
5	GBH6_0.05-0.15	6/09/22	s				X									
6	GBH6_0.15-0.35	6/09/22	s	X	X											
7	GBH6_1.3-1.5	6/09/22	s				X									
8	GBH7_0.05-0.15	6/09/22	s	X	X											
9	GBH7_0.5-0.7	6/09/22	s				X									
10	GBH7_2.0-2.2	6/09/22	s				X									
	Total Counts			3	3		7									

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal Name Signature Date __/__/__ Time __:__

Eurofins | mgt Laboratory Use Only					
Received By: Jaidyn Slangmu	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature: [signature]	Date 8/9/22	Time 10:58 AM	Temperature 6.2
Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date __/__/__	Time __:__	Report № 921952

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

3/4

CHAIN OF COUSTODY RECORD

ABN 50 005 085 521

☐ **Sydney Laboratory**
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory**
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory**
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory**
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI
Contact Name	Edward Munninghs	Project Manager	Edward Munnings
Phone №	478735577	EDD Format (ESdat, EQuIS, Custom)	Esdat
Special Directions		Sampler(s)	EM
Purchase Order	410000309	Handed over by	EM
Quote ID №	As per Price book 2017/18	Email for Invoice	admin@geosyntec.com
		Email for Results	edward.munnings@geosyntec.com

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

Containers: 1L Plastic; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL VOA vial; 500mL PFAS Bottle; Jar (Glass or HDPE); Other (Asbestos AS4964, WA Guidelines)

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Combo B7	PFAS short suite, standard detection limit	Hold	Sample Comments / Dangerous Goods Hazard Warning
1	GBH8_0.05-0.15	6/09/22	s	X	X		
2	GBH8_0.8-1.0	6/09/22	s			X	
3	GBH8_3.0-3.2	6/09/22	s			X	
4	GBH8_3.5-3.7	6/09/22	s			X	
5	S-1	6/09/22	s		X		
6	S-2	6/09/22	s		X		
7	S-3	6/09/22	s		X		
8	S-4	6/09/22	s		X		
9	DUP-1	5/09/22	s	X			
10	DUP-2	6/09/22	s			X	
	Total Counts			2	5	4	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	__/__/__
								Time	__:__
Eurofins | mgt Laboratory Use Only	Received By	Jaidyn Sl[illegible]	SYD | BNE | MEL | PER | ADL | NTL (circled) | DRW	Signature	[signature]	Date	8/9/22	Time	10:44 am
								Temperature	6.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__
								Report №	921952

4/4

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec	Project №	AU122217	Project Manager	Edward Munnings
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	Southwest Rocks DSI	EDD Format (ESdat, EQuIS, Custom)	Esdat
Contact Name	Edward Munninghs				
Phone №	478735577				
Special Directions					
Purchase Order	4100003098				
Quote ID №	As per Price book 2017/18				

Sampler(s)	EM
Handed over by	EM
Email for Invoice	admin@geosyntec.com
Email for Results	edward.munnings@geosyntec.com

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

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Please send to envirolab for ELS combo 3	btex/tth / recovery	Hold	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964; WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TRIP-1	5/09/22	s	X											
2	TRIP-2	6/09/22	s			X									
3	TB	5/09/22	s		X										
4	TS	5/09/22	s		X										
5															
6															
7															
8															
9															
10															
	Total Counts			1	2	1									

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

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

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date	__/__/__	Time	__:__
Eurofins | mgt Laboratory Use Only	Received By: Jaidyn Glasgow	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date: 8/9/22	Time: 10:44 AM	Temperature: 6.2		
	Received By:	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date: __/__/__	Time: __:__	Report №: 921952		

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

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

Sample Receipt Advice

Company name:	Geosyntec Consultants Pty Ltd
Contact name:	Edward Munnings
Project name:	AU122217
Project ID:	SOUTHWEST ROCKS DSI
Turnaround time:	5 Day
Date/Time received	Sep 9, 2022 10:43 AM
Eurofins reference	921952

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.
✓	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Extra samples received - GBH6_2.7-2.9 and GBH8_4.8-5.0

Contact

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

Asim Khan on phone : or by email: AsimKhan@eurofins.com

Results will be delivered electronically via email to Edward Munnings - edward.munnings@geosyntec.com.

Global Leader - Results you can trust

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	GBH1_0.05-0.15	Sep 05, 2022		Soil	N22-Se0018713		X			X	
2	GBH1_0.6-0.7	Sep 05, 2022		Soil	N22-Se0018714		X			X	
3	GBH1_2.7-2.8	Sep 05, 2022		Soil	N22-Se0018715		X	X		X	
4	GBH2_0.2-0.3	Sep 05, 2022		Soil	N22-Se0018716		X	X		X	
5	GBH2_1.6-1.7	Sep 05, 2022		Soil	N22-Se0018717		X			X	
6	GBH3_0.1-0.3	Sep 05, 2022		Soil	N22-Se0018718		X	X		X	
7	GBH3_1.8-2.0	Sep 05, 2022		Soil	N22-Se0018719		X			X	
8	GBH4_0.1-0.2	Sep 05, 2022		Soil	N22-Se0018720		X	X		X	
9	GBH5_0.05-0.15	Sep 05, 2022		Soil	N22-Se0018721		X	X		X	
10	GBH6_0.15-0.35	Sep 06, 2022		Soil	N22-Se0018722		X	X		X	
11	GBH7_0.05-	Sep 06, 2022		Soil	N22-Se0018723		X	X		X	

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
	0.15										
12	GBH8_0.05-0.15	Sep 06, 2022		Soil	N22-Se0018724		X	X		X	
13	S-1	Sep 06, 2022		Soil	N22-Se0018725		X			X	
14	S-2	Sep 06, 2022		Soil	N22-Se0018726		X			X	
15	S-3	Sep 06, 2022		Soil	N22-Se0018727		X			X	
16	S-4	Sep 06, 2022		Soil	N22-Se0018728		X			X	
17	DUP-1	Sep 05, 2022		Soil	N22-Se0018729		X	X			
18	TB	Sep 06, 2022		Soil	N22-Se0018730				X		
19	TS	Sep 06, 2022		Soil	N22-Se0018731						X
20	GBH1_2.9-3.0	Sep 05, 2022		Soil	N22-Se0018732	X					
21	GBH2_0.1-0.2	Sep 05, 2022		Soil	N22-Se0018733	X					
22	GBH4_1.0-1.1	Sep 06, 2022		Soil	N22-Se0018734	X					
23	GBH4_1.6-1.8	Sep 06, 2022		Soil	N22-Se0018735	X					
24	GBH5_1.1-1.2	Sep 06, 2022		Soil	N22-Se0018736	X					
25	GBH6_0.05-	Sep 06, 2022		Soil	N22-Se0018737	X					

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
	0.15										
26	GBH6_1.3-1.5	Sep 06, 2022		Soil	N22-Se0018738	X					
27	GBH7_0.5-0.7	Sep 06, 2022		Soil	N22-Se0018739	X					
28	GBH7_2.0-2.2	Sep 06, 2022		Soil	N22-Se0018740	X					
29	GBH8_0.8-1.0	Sep 06, 2022		Soil	N22-Se0018741	X					
30	GBH8_3.0-3.2	Sep 06, 2022		Soil	N22-Se0018742	X					
31	GBH8_3.5-3.7	Sep 06, 2022		Soil	N22-Se0018743	X					
32	DUP-2	Sep 06, 2022		Soil	N22-Se0018744	X					
33	TRIP-2	Sep 06, 2022		Soil	N22-Se0018745	X					
34	GBH6_2.7-2.9	Sep 05, 2022		Soil	N22-Se0018789	X					
35	GBH8_4.8-5.0	Sep 05, 2022		Soil	N22-Se0018790	X					
Test Counts						16	17	9	1	16	1

Geosyntec Consultants Pty Ltd
Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Attention: **Edward Munnings**

Report **921952-S**
Project name AU122217
Project ID SOUTHWEST ROCKS DSI
Received Date Sep 09, 2022

Client Sample ID			**GBH1_0.05-0.15**	**GBH1_0.6-0.7**	**GBH1_2.7-2.8**	**GBH2_0.2-0.3**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N22-Se0018713**	**N22-Se0018714**	**N22-Se0018715**	**N22-Se0018716**
Date Sampled			**Sep 05, 2022**	**Sep 05, 2022**	**Sep 05, 2022**	**Sep 05, 2022**
Test/Reference	LOR	Unit				
% Moisture	1	%	21	18	12	22
Per- and Polyfluoroalkyl Substances (PFASs) - Short						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10	< 10	< 10
13C2-6:2 FTSA (surr.)	1	%	125	77	71	120
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
18O2-PFHxS (surr.)	1	%	95	89	89	90
13C8-PFOS (surr.)	1	%	101	93	89	92
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
13C8-PFOA (surr.)	1	%	91	86	86	86
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	< 20	< 20
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	58
TRH C29-C36	50	mg/kg	-	-	< 50	100
TRH C10-C36 (Total)	50	mg/kg	-	-	< 50	158
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
4-Bromofluorobenzene (surr.)	1	%	-	-	51	99
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	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

Client Sample ID			GBH1_0.05-0.15	GBH1_0.6-0.7	GBH1_2.7-2.8	GBH2_0.2-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018713	N22-Se0018714	N22-Se0018715	N22-Se0018716
Date Sampled			Sep 05, 2022	Sep 05, 2022	Sep 05, 2022	Sep 05, 2022
Test/Reference	LOR	Unit				
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
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	%	-	-	91	91
p-Terphenyl-d14 (surr.)	1	%	-	-	96	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	< 100	120
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	< 100	120
Heavy Metals						
Arsenic	2	mg/kg	-	-	< 2	< 2
Cadmium	0.4	mg/kg	-	-	< 0.4	< 0.4
Chromium	5	mg/kg	-	-	< 5	< 5
Copper	5	mg/kg	-	-	< 5	< 5
Lead	5	mg/kg	-	-	< 5	< 5
Mercury	0.1	mg/kg	-	-	< 0.1	< 0.1
Nickel	5	mg/kg	-	-	< 5	< 5
Zinc	5	mg/kg	-	-	< 5	< 5

Client Sample ID			GBH2_1.6-1.7	GBH3_0.1-0.3	GBH3_1.8-2.0	GBH4_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018717	N22-Se0018718	N22-Se0018719	N22-Se0018720
Date Sampled			Sep 05, 2022	Sep 05, 2022	Sep 05, 2022	Sep 05, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	17	18	20	14
Per- and Polyfluoroalkyl Substances (PFASs) - Short						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10	< 10	< 10
13C2-6:2 FTSA (surr.)	1	%	74	98	74	148
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
18O2-PFHxS (surr.)	1	%	88	96	89	93
13C8-PFOS (surr.)	1	%	94	96	92	95
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
13C8-PFOA (surr.)	1	%	84	92	87	83
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	< 20	-	< 20
TRH C10-C14	20	mg/kg	-	< 20	-	< 20
TRH C15-C28	50	mg/kg	-	65	-	70
TRH C29-C36	50	mg/kg	-	88	-	87
TRH C10-C36 (Total)	50	mg/kg	-	153	-	157
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
4-Bromofluorobenzene (surr.)	1	%	-	108	-	66
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	< 0.5	-	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	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
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
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

Client Sample ID			GBH2_1.6-1.7	GBH3_0.1-0.3	GBH3_1.8-2.0	GBH4_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018717	N22-Se0018718	N22-Se0018719	N22-Se0018720
Date Sampled			Sep 05, 2022	Sep 05, 2022	Sep 05, 2022	Sep 05, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
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	%	-	88	-	83
p-Terphenyl-d14 (surr.)	1	%	-	109	-	96
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	< 50	-	< 50
TRH >C16-C34	100	mg/kg	-	110	-	120
TRH >C34-C40	100	mg/kg	-	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	110	-	120
Heavy Metals						
Arsenic	2	mg/kg	-	< 2	-	< 2
Cadmium	0.4	mg/kg	-	< 0.4	-	< 0.4
Chromium	5	mg/kg	-	5.5	-	< 5
Copper	5	mg/kg	-	58	-	< 5
Lead	5	mg/kg	-	35	-	< 5
Mercury	0.1	mg/kg	-	< 0.1	-	< 0.1
Nickel	5	mg/kg	-	< 5	-	< 5
Zinc	5	mg/kg	-	74	-	< 5

Client Sample ID			GBH5_0.05-0.15	GBH6_0.15-0.35	GBH7_0.05-0.15	GBH8_0.05-0.15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018721	N22-Se0018722	N22-Se0018723	N22-Se0018724
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	9.7	18	32	11
Per- and Polyfluoroalkyl Substances (PFASs) - Short						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10	< 10	< 10
13C2-6:2 FTSA (surr.)	1	%	121	69	178	176
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
18O2-PFHxS (surr.)	1	%	97	89	87	92
13C8-PFOS (surr.)	1	%	94	91	91	97
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
13C8-PFOA (surr.)	1	%	87	86	78	83
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5

Client Sample ID			GBH5_0.05-0.15	GBH6_0.15-0.35	GBH7_0.05-0.15	GBH8_0.05-0.15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018721	N22-Se0018722	N22-Se0018723	N22-Se0018724
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	33	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	130	88
TRH C29-C36	50	mg/kg	57	< 50	170	130
TRH C10-C36 (Total)	50	mg/kg	57	< 50	333	218
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	79	75	87	70
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	95	99	95	98
p-Terphenyl-d14 (surr.)	1	%	102	104	99	109
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	220	160
TRH >C34-C40	100	mg/kg	< 100	< 100	120	110
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	340	270

Client Sample ID			GBH5_0.05-0.15	GBH6_0.15-0.35	GBH7_0.05-0.15	GBH8_0.05-0.15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018721	N22-Se0018722	N22-Se0018723	N22-Se0018724
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	< 5	< 5	< 5
Copper	5	mg/kg	< 5	< 5	< 5	< 5
Lead	5	mg/kg	< 5	< 5	< 5	84
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	8.1	< 5	< 5	< 5

Client Sample ID			S-1	S-2	S-3	S-4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018725	N22-Se0018726	N22-Se0018727	N22-Se0018728
Date Sampled			Sep 06, 2022	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit				
% Moisture	1	%	23	14	21	24
Per- and Polyfluoroalkyl Substances (PFASs) - Short						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10	< 10	< 10
13C2-6:2 FTSA (surr.)	1	%	142	160	137	181
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
18O2-PFHxS (surr.)	1	%	91	88	92	84
13C8-PFOS (surr.)	1	%	91	89	86	86
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5	< 5	< 5
13C8-PFOA (surr.)	1	%	88	80	88	76
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5	< 5

Client Sample ID			DUP-1	TB	TS
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018729	N22-Se0018730	N22-Se0018731
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit			
% Moisture	1	%	19	-	-
Naphthalene[N02]	0.5	mg/kg	-	< 0.5	-
TRH C6-C10	1	%	-	-	110
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	-
TRH C10-C14	20	mg/kg	31	-	-
TRH C15-C28	50	mg/kg	170	-	-
TRH C29-C36	50	mg/kg	200	-	-
TRH C10-C36 (Total)	50	mg/kg	401	-	-

Client Sample ID			DUP-1	TB	TS
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018729	N22-Se0018730	N22-Se0018731
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit			
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	-
4-Bromofluorobenzene (surr.)	1	%	103	102	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	68	-	-
TRH C6-C10	20	mg/kg	< 20	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	93	-	-
p-Terphenyl-d14 (surr.)	1	%	103	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	68	-	-
TRH >C16-C34	100	mg/kg	260	-	-
TRH >C34-C40	100	mg/kg	200	-	-
TRH >C10-C40 (total)*	100	mg/kg	528	-	-
Heavy Metals					
Arsenic	2	mg/kg	3.9	-	-
Cadmium	0.4	mg/kg	< 0.4	-	-
Chromium	5	mg/kg	12	-	-
Copper	5	mg/kg	26	-	-
Lead	5	mg/kg	8.6	-	-
Mercury	0.1	mg/kg	< 0.1	-	-
Nickel	5	mg/kg	< 5	-	-
Zinc	5	mg/kg	170	-	-

Client Sample ID			DUP-1	TB	TS
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			N22-Se0018729	N22-Se0018730	N22-Se0018731
Date Sampled			Sep 05, 2022	Sep 06, 2022	Sep 06, 2022
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C10	20	mg/kg	-	< 20	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	< 20	-
Naphthalene	1	%	-	-	110
TRH C6-C9	1	%	-	-	120
BTEX					
Benzene	1	%	-	-	110
Ethylbenzene	1	%	-	-	110
m&p-Xylenes	1	%	-	-	110
o-Xylene	1	%	-	-	110
Toluene	1	%	-	-	110
Xylenes - Total	1	%	-	-	110
4-Bromofluorobenzene (surr.)	1	%	-	-	77

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
% Moisture	Sydney	Sep 09, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Per- and Polyfluoroalkyl Substances (PFASs) - Short	Sydney	Sep 15, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 15, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Sydney	Sep 15, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	GBH1_0.05-0.15	Sep 05, 2022		Soil	N22-Se0018713		X			X	
2	GBH1_0.6-0.7	Sep 05, 2022		Soil	N22-Se0018714		X			X	
3	GBH1_2.7-2.8	Sep 05, 2022		Soil	N22-Se0018715		X	X		X	
4	GBH2_0.2-0.3	Sep 05, 2022		Soil	N22-Se0018716		X	X		X	
5	GBH2_1.6-1.7	Sep 05, 2022		Soil	N22-Se0018717		X			X	
6	GBH3_0.1-0.3	Sep 05, 2022		Soil	N22-Se0018718		X	X		X	
7	GBH3_1.8-2.0	Sep 05, 2022		Soil	N22-Se0018719		X			X	
8	GBH4_0.1-0.2	Sep 05, 2022		Soil	N22-Se0018720		X	X		X	
9	GBH5_0.05-0.15	Sep 05, 2022		Soil	N22-Se0018721		X	X		X	
10	GBH6_0.15-0.35	Sep 06, 2022		Soil	N22-Se0018722		X	X		X	
11	GBH7_0.05-	Sep 06, 2022		Soil	N22-Se0018723		X	X		X	

Date Reported:Sep 20, 2022

Date Reported:Sep 20, 2022

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
	0.15										
12	GBH8_0.05-0.15	Sep 06, 2022		Soil	N22-Se0018724		X	X		X	
13	S-1	Sep 06, 2022		Soil	N22-Se0018725		X			X	
14	S-2	Sep 06, 2022		Soil	N22-Se0018726		X			X	
15	S-3	Sep 06, 2022		Soil	N22-Se0018727		X			X	
16	S-4	Sep 06, 2022		Soil	N22-Se0018728		X			X	
17	DUP-1	Sep 05, 2022		Soil	N22-Se0018729		X	X			
18	TB	Sep 06, 2022		Soil	N22-Se0018730				X		
19	TS	Sep 06, 2022		Soil	N22-Se0018731						X
20	GBH1_2.9-3.0	Sep 05, 2022		Soil	N22-Se0018732	X					
21	GBH2_0.1-0.2	Sep 05, 2022		Soil	N22-Se0018733	X					
22	GBH4_1.0-1.1	Sep 06, 2022		Soil	N22-Se0018734	X					
23	GBH4_1.6-1.8	Sep 06, 2022		Soil	N22-Se0018735	X					
24	GBH5_1.1-1.2	Sep 06, 2022		Soil	N22-Se0018736	X					
25	GBH6_0.05-	Sep 06, 2022		Soil	N22-Se0018737	X					

Date Reported:Sep 20, 2022

Date Reported:Sep 20, 2022

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: AU122217
Project ID: SOUTHWEST ROCKS DSI

Order No.: 41000309
Report #: 921952
Phone: 02 9251 8070
Fax:

Received: Sep 9, 2022 10:43 AM
Due: Sep 16, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X
	0.15										
26	GBH6_1.3-1.5	Sep 06, 2022		Soil	N22-Se0018738	X					
27	GBH7_0.5-0.7	Sep 06, 2022		Soil	N22-Se0018739	X					
28	GBH7_2.0-2.2	Sep 06, 2022		Soil	N22-Se0018740	X					
29	GBH8_0.8-1.0	Sep 06, 2022		Soil	N22-Se0018741	X					
30	GBH8_3.0-3.2	Sep 06, 2022		Soil	N22-Se0018742	X					
31	GBH8_3.5-3.7	Sep 06, 2022		Soil	N22-Se0018743	X					
32	DUP-2	Sep 06, 2022		Soil	N22-Se0018744	X					
33	TRIP-2	Sep 06, 2022		Soil	N22-Se0018745	X					
34	GBH6_2.7-2.9	Sep 05, 2022		Soil	N22-Se0018789	X					
35	GBH8_4.8-5.0	Sep 05, 2022		Soil	N22-Se0018790	X					
Test Counts						16	17	9	1	16	1

Date Reported:Sep 20, 2022

Date Reported:Sep 20, 2022

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of 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 like compound to the analyte target and reported as percentage recovery.
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 5.4
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 be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

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

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

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

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Per- and Polyfluoroalkyl Substances (PFASs) - Short							
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 10			10	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5			5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Sum of US EPA PFAS (PFOS + PFOA)*	ug/kg	-			5	N/A	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
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	
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	
TRH C6-C10	mg/kg	< 20			20	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	
Total PAH*	mg/kg	-			0.5	N/A	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
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							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C10	mg/kg	< 20			20	Pass	
LCS - % Recovery							
Naphthalene	%	107			70-130	Pass	
LCS - % Recovery							
Per- and Polyfluoroalkyl Substances (PFASs) - Short							
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	131			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	134			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	127			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	130			50-150	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	86			70-130	Pass	
TRH C10-C14	%	87			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	110			70-130	Pass	
Toluene	%	101			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
m&p-Xylenes	%	105			70-130	Pass	
o-Xylene	%	104			70-130	Pass	
Xylenes - Total*	%	105			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	96			70-130	Pass	
TRH C6-C10	%	95			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	88			70-130	Pass	
Acenaphthylene	%	90			70-130	Pass	
Anthracene	%	119			70-130	Pass	
Benz(a)anthracene	%	86			70-130	Pass	
Benzo(a)pyrene	%	101			70-130	Pass	
Benzo(b&j)fluoranthene	%	85			70-130	Pass	
Benzo(g.h.i)perylene	%	91			70-130	Pass	
Benzo(k)fluoranthene	%	120			70-130	Pass	
Chrysene	%	106			70-130	Pass	
Dibenz(a.h)anthracene	%	102			70-130	Pass	
Fluoranthene	%	89			70-130	Pass	
Fluorene	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	99			70-130	Pass	
Naphthalene	%	88			70-130	Pass	
Phenanthrene	%	89			70-130	Pass	
Pyrene	%	87			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	89			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	98			80-120	Pass	
Cadmium	%	99			80-120	Pass	
Chromium	%	97			80-120	Pass	
Copper	%	93			80-120	Pass	
Lead	%	86			80-120	Pass	
Mercury	%	103			80-120	Pass	
Nickel	%	92			80-120	Pass	
Zinc	%	101			80-120	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C10	%	81			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Per- and Polyfluoroalkyl Substances (PFASs) - Short				Result 1					
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	N22-Se0018713	CP	%	128			50-150	Pass	
Perfluorooctanoic acid (PFOA)	N22-Se0018713	CP	%	138			50-150	Pass	
Spike - % Recovery									
				Result 1					
Naphthalene	N22-Se0023105	NCP	%	87			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	N22-Se0023105	NCP	%	92			70-130	Pass	
TRH C10-C14	S22-Se0027682	NCP	%	119			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	N22-Se0023105	NCP	%	100			70-130	Pass	
Toluene	N22-Se0023105	NCP	%	95			70-130	Pass	
Ethylbenzene	N22-Se0023105	NCP	%	96			70-130	Pass	
m&p-Xylenes	N22-Se0023105	NCP	%	98			70-130	Pass	
o-Xylene	N22-Se0023105	NCP	%	97			70-130	Pass	
Xylenes - Total*	N22-Se0023105	NCP	%	97			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	N22-Se0023105	NCP	%	88			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S22-Se0027682	NCP	%	122			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-Se0019309	NCP	%	112			75-125	Pass	
Cadmium	S22-Se0019309	NCP	%	110			75-125	Pass	
Chromium	S22-Se0019309	NCP	%	121			75-125	Pass	
Copper	S22-Se0028841	NCP	%	85			75-125	Pass	
Lead	S22-Se0028841	NCP	%	89			75-125	Pass	
Mercury	S22-Se0019309	NCP	%	117			75-125	Pass	
Nickel	S22-Se0019309	NCP	%	110			75-125	Pass	
Zinc	S22-Se0028841	NCP	%	96			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N22-Se0018714	CP	%	18	18	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S22-Se0028844	NCP	mg/kg	5.3	6.4	19	30%	Pass	
Duplicate									
Per- and Polyfluoroalkyl Substances (PFASs) - Short				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	N22-Se0018724	CP	ug/kg	< 10	< 10	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	N22-Se0018724	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	N22-Se0018724	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N22-Se0018725	CP	%	23	23	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Naphthalene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	N22-Se0018729	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	N22-Se0018729	CP	mg/kg	31	20	41	30%	Fail	Q15
TRH C15-C28	N22-Se0018729	CP	mg/kg	170	130	27	30%	Pass	
TRH C29-C36	N22-Se0018729	CP	mg/kg	200	190	8.4	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	N22-Se0018729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	N22-Se0018729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	N22-Se0018729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	N22-Se0018729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	N22-Se0018729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	N22-Se0018729	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C10	N22-Se0018729	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	N22-Se0018729	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	N22-Se0018729	CP	mg/kg	68	< 50	43	30%	Fail	Q15
TRH >C16-C34	N22-Se0018729	CP	mg/kg	260	220	16	30%	Pass	
TRH >C34-C40	N22-Se0018729	CP	mg/kg	200	200	1.2	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-Se0018729	CP	mg/kg	3.9	8.8	77	30%	Fail	Q15
Cadmium	N22-Se0018729	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	N22-Se0018729	CP	mg/kg	12	15	25	30%	Pass	
Lead	N22-Se0018729	CP	mg/kg	8.6	14	45	30%	Fail	Q15
Mercury	N22-Se0018729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	N22-Se0018729	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	N22-Se0018729	CP	mg/kg	170	180	8.2	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.
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.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Asim Khan	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Volatile
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Organic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☑ Sydney Laboratory
179 Magowar Road, Girraween, NSW 2145
+61 2 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1/21 Smallwood Place, Murarrie, QLD 4172
+61 7 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
46-48 Banksia Road, Welshpool, WA 6106
+61 8 6253 4444 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company	Geosyntec Consultants	Project №	AU122217	Project Manager	Edward Mannings
Address	Suite 1, Level 9, 189 Kent St, Sydney	Project Name	South West Rocks DSI	EDD Format (ESdat, EQuIS etc)	Esdat
Contact Name	Edward Mannings	Sampler(s)	Edward Mannings	Handed over by	--
Phone №	0478735577	Email for Invoice	admin@geosyntec.com	Email for Results	Edward.Mannings@geosyntec.com
Special Directions	—				
Purchase Order	410000304				
Quote ID №	—				

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

Analyses columns: B7 | PFAS short suite TRACE | Please send to Envirolab for combo 3 | BTEX/volatile TRH / heavy [illegible] | TB / TS

Containers (Change container type & size if necessary): 500mL Plastic red/[illegible] | 250mL Plastic | 125mL Plastic | 200mL Amber Glass | 40mL VOA vial | 500mL PFAS Bottle | Jar (Glass or HDPE) | Other (Asbestos AS4964, WA Guidelines)

Required Turnaround Time (TAT) — Default will be 5 days if not ticked. ♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day ♦ ☐ 1 day ♦
☐ 2 days ♦ ☐ 3
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B7	PFAS short suite TRACE	Please send to Envirolab for combo 3			BTEX/volatile TRH / heavy [illegible]	TB / TS	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar	Other	Sample Comments / Dangerous Goods Hazard Warning
1	GMW1	11.9.22	W	X	X						x			x	x	x			
2	GMW2	↓	↓	X	X						x			x	x	x			
3	GMW3			X	X						x			x	x	x			
4	GMW4			X	X						x			x	x	x			
5	GMW5			X	X						x			x	x	x			
6	GMW6			X	X						x			x	x	x			
7	GMW7			X	X						x			x	x	x			
8	GMW8			X	X						x			x	x	x			
9	DUP1W			X							x			x	x				
10	TRIP1W	↓	↓			X					x			x	x				
	Total Counts			9	8	1													

(TB/TS)

Method of Shipment	☐ Courier (#) ☑ Hand Delivered ☐ Postal	Name	Edward Mannings	Signature	E. [signature]	Date	13.9.22	Time	9:15am
Laboratory Use Only	Received By	Jaidyn Stevenson	SYD | BNE | MEL | PER | ADL | (NTL) | DRW	Signature	[signature]	Date	13/9/22	Time	9:15 Am	Temperature	5.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	13/9/22	Time		Report №	923151

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

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

Sample Receipt Advice

Company name:	Geosyntec Consultants Pty Ltd
Contact name:	Edward Munnings
Project name:	SOUTH WEST ROCKS DSI
Project ID:	AU122217
Turnaround time:	5 Day
Date/Time received	Sep 14, 2022 9:15 AM
Eurofins reference	923151

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.
✓	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Extra sample received - EB logged on HOLD

Contact

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

Asim Khan on phone : or by email: AsimKhan@eurofins.com

Results will be delivered electronically via email to Edward Munnings - edward.munnings@geosyntec.com.

Global Leader - Results you can trust

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: SOUTH WEST ROCKS DSI
Project ID: AU122217

Order No.: 410000309
Report #: 923151
Phone: 02 9251 8070
Fax:

Received: Sep 14, 2022 9:15 AM
Due: Sep 21, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Eurofins Suite B7A (filtered metals)	BTEXN and Volatile TRH	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	
Brisbane Laboratory - NATA # 1261 Site # 20794									X
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	GMW1	Sep 11, 2022		Water	N22-Se0029114	X			X
2	GMW2	Sep 11, 2022		Water	N22-Se0029115	X			X
3	GMW3	Sep 11, 2022		Water	N22-Se0029116	X			X
4	GMW4	Sep 11, 2022		Water	N22-Se0029117	X			X
5	GMW5	Sep 11, 2022		Water	N22-Se0029118	X			X
6	GMW6	Sep 11, 2022		Water	N22-Se0029119	X			X
7	GMW7	Sep 11, 2022		Water	N22-Se0029120	X			X
8	GMW8	Sep 11, 2022		Water	N22-Se0029121	X			X
9	DUP1W	Sep 11, 2022		Water	N22-Se0029122	X			
10	TB	Sep 11, 2022		Water	N22-Se0029123		X		
11	TS	Sep 11, 2022		Water	N22-Se0029124			X	

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: SOUTH WEST ROCKS DSI
Project ID: AU122217

Order No.: 410000309
Report #: 923151
Phone: 02 9251 8070
Fax:

Received: Sep 14, 2022 9:15 AM
Due: Sep 21, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Eurofins Suite B7A (filtered metals)	BTEXN and Volatile TRH	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	
Brisbane Laboratory - NATA # 1261 Site # 20794									X
12	EB	Sep 11, 2022		Water	N22-Se0029198				X
Test Counts						9	1	1	9

Geosyntec Consultants Pty Ltd
Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Attention: **Edward Munnings**

Report **923151-W**
Project name SOUTH WEST ROCKS DSI
Project ID AU122217
Received Date Sep 14, 2022

Client Sample ID			**GMW1**	**GMW2**	**GMW3**	**GMW4**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**N22-Se0029114**	**N22-Se0029115**	**N22-Se0029116**	**N22-Se0029117**
Date Sampled			**Sep 11, 2022**	**Sep 11, 2022**	**Sep 11, 2022**	**Sep 11, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	0.6	< 0.1	0.2
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	0.6	< 0.1	0.3
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	73	75	73	73
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	0.17	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			GMW1	GMW2	GMW3	GMW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029114	N22-Se0029115	N22-Se0029116	N22-Se0029117
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	59	57	64	62
p-Terphenyl-d14 (surr.)	1	%	52	78	110	52
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	34	34	34	34
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	< 0.05	0.17	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	0.3	< 0.1	0.2
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	0.47	< 0.1	0.2
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	0.003	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	0.009	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004	0.007	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.026	< 0.005
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.005	ug/L	< 0.005	< 0.005	< 0.005	< 0.005
13C2-6:2 FTSA (surr.)	1	%	90	131	78	150
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.001	ug/L	[N09]0.006	[N09]0.011	< 0.001	< 0.001
Perfluorooctanesulfonic acid (PFOS)[N11]	0.001	ug/L	[N09]0.019	[N09]0.022	< 0.001	< 0.001
18O2-PFHxS (surr.)	1	%	87	89	90	132
13C8-PFOS (surr.)	1	%	76	86	76	120

Client Sample ID			GMW1	GMW2	GMW3	GMW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029114	N22-Se0029115	N22-Se0029116	N22-Se0029117
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
Perfluorooctanoic acid (PFOA)[N11]	0.001	ug/L	0.007	0.011	< 0.001	< 0.001
13C8-PFOA (surr.)	1	%	54	81	91	82
Sum (PFHxS + PFOS)*	0.001	ug/L	0.025	0.033	< 0.001	< 0.001
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	0.032	0.044	< 0.001	< 0.001
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	0.026	0.033	< 0.001	< 0.001

Client Sample ID			GMW5	GMW6	GMW7	GMW8
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029118	N22-Se0029119	N22-Se0029120	N22-Se0029121
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	0.06	< 0.05	< 0.05	0.16
TRH C15-C28	0.1	mg/L	0.1	0.1	< 0.1	0.2
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.16	0.1	< 0.1	0.36
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	73	72	68	75
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.09	< 0.05	< 0.05	0.17
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			GMW5	GMW6	GMW7	GMW8
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029118	N22-Se0029119	N22-Se0029120	N22-Se0029121
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	62	INT	60	65
p-Terphenyl-d14 (surr.)	1	%	INT	89	62	81
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.01	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	33	35	35	34
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	0.09	< 0.05	< 0.05	0.17
TRH >C16-C34	0.1	mg/L	0.2	0.2	< 0.1	0.2
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.29	0.2	< 0.1	0.37
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Copper (filtered)	0.001	mg/L	0.001	0.001	0.003	0.007
Lead (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	0.0003	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.027	0.009	0.021	0.008
Zinc (filtered)	0.005	mg/L	0.015	0.010	< 0.005	0.061
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.005	ug/L	< 0.005	< 0.005	< 0.005	< 0.005
13C2-6:2 FTSA (surr.)	1	%	56	62	92	98
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.001	ug/L	< 0.001	< 0.001	< 0.001	< 0.001
Perfluorooctanesulfonic acid (PFOS)[N11]	0.001	ug/L	0.003	< 0.001	[N09]0.004	[N09]0.004
18O2-PFHxS (surr.)	1	%	73	92	82	96
13C8-PFOS (surr.)	1	%	68	76	82	82

Client Sample ID			GMW5	GMW6	GMW7	GMW8
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029118	N22-Se0029119	N22-Se0029120	N22-Se0029121
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
Perfluorooctanoic acid (PFOA)[N11]	0.001	ug/L	< 0.001	< 0.001	[N09]0.005	< 0.001
13C8-PFOA (surr.)	1	%	38	61	53	99
Sum (PFHxS + PFOS)*	0.001	ug/L	0.003	< 0.001	0.004	0.004
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	0.003	< 0.001	0.009	0.004
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	0.003	< 0.001	0.009	0.004

Client Sample ID			DUP1W	TB	TS	EB
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029122	N22-Se0029123	N22-Se0029124	N22-Se0029198
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	-	-
TRH C10-C14	0.05	mg/L	< 0.05	-	-	-
TRH C15-C28	0.1	mg/L	< 0.1	-	-	-
TRH C29-C36	0.1	mg/L	< 0.1	-	-	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	-	-	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	-	-
Toluene	0.001	mg/L	< 0.001	< 0.001	-	-
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	-	-
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	-	-
o-Xylene	0.001	mg/L	< 0.001	< 0.001	-	-
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	-	-
4-Bromofluorobenzene (surr.)	1	%	70	71	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	-	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	-	-	-
TRH C6-C10	0.02	mg/L	< 0.02	-	-	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	-	-	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	-	-	-
Acenaphthylene	0.001	mg/L	< 0.001	-	-	-
Anthracene	0.001	mg/L	< 0.001	-	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	-	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	-	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	-	-	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	-	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	-	-	-
Chrysene	0.001	mg/L	< 0.001	-	-	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	-	-	-
Fluoranthene	0.001	mg/L	< 0.001	-	-	-
Fluorene	0.001	mg/L	< 0.001	-	-	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	-	-	-
Naphthalene	0.001	mg/L	< 0.001	-	-	-
Phenanthrene	0.001	mg/L	< 0.001	-	-	-
Pyrene	0.001	mg/L	< 0.001	-	-	-

Client Sample ID			DUP1W	TB	TS	EB
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029122	N22-Se0029123	N22-Se0029124	N22-Se0029198
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Total PAH*	0.001	mg/L	< 0.001	-	-	-
2-Fluorobiphenyl (surr.)	1	%	58	-	-	-
p-Terphenyl-d14 (surr.)	1	%	57	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	-	-	-
2.4-Dichlorophenol	0.003	mg/L	< 0.003	-	-	-
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	-	-	-
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	-	-	-
2.6-Dichlorophenol	0.003	mg/L	< 0.003	-	-	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	-	-	-
Pentachlorophenol	0.01	mg/L	< 0.01	-	-	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	-	-	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	-	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	-	-	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	-	-	-
2-Nitrophenol	0.01	mg/L	< 0.01	-	-	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	-	-	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	-	-	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	-	-	-
Total cresols*	0.01	mg/L	< 0.01	-	-	-
4-Nitrophenol	0.03	mg/L	< 0.03	-	-	-
Dinoseb	0.1	mg/L	< 0.1	-	-	-
Phenol	0.003	mg/L	< 0.003	-	-	-
Phenol-d6 (surr.)	1	%	35	-	-	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	< 0.05	-	-	-
TRH >C16-C34	0.1	mg/L	< 0.1	-	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	-	-	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	-	-	-
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	-	-	-
Cadmium (filtered)	0.0002	mg/L	< 0.0002	-	-	-
Chromium (filtered)	0.001	mg/L	0.003	-	-	-
Copper (filtered)	0.001	mg/L	< 0.001	-	-	-
Lead (filtered)	0.001	mg/L	< 0.001	-	-	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	-	-	-
Nickel (filtered)	0.001	mg/L	0.004	-	-	-
Zinc (filtered)	0.005	mg/L	< 0.005	-	-	-
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.005	ug/L	-	-	-	< 0.005
13C2-6:2 FTSA (surr.)	1	%	-	-	-	125
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.001	ug/L	-	-	-	< 0.001
Perfluorooctanesulfonic acid (PFOS)[N11]	0.001	ug/L	-	-	-	0.002
18O2-PFHxS (surr.)	1	%	-	-	-	142
13C8-PFOS (surr.)	1	%	-	-	-	120

Client Sample ID			DUP1W	TB	TS	EB
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N22-Se0029122	N22-Se0029123	N22-Se0029124	N22-Se0029198
Date Sampled			Sep 11, 2022	Sep 11, 2022	Sep 11, 2022	Sep 11, 2022
Test/Reference	LOR	Unit				
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace						
Perfluorooctanoic acid (PFOA)[N11]	0.001	ug/L	-	-	-	< 0.001
13C8-PFOA (surr.)	1	%	-	-	-	102
Sum (PFHxS + PFOS)*	0.001	ug/L	-	-	-	0.002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	-	-	-	0.002
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	-	-	-	0.002
Naphthalene[N02]	0.01	mg/L	-	< 0.01	-	-
TRH C6-C10	1	%	-	-	71	-
Total Recoverable Hydrocarbons						
TRH C6-C10	0.02	mg/L	-	< 0.02	-	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	< 0.02	-	-
Naphthalene	1	%	-	-	110	-
TRH C6-C9	1	%	-	-	72	-
BTEX						
Benzene	1	%	-	-	91	-
Ethylbenzene	1	%	-	-	85	-
m&p-Xylenes	1	%	-	-	99	-
o-Xylene	1	%	-	-	87	-
Toluene	1	%	-	-	87	-
Xylenes - Total	1	%	-	-	91	-
4-Bromofluorobenzene (surr.)	1	%	-	-	90	-

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	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Sep 20, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Sep 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 20, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8 filtered	Sydney	Sep 20, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace	Brisbane	Sep 21, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: SOUTH WEST ROCKS DSI
Project ID: AU122217

Order No.: 410000309
Report #: 923151
Phone: 02 9251 8070
Fax:

Received: Sep 14, 2022 9:15 AM
Due: Sep 21, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Eurofins Suite B7A (filtered metals)	BTEXN and Volatile TRH	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	
Brisbane Laboratory - NATA # 1261 Site # 20794									X
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	GMW1	Sep 11, 2022		Water	N22-Se0029114	X			X
2	GMW2	Sep 11, 2022		Water	N22-Se0029115	X			X
3	GMW3	Sep 11, 2022		Water	N22-Se0029116	X			X
4	GMW4	Sep 11, 2022		Water	N22-Se0029117	X			X
5	GMW5	Sep 11, 2022		Water	N22-Se0029118	X			X
6	GMW6	Sep 11, 2022		Water	N22-Se0029119	X			X
7	GMW7	Sep 11, 2022		Water	N22-Se0029120	X			X
8	GMW8	Sep 11, 2022		Water	N22-Se0029121	X			X
9	DUP1W	Sep 11, 2022		Water	N22-Se0029122	X			
10	TB	Sep 11, 2022		Water	N22-Se0029123		X		
11	TS	Sep 11, 2022		Water	N22-Se0029124			X	

Date Reported:Sep 23, 2022

Date Reported:Sep 23, 2022

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

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

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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

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

Company Name: Geosyntec Consultants Pty Ltd
Address: Suite 1, Level 9, 189 Kent Street
Sydney
NSW 2000

Project Name: SOUTH WEST ROCKS DSI
Project ID: AU122217

Order No.: 410000309
Report #: 923151
Phone: 02 9251 8070
Fax:

Received: Sep 14, 2022 9:15 AM
Due: Sep 21, 2022
Priority: 5 Day
Contact Name: Edward Munnings

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Eurofins Suite B7A (filtered metals)	BTEXN and Volatile TRH	BTEXN and Volatile TRH	Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	
Brisbane Laboratory - NATA # 1261 Site # 20794									X
12	EB	Sep 11, 2022		Water	N22-Se0029198				X
Test Counts						9	1	1	9

Date Reported:Sep 23, 2022

Date Reported:Sep 23, 2022

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of 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 like compound to the analyte target and reported as percentage recovery.
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 5.4
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 be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

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

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

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

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
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	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	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							
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace							
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.005			0.005	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	80			70-130	Pass	
TRH C10-C14	%	116			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	79			70-130	Pass	
Toluene	%	83			70-130	Pass	
Ethylbenzene	%	84			70-130	Pass	
m&p-Xylenes	%	93			70-130	Pass	
o-Xylene	%	90			70-130	Pass	
Xylenes - Total*	%	92			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	101			70-130	Pass	
TRH C6-C10	%	88			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	116			70-130	Pass	
Acenaphthylene	%	120			70-130	Pass	
Benz(a)anthracene	%	119			70-130	Pass	
Benzo(a)pyrene	%	119			70-130	Pass	
Benzo(b&j)fluoranthene	%	118			70-130	Pass	
Benzo(g.h.i)perylene	%	106			70-130	Pass	
Benzo(k)fluoranthene	%	116			70-130	Pass	
Chrysene	%	118			70-130	Pass	
Dibenz(a.h)anthracene	%	116			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluorene	%	127			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	119			70-130	Pass	
Naphthalene	%	84			70-130	Pass	
Phenanthrene	%	129			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	113			25-140	Pass	
2.4.6-Trichlorophenol	%	112			25-140	Pass	
4-Chloro-3-methylphenol	%	125			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2.4-Dimethylphenol	%	109			25-140	Pass	
2-Methylphenol (o-Cresol)	%	101			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	101			25-140	Pass	
4-Nitrophenol	%	39			25-140	Pass	
Phenol	%	51			25-140	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	112			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	109			80-120	Pass	
Cadmium (filtered)	%	103			80-120	Pass	
Chromium (filtered)	%	106			80-120	Pass	
Copper (filtered)	%	105			80-120	Pass	
Lead (filtered)	%	94			80-120	Pass	
Mercury (filtered)	%	96			80-120	Pass	
Nickel (filtered)	%	103			80-120	Pass	
Zinc (filtered)	%	108			80-120	Pass	
LCS - % Recovery							
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace							
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	107			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	91			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	94			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	96			50-150	Pass	
LCS - % Recovery							
Naphthalene	%	100			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C10	%	83			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S22-Se0034827	NCP	%	105			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Benzo(g.h.i)perylene	R22-Se0015739	NCP	%	98			70-130	Pass	
Benzo(k)fluoranthene	R22-Se0015739	NCP	%	108			70-130	Pass	
Dibenz(a.h)anthracene	R22-Se0015739	NCP	%	115			70-130	Pass	
Indeno(1.2.3-cd)pyrene	R22-Se0015739	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S22-Se0034827	NCP	%	105			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals				Result 1					
Arsenic (filtered)	S22-Jl0001874	NCP	%	115			75-125	Pass	
Cadmium (filtered)	S22-Jl0001874	NCP	%	97			75-125	Pass	
Chromium (filtered)	S22-Jl0001874	NCP	%	104			75-125	Pass	
Copper (filtered)	S22-Jl0001874	NCP	%	97			75-125	Pass	
Lead (filtered)	N22-Jn0064828	NCP	%	89			75-125	Pass	
Mercury (filtered)	S22-Jl0001874	NCP	%	84			75-125	Pass	
Nickel (filtered)	S22-Jl0001874	NCP	%	98			75-125	Pass	
Zinc (filtered)	S22-Jl0001874	NCP	%	98			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	N22-Se0029115	CP	%	98			70-130	Pass	
Acenaphthylene	N22-Se0029115	CP	%	105			70-130	Pass	
Anthracene	N22-Se0029115	CP	%	109			70-130	Pass	
Benz(a)anthracene	N22-Se0029115	CP	%	70			70-130	Pass	
Benzo(a)pyrene	N22-Se0029115	CP	%	71			70-130	Pass	
Benzo(b&j)fluoranthene	N22-Se0029115	CP	%	75			70-130	Pass	
Chrysene	N22-Se0029115	CP	%	72			70-130	Pass	
Fluoranthene	N22-Se0029115	CP	%	105			70-130	Pass	
Fluorene	N22-Se0029115	CP	%	106			70-130	Pass	
Naphthalene	N22-Se0029115	CP	%	89			70-130	Pass	
Phenanthrene	N22-Se0029115	CP	%	104			70-130	Pass	
Pyrene	N22-Se0029115	CP	%	100			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	N22-Se0029115	CP	%	102			30-130	Pass	
2.4.6-Trichlorophenol	N22-Se0029115	CP	%	95			30-130	Pass	
4-Chloro-3-methylphenol	N22-Se0029115	CP	%	111			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2.4-Dimethylphenol	N22-Se0029115	CP	%	99			30-130	Pass	
2-Methylphenol (o-Cresol)	N22-Se0029115	CP	%	90			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	N22-Se0029115	CP	%	90			30-130	Pass	
4-Nitrophenol	N22-Se0029115	CP	%	35			30-130	Pass	
Phenol	N22-Se0029115	CP	%	47			30-130	Pass	
Spike - % Recovery									
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace				Result 1					
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	B22-Se0047310	NCP	%	70			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B22-Se0047310	NCP	%	103			50-150	Pass	
Perfluorooctanoic acid (PFOA)	B22-Se0047310	NCP	%	86			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S22-Se0040531	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S22-Se0040531	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S22-Se0040531	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S22-Se0040531	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S22-Se0040531	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S22-Se0040531	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	S22-Se0040531	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S22-Se0040531	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S22-Se0040531	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S22-Jn0067307	NCP	mg/L	0.001	0.001	3.0	30%	Pass	
Cadmium (filtered)	S22-Jn0067307	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S22-Jn0067307	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S22-Jn0067307	NCP	mg/L	0.002	0.002	4.7	30%	Pass	
Lead (filtered)	S22-Jn0067307	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S22-Jn0067307	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S22-Jn0067307	NCP	mg/L	0.002	0.002	1.0	30%	Pass	
Zinc (filtered)	S22-Jn0067307	NCP	mg/L	0.016	0.015	7.5	30%	Pass	
Duplicate									
Per- and Polyfluoroalkyl Substances (PFASs) - Short Trace				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	N22-Se0029114	CP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	N22-Se0029114	CP	ug/L	0.006	0.006	5.8	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	N22-Se0029114	CP	ug/L	0.019	0.017	12	30%	Pass	
Perfluorooctanoic acid (PFOA)	N22-Se0029114	CP	ug/L	0.007	0.007	4.1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	N22-Se0029118	CP	mg/L	0.06	< 0.05	63	30%	Fail	Q15
TRH C15-C28	N22-Se0029118	CP	mg/L	0.1	< 0.1	57	30%	Fail	Q15
TRH C29-C36	N22-Se0029118	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	N22-Se0029118	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dichlorophenol	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4.5-Trichlorophenol	N22-Se0029118	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4.6-Trichlorophenol	N22-Se0029118	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.6-Dichlorophenol	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	N22-Se0029118	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	N22-Se0029118	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	N22-Se0029118	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	

Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	N22-Se0029118	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	N22-Se0029118	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	N22-Se0029118	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4-Dimethylphenol	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dinitrophenol	N22-Se0029118	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	N22-Se0029118	CP	mg/L	< 0.01	< 0.006	<1	30%	Pass	
4-Nitrophenol	N22-Se0029118	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	N22-Se0029118	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	N22-Se0029118	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	N22-Se0029118	CP	mg/L	0.09	0.06	43	30%	Fail	Q15
TRH >C16-C34	N22-Se0029118	CP	mg/L	0.2	< 0.1	61	30%	Fail	Q15
TRH >C34-C40	N22-Se0029118	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Comments

Sample Integrity

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

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

Authorised by:

Asim Khan	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal
Jonathon Angell	Senior Analyst-PFAS
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

Appendix E Calibration Certificates

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (60M)**
Serial No. **3911**

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity above 7.9v	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: **Adam Nikolic**

Calibration date: **19-Aug-22**

Next calibration due: **18-Oct-22**

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-118254

airmet

Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		93ppm Isobutylene	NATA	SY361		93.1ppm

Calibrated by: Alex Buist

Calibration date: 31/08/2022

Next calibration due: 27/02/2023

31/08/2022

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 18G103111

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		381241	pH 7.00
2. pH 4.00		pH 4.00		389384	pH 3.97
3. ORP		238.4mV		387771/385070	238.3mV
4. EC		2.76mS		385041	2.76mS
5. D.O		0ppm		379624	-.050ppm
6. Temp		20.8°C		MultiTherm	20.4°C

Calibrated by: Evan Weller

Calibration date: 31/08/2022

Next calibration due: 01/10/2022

Appendix F RPD and QA/QC Tables

AU122217

Soil RPD Tables

Geosyntec consultants

				BTEX							TRH							Metals							
				Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
				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
EQL				0.5	0.1	0.1	0.1	0.2	0.1	0.3	20	20	50	50	100	100	100	2	0.4	5	5	5	0.1	5	5
Lab Report	Field ID	Date	Matrix Type																						
921952	GBH3_0.1-0.3	5/09/2022	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	110	<100	110	<2	<0.4	5.5	58	35	<0.1	<5	74
921952	DUP-1	5/09/2022	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	68	68	260	200	528	3.9	<0.4	12	26	8.6	<0.1	<5	170
RPD				0	0	0	0	0	0	0	0	0	31	31	81	67	131	64	0	74	76	121	0	0	79
Lab Report	Field ID	Date	Matrix Type																						
921952	GBH3_0.1-0.3	5/09/2022	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	110	<100	110	<2	<0.4	5.5	58	35	<0.1	<5	74
305582	TRIP-1	5/09/2022	Soil	<1	<0.2	<0.5	<1	<2	<1	<1	<25	<25	70	70	320	240	620	<4	<0.4	9	32	12	<0.1	5	250
RPD				0	0	0	0	0	0	0	0	0	95	95	98	131	140	0	0	48	58	98	0	67	109

				PAH																
				Acenaphthene	Acenaphthylene	Anthracene	Benzo(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	Phenanthrene	Pyrene	PAHs (Sum of total)
				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
EQL				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
Lab Report	Field ID	Date	Matrix Type																	
921952	GBH3_0.1-0.3	5/09/2022	Soil	<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
921952	DUP-1	5/09/2022	Soil	<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
Lab Report	Field ID	Date	Matrix Type																	
921952	GBH3_0.1-0.3	5/09/2022	Soil	<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
305582	TRIP-1	5/09/2022	Soil	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
RPD				0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0

*RPDs of 30% or higher are highlighted

**Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

***Where one result is recorded as non-detect and the other is detected, the RPD is calculated using the LOR x0.5

AU122217

Groundwater RPD Tables

Geosyntec consultants

				BTEX							TRH								Metals							
				Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Lead (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)
				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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				0.01	1	1	1	2	1	3	20	20	50	50	100	100	100	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005
Lab Report	**Field ID**	**Date**	**Matrix Type**																						
923151	**GMW1**	**11/09/2022**	**Water**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	<0.001	<0.0002	0.003	<0.001	<0.001	0.0001	0.004	<0.005
923151	**DUP1W**	**11/09/2022**	**Water**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	<0.001	<0.0002	0.003	<0.001	<0.001	<0.0001	0.004	<0.005
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
923151	**GMW1**	**11/09/2022**	**Water**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	<50	<50	<100	<100	<100	<0.001	<0.0002	0.003	<0.001	<0.001	0.0001	0.004	<0.005
305978	**TRIP1W**	**11/09/2022**	**Water**	<1	<1	<1	<1	<2	<1	<3	<10	<10	<50	<50	<100	<100	<50	<0.001	<0.0001	0.004	<0.001	<0.001	<0.0005	0.005	0.002
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	86	22	22

				PAH																	
				Acenaphthene	Acenaphthylene	Anthracene	Benzo(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	Phenanthrene	Pyrene	PAHs (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/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
EQL				1	1	1	1	1	0.001	1	1	1	1	1	1	1	1	1	1	1
Lab Report	**Field ID**	**Date**	**Matrix Type**																	
923151	**GMW1**	**11/09/2022**	**Water**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
923151	**DUP1W**	**11/09/2022**	**Water**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
RPD				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
923151	**GMW1**	**11/09/2022**	**Water**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
305978	**TRIP1W**	**11/09/2022**	**Water**	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
RPD				0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0

***RPDs of 30% or higher are highlighted**

****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

*****Where one result is recorded as non-detect and the other is detected, the RPD is calculated using the LOR x0.5**

AU122217

Trip Blank and Equipment Blank Results

Geosyntec consultants

		BTEX							TRH		Perfluoroalkane Carboxylic Acids	(n:2) Fluorotelomer Sulfonic Acids	Perfluoroalkane Sulfonic Acids	
		Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	Perfluorooctanoic acid (PFOA)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)
		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
EQL		0.01	1	1	1	2	1	3	20	20	0.001	0.005	0.001	0.001
Field ID	**Date**													
EB	**11/09/2022**	-	-	-	-	-	-	-	-	-	<0.001	<0.005	<0.001	0.002
TB	**11/09/2022**	<0.01	<1	<1	<1	<2	<1	<3	<20	<20	-	-	-	-

AU122217

Trip Spike Results

Geosyntec consultants

Trip Spikes

Lab Report Number	Matrix Type	Analysis Batch	Field ID	Sampled Date/T	Chem Name	Spike Recovery %	LCL	UCL
921952	Soil	2022-09-20	TS	6/09/2022	Ethylbenzene	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Xylene (m & p)	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Toluene	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Xylene Total	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Benzene	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Naphthalene (VOC)	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	Xylene (o)	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	C6-C10 Fraction (F1)	**110**	70	130
921952	Soil	2022-09-20	TS	6/09/2022	C6-C9 Fraction	**120**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Ethylbenzene	**85**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Xylene (m & p)	**99**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Toluene	**87**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Xylene Total	**91**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Benzene	**91**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Naphthalene (VOC)	**110**	70	130
923151	Water	2022-09-23	TS	11/09/2022	Xylene (o)	**87**	70	130
923151	Water	2022-09-23	TS	11/09/2022	C6-C10 Fraction (F1)	**71**	70	130
923151	Water	2022-09-23	TS	11/09/2022	C6-C9 Fraction	**72**	70	130

Appendix G QA/QC Assessment

Table G-1 QA/QC Assessment

Data Quality Objective	Sampling Frequency	Frequency Achieved?	DQI	DQI Met?
Precision				
Intra-Laboratory Field Duplicates	1/20 samples	Yes. 1 intra-laboratory duplicates for 16 primary soil samples and 1 intra-laboratory duplicate for 8 primary groundwater samples	>5xLOR: 50% RPD	Yes, noting that: • For soils TRH fractions F1, F2, F3 and F4, arsenic, chromium, copper, lead, and zinc RPD results ranged from 31% and 131% attributable to sample heterogeneity
Inter-Laboratory Field Duplicates	1/20 samples	Yes. 1 inter-laboratory duplicates for 16 primary soil samples and 1 inter-laboratory duplicate for 8 primary groundwater samples	>5xLOR: 50% RPD	Yes, noting that: • For soils TRH fractions F1, F2, F3 and F4, chromium, copper, lead, nickel and zinc RPD results ranged from 48% and 140% attributable to sample heterogeneity • For groundwater, mercury RPD results were 86% attributable to the detection being close to the laboratory detection limits
Laboratory duplicates	1/20 samples	Yes	>5xLOR: 50% RPD	Yes, noting some RPDs exceeded 50% but still met Laboratory internal acceptance criteria
Laboratory method blanks	1/10 samples	Yes	< LOR Not required for asbestos	Yes
Accuracy				
Matrix spikes	1/10 samples	Yes	Acceptable recoveries: 70 to 130% for metals and inorganics 60-140% for organics 10-140% for sVOC and speciated phenols Not required for asbestos	Yes
Laboratory control spike	1/10 samples	Yes	As Matrix spikes Not required for asbestos	Yes
Surrogate spike	1/10 samples	Yes	As Matrix spikes Not required for asbestos	Yes
Representativeness				
Sampling handling storage and transport appropriate for media and analytes	All	Yes	Received by laboratory cooled and with container in good condition	Yes
Rinsate / Equipment blanks	1 PFAS EB for plastic bailer	Yes	<LOR	Partial. Trace detection of PFOS recorded in EB,

Data Quality Objective	Sampling Frequency	Frequency Achieved?	DQI	DQI Met?
	used for well GMW3			however sample GMW3 reported PFOS below laboratory detection limits, therefore this does not affect the outcome of the assessment.
Trip Spike and Trip Blank	1 per media	Yes	<LOR/as specified by laboratory	Yes
Samples extracted and analysed within holding times.	All	Yes	Hold Times: 7 days - organics 6 months – inorganics	Yes
Comparability				
Standard operating procedures used for sample collection and handling (including decontamination)	All Samples	Yes	Yes	Yes
Standard analytical methods used for all analyses	All Samples	Yes	Yes	Yes
Consistent field conditions, sampling staff and laboratory analysis	All Samples	Yes	Yes	Yes
Limits of reporting appropriate and consistent	All Samples	Yes	Yes	Yes
Completeness				
Soil description and COCs completed and appropriate	All Samples	Yes	Yes	Yes, borehole logs and laboratory certificates are presented in Appendices I and D, respectively.
Appropriate documentation for testing	All Samples	Yes	Yes	Yes
Data set to be 95% complete after validation	All Samples	Yes	Yes	Yes

Appendix H Background Searches

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 26 May 2022 14:35:57

Reference: LS032683 EP

Address: Lot 2 Phillip Drive, South West Rocks, NSW 2431

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Customer Service - Spatial Services	06/04/2022	06/04/2022	Quarterly	-	-	-	-
Topographic Data	NSW Department of Customer Service - Spatial Services	25/06/2019	25/06/2019	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	25/05/2022	06/05/2022	Monthly	1000m	1	3	3
Contaminated Land Records of Notice	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	0
Former Gasworks	Environment Protection Authority	02/03/2022	14/07/2021	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	26/05/2022	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	03/05/2022	14/07/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	03/03/2022	03/03/2022	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	16/02/2022	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	4	4
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	0	2	2
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	11	11
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	0
Cattle dips of the Northern Rivers region	NSW Dept. of Primary Industries	15/02/2021	15/02/2021	Annually	1000m	0	0	0
Points of Interest	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	8
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	1
Major Easements	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	2
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	10/02/2022	31/12/2021	Annually	1000m	0	1	2
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	Annually	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	28/03/2022	23/02/2018	Annually	1000m	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
National Groundwater Information System (NGIS) Boreholes	Bureau of Meteorology; Water NSW	24/01/2022	24/01/2022	Annually	2000m	0	4	112
NSW Seamless Geology Single Layer: Rock Units	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	2	4	14
NSW Seamless Geology – Single Layer: Trendlines	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
NSW Seamless Geology – Single Layer: Geological Boundaries and Faults	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	2
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000m	2	2	13
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	06/04/2022	18/02/2022	Monthly	500m	2	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	2	2	3
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	25/05/2022	25/05/2022	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	25/05/2022	25/05/2022	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	25/05/2022	25/05/2022	Monthly	1000m	4	5	9
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	1	10	26
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	0	0	0
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	06/04/2022	25/03/2022	Monthly	1000m	0	0	1
Bush Fire Prone Land	NSW Rural Fire Service	23/05/2022	08/12/2021	Weekly	1000m	3	4	4
Eastern Bushland Database (North Region)	NSW Office of Environment & Heritage	24/07/2016	01/01/1991	None planned	1000m	1	1	3
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	28/03/2022	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	1	3	10
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	3	8	23
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	23/05/2022	23/05/2022	Weekly	10000m	-	-	-

Site Diagram

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 48165m²

Total Perimeter: 1.13km

Scale: 0 25 50 100 150 Meters

Data Source Aerial Imagery:
© Aerometrex Pty Ltd

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

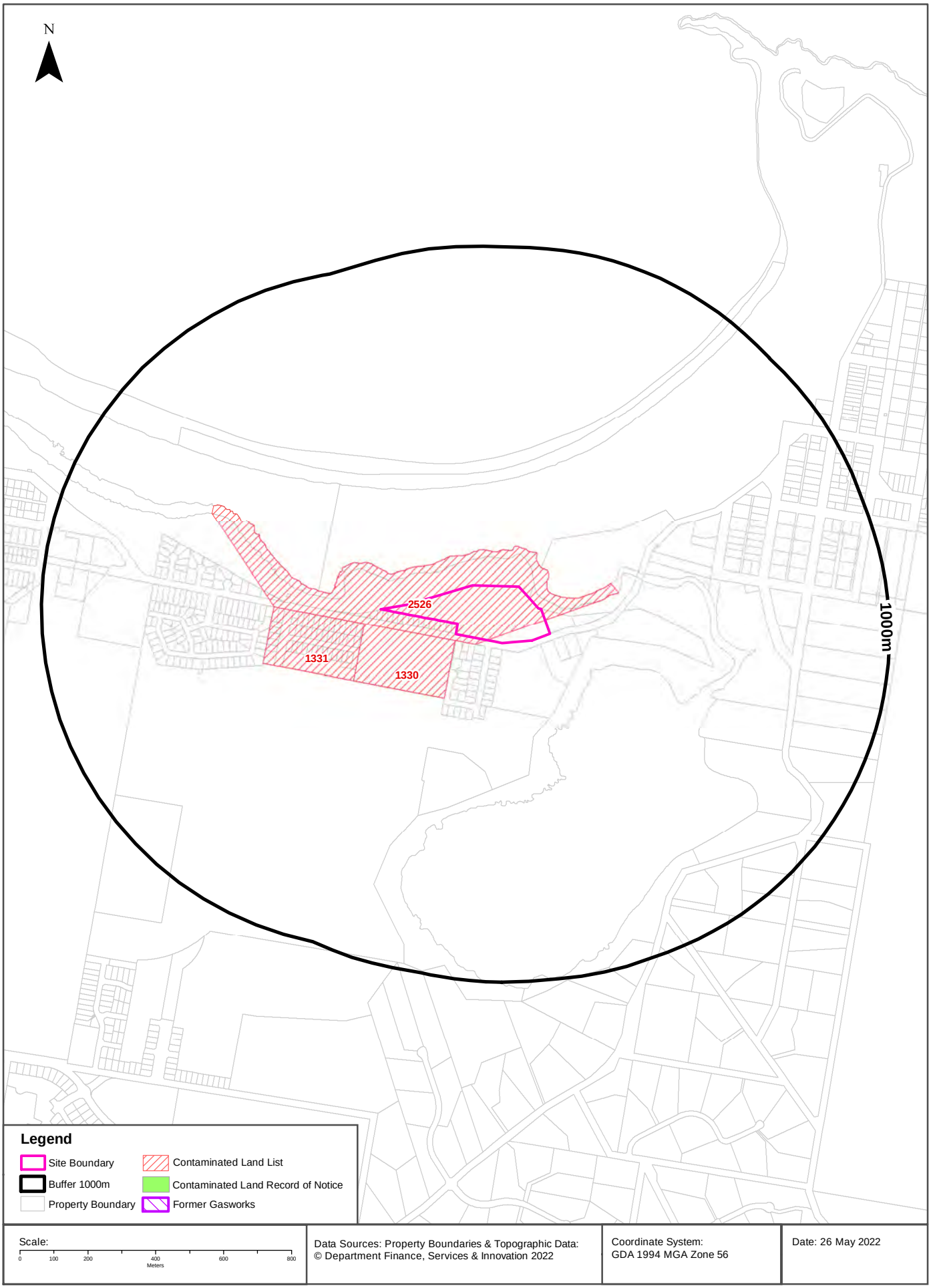
Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 27 May 2022

Contaminated Land

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Contaminated Land

Lot 2 Phillip Drive, South West Rocks, NSW 2431

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
2526	Residential area and Reserve opposite Former Caltex terminal	Phillip Drive	South West Rocks	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Area Match	0m	On-site
1330	Former Trial Bay Caltex Depot	Phillip Drive	South West Rocks	Other Petroleum	Under assessment	Current EPA List	Premise Match	20m	South West
1331	Former Shell Trial Bay Depot	Phillip Drive	South West Rocks	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	65m	West

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority

Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

Lot 2 Phillip Drive, South West Rocks, NSW 2431

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist	Direction
N/A	No records in buffer											

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
N/A	No records in buffer										

PFAS Investigation & Management Programs

Lot 2 Phillip Drive, South West Rocks, NSW 2431

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Defence 3 Year Regional Contamination Investigation Program

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

Lot 2 Phillip Drive, South West Rocks, NSW 2431

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority

Current EPA Licensed Activities

Lot 2 Phillip Drive, South West Rocks, NSW 2431

EPA Activities

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Licensed Activities under the POEO Act 1997

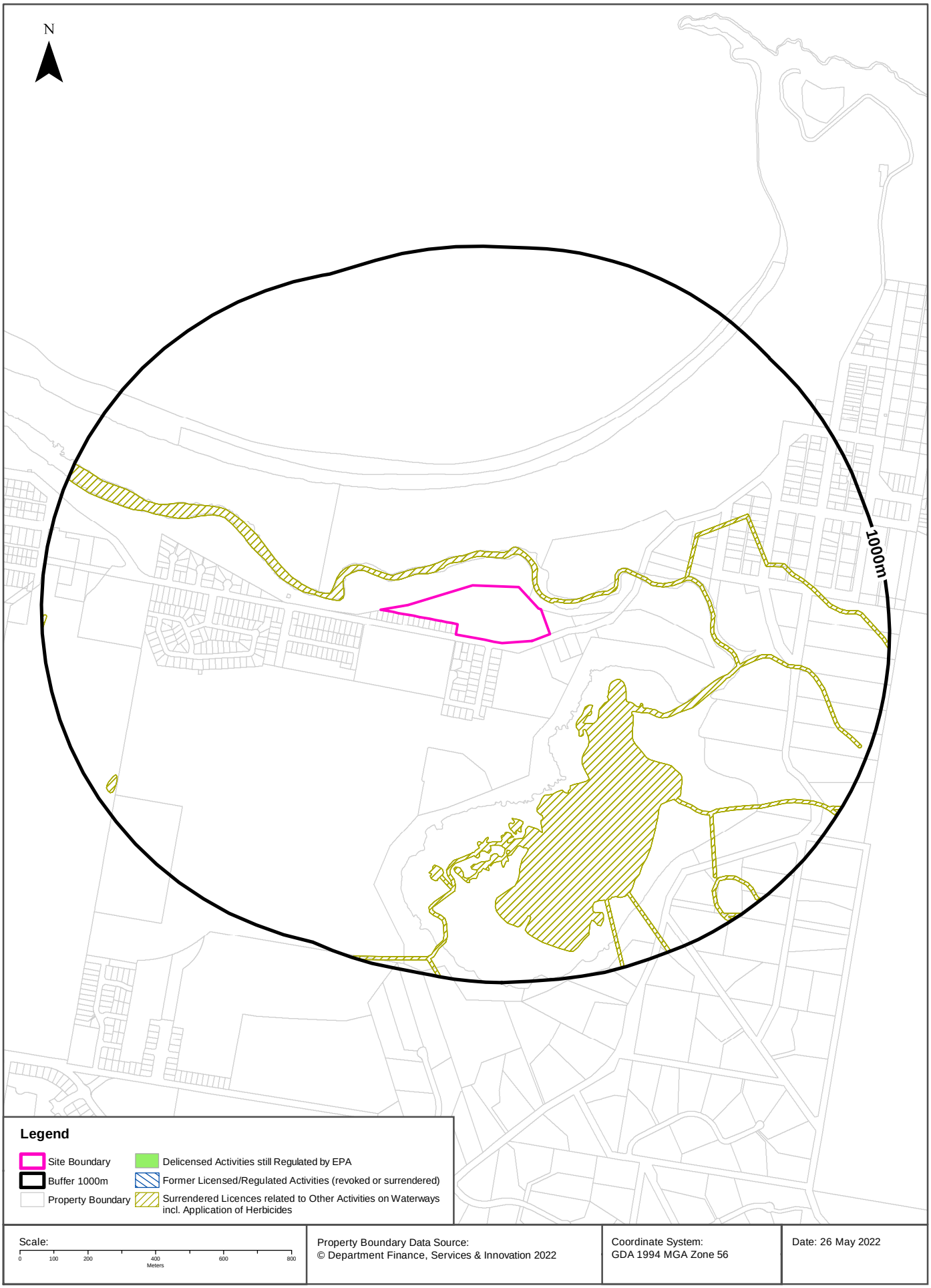
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
2497	KEMPSEY SHIRE COUNCIL	SOUTH WEST ROCKS SEWAGE TREATMENT WORKS	BELLE O'CONNOR STREET	SOUTH WEST ROCKS	Sewage treatment processing by small plants	Premise Match	821m	South West

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Lot 2 Phillip Drive, South West Rocks, NSW 2431



EPA Activities

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

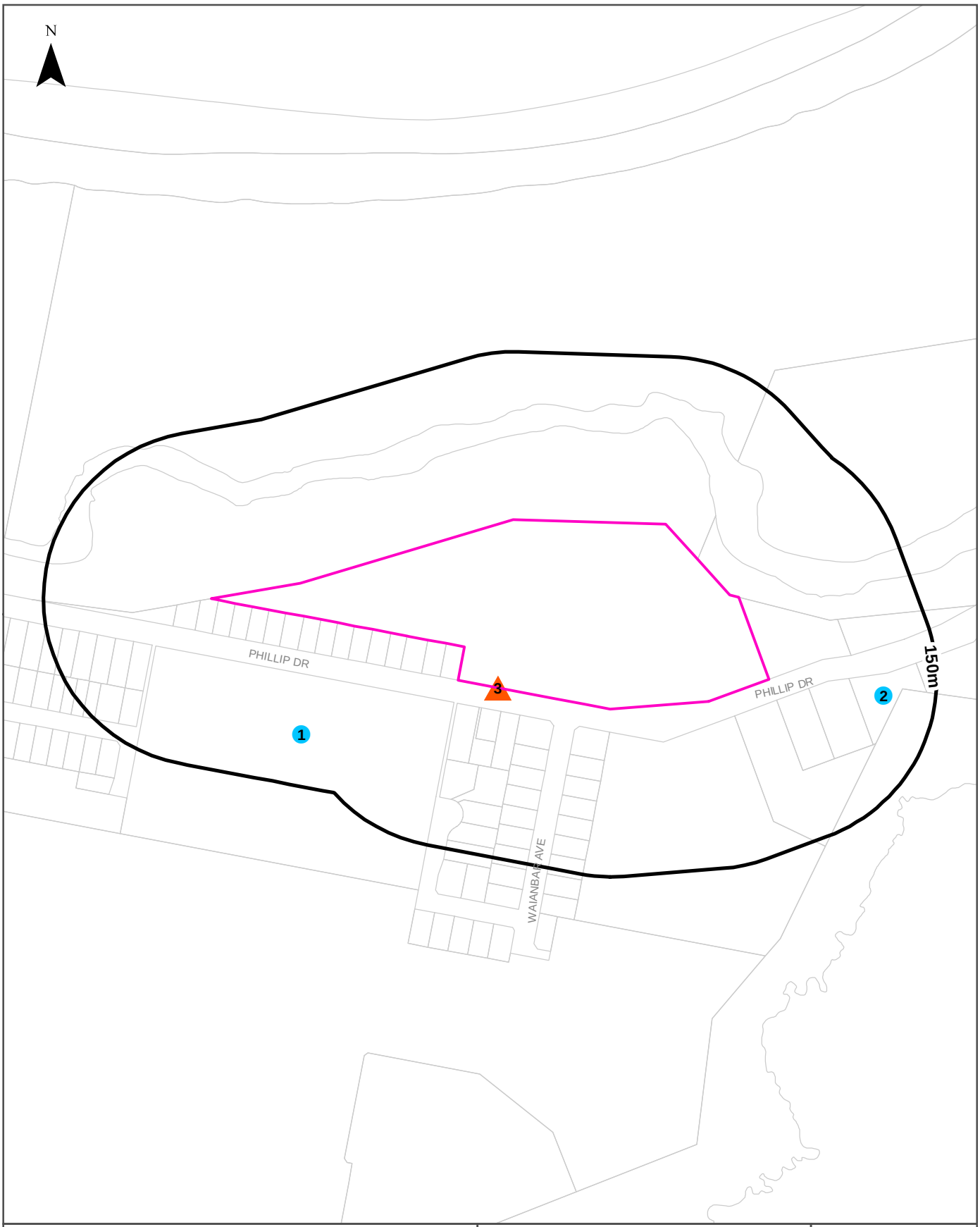
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4001	KEMPSEY SHIRE COUNCIL	WATERWAYS OF KEMPSEY SHIRE COUNCIL, Elbow Street, WEST KEMPSEY	Surrendered	22/08/2000	Other activities - Application of Herbicide(s)	Network of Features	28m	South East
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	28m	South East
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	28m	South East
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	28m	South East

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Legend

- Site Boundary
- Buffer 150m
- Property Boundary
- Business directory records mapped to a specific premise
- Business directory records mapped to a road intersection
- Business directory records mapped to a road corridor
- Business directory records mapped to a general area

Scale: 0 60 120 180 240 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 26 May 2022

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Historical Business Directories

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR OIL & SPIRIT DEPOTS	Caltex Oil (Aust.) Pty. Ltd., Phillip Dr. Trial Bay. South-West Rocks. 2431	197491	1991	Premise Match	20m	South West
2	BUILDERS & BUILDINGS CONSTRUCTORS	Coiling J. Constructions Bldr., 155 Phillip Dr. South-West Rocks. 2431	197496	1991	Premise Match	71m	East

Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
3	Not Listed	Lagoon View Caravan Park., Phillip Dr. South-West Rocks. 2431	197515	1991	Road Match	0m
	Not Listed	Lagoon View General Store., Phillip Dr. South-West Rocks. 2431	197516	1991	Road Match	0m
	Not Listed	Lagoon View Restaurant., Phillip Dr. South-West Rocks. 2431	197517	1991	Road Match	0m
	Not Listed	Macleay Saw Service., Phillip Dr. South-West Rocks. 2431	197523	1991	Road Match	0m
	Not Listed	Scalfe. S. Plmbr., Phillip Dr. South-West Rocks. 2431	198315	1991	Road Match	0m
	NOT LISTED	Golden Fleece Petroleum Products, Phillip Dr., South-West Rocks 2431	96021	1982	Road Match	0m
	NOT LISTED	Lagoon View Caravan Park, Phillip Dr., South-West Rocks 2431	96023	1982	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Shell Co. of Aust. Ltd., Phillip Dr., South-West Rocks 2431	96058	1982	Road Match	0m
	NOT LISTED	South West Country Club Ltd., Phillip Dr., South-West Rocks 2431	96065	1982	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Golden Fleece Petroleum Products, Phillip Drv., South-West Rocks,2441	618554	1970	Road Match	0m
	VETERINARY SURGEONS	McNiven, A. R., Phillip Drv., South-West Rocks,2441	618571	1970	Road Match	0m

Historical Business Directories

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

Cattle Dips

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Cattle Dips of the Northern Rivers Region

Cattle dip sites within the dataset buffer:

Dip Name	Road	Town	Dip Status	Licence / Lease Status	Licence / Lease Expiry Date	Distance	Direction
N/A	No records in buffer						

Cattle dip site data provided by the NSW Department of Primary Industries.

Aerial Imagery 2020

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Scale:	Data Source Aerial Imagery:	Coordinate System:	Date: 26 May 2022
0 50 100 150 200 Meters	© Aerometrex Pty Ltd	GDA 1994 MGA Zone 56	

Aerial Imagery 2014

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Data Source Aerial Imagery: © 2022 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 26 May 2022

Aerial Imagery 2010

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Scale:
0 50 100 150 200
Meters

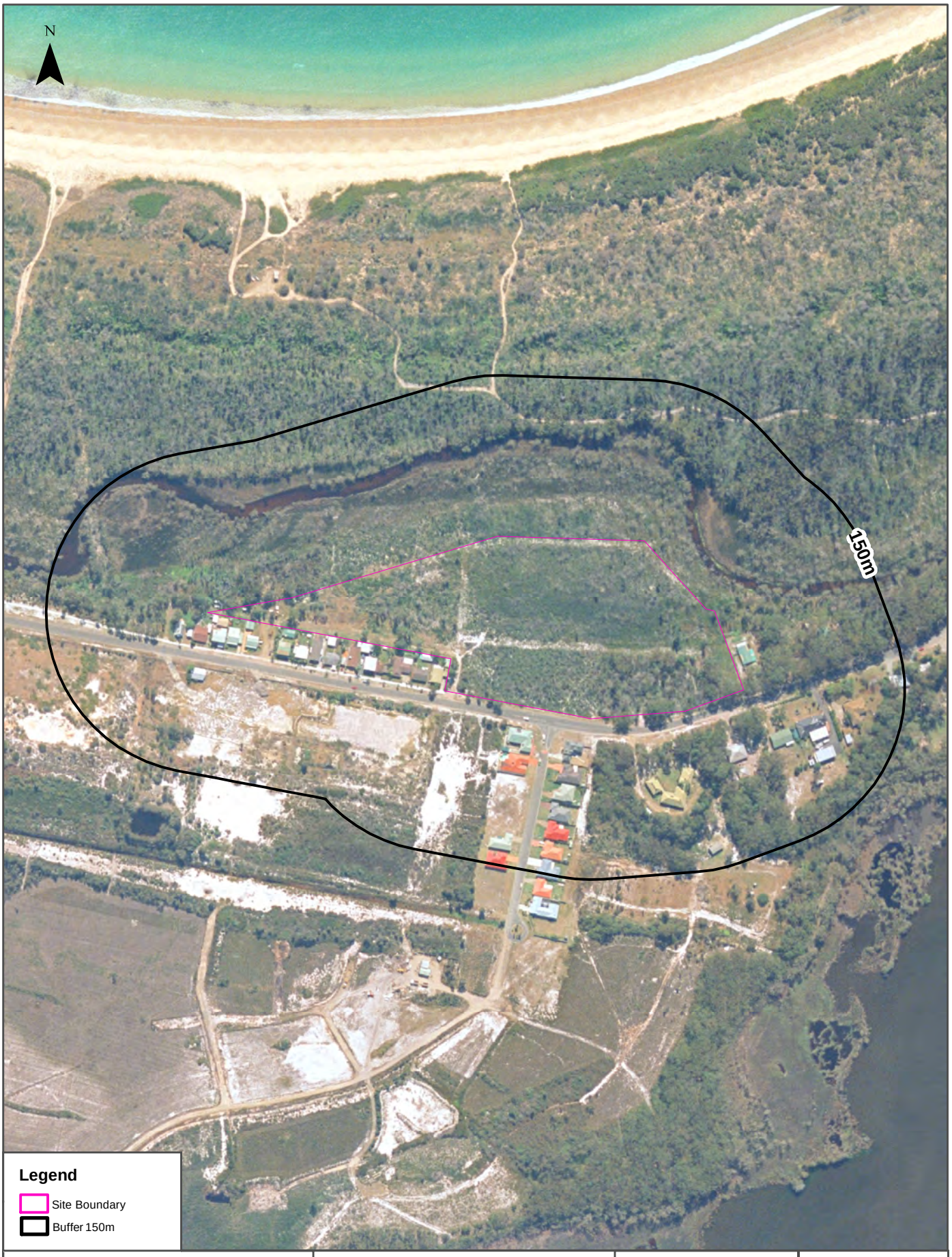
Data Source Aerial Imagery: © 2022 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 26 May 2022

Aerial Imagery 2003

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Aerial Imagery 1997

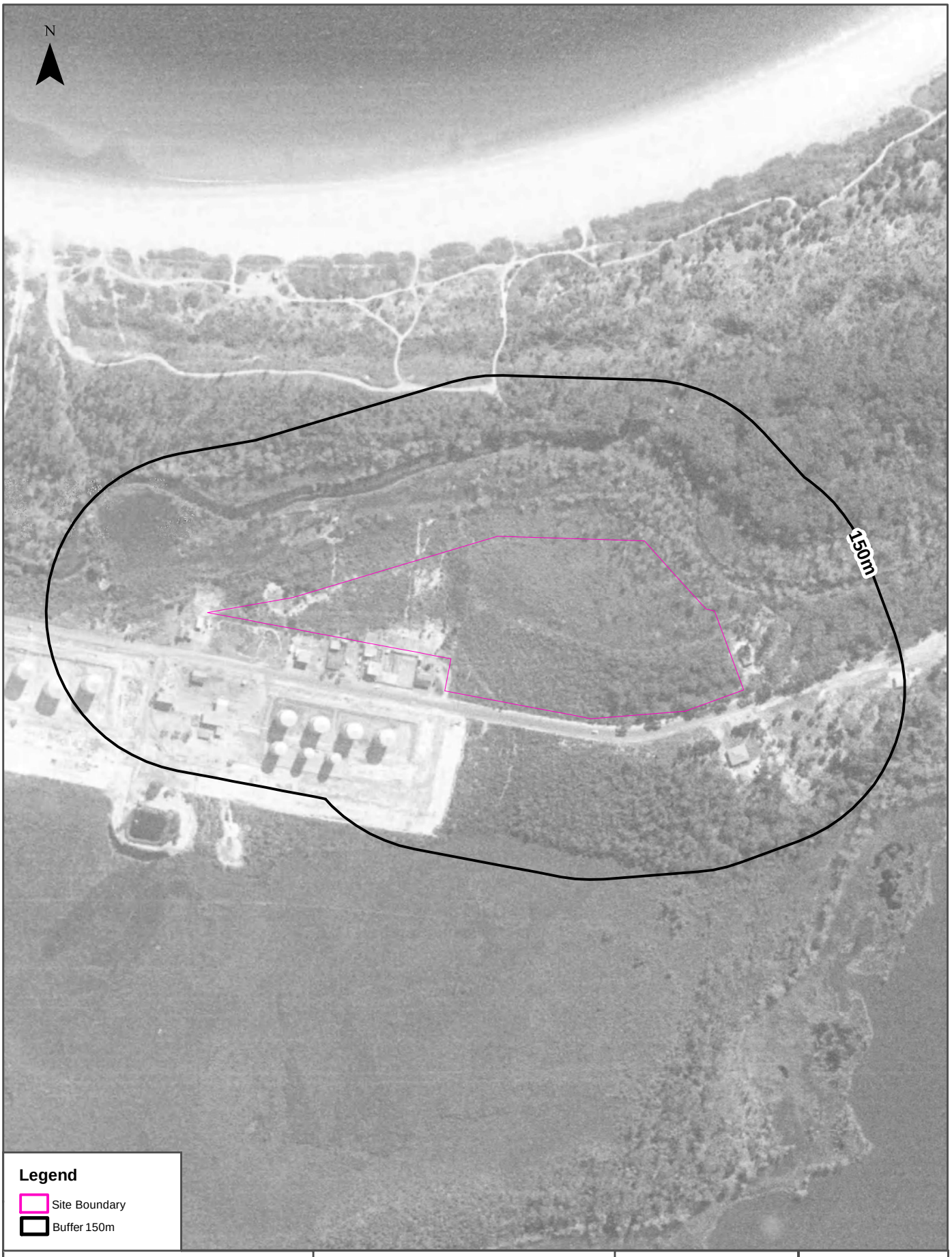
Lot 2 Phillip Drive, South West Rocks, NSW 2431

Aerial Imagery 1991

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Aerial Imagery 1980

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Aerial Imagery 1975

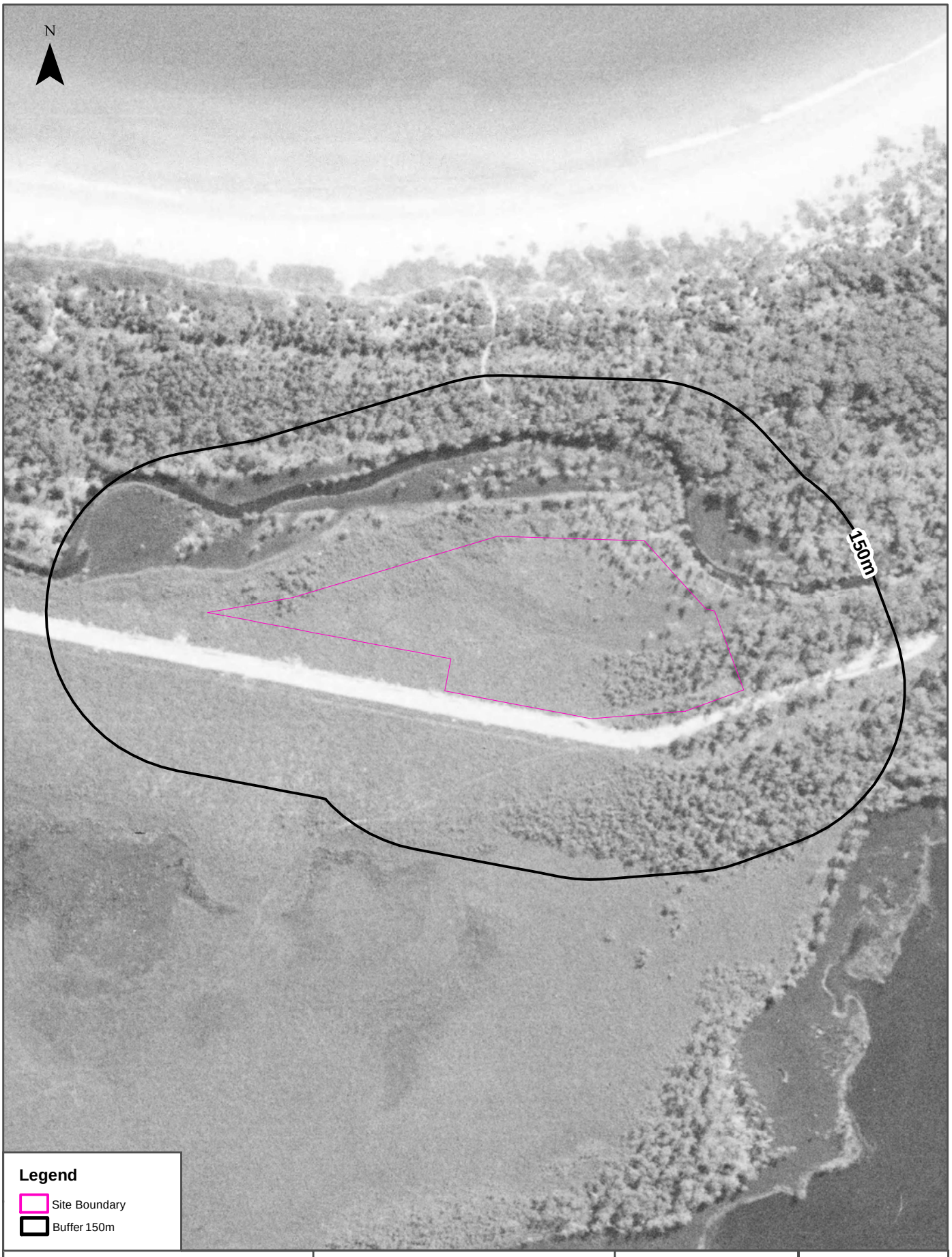
Lot 2 Phillip Drive, South West Rocks, NSW 2431

Aerial Imagery 1967

Lot 2 Phillip Drive, South West Rocks, NSW 2431

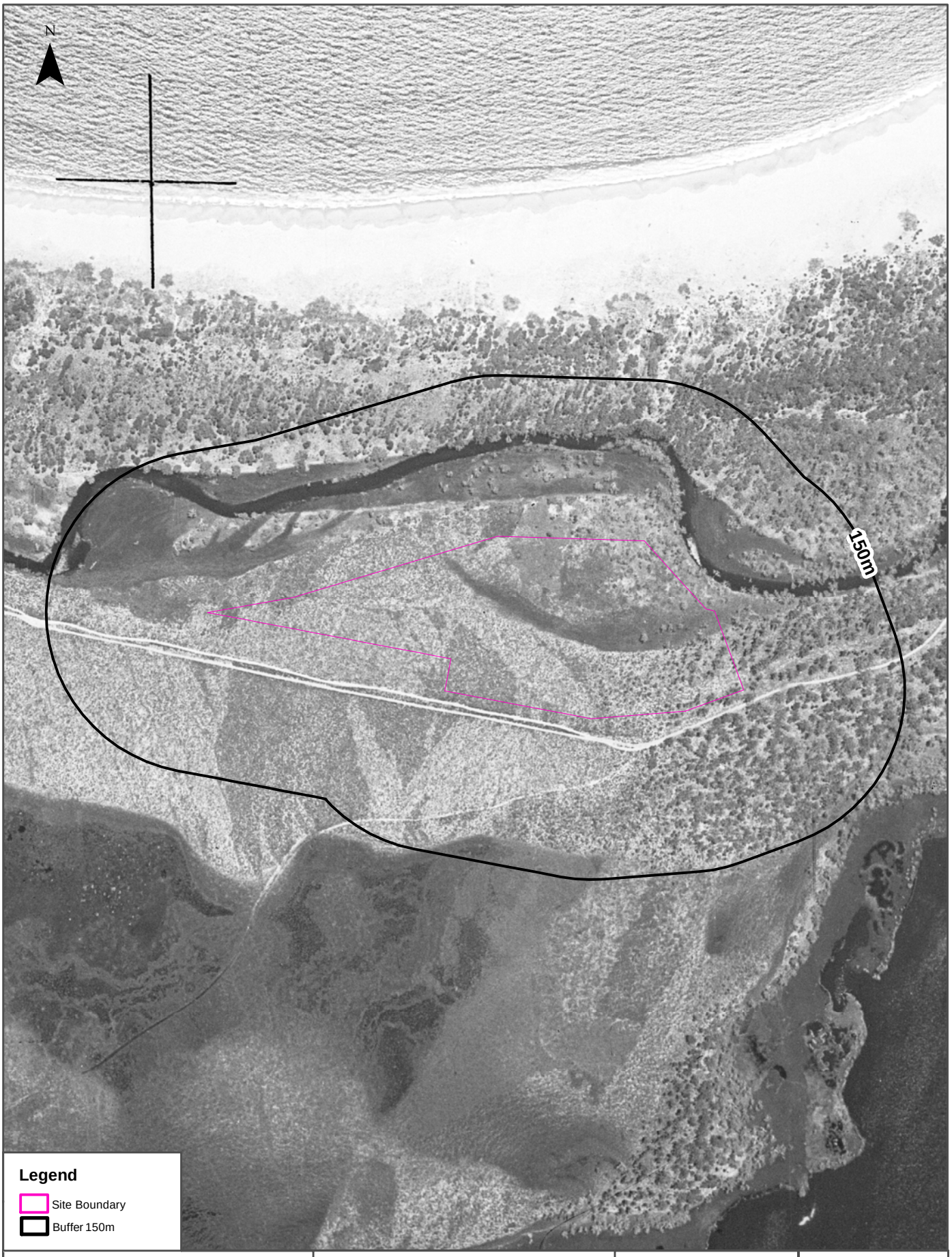
Aerial Imagery 1956

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Aerial Imagery 1942

Lot 2 Phillip Drive, South West Rocks, NSW 2431



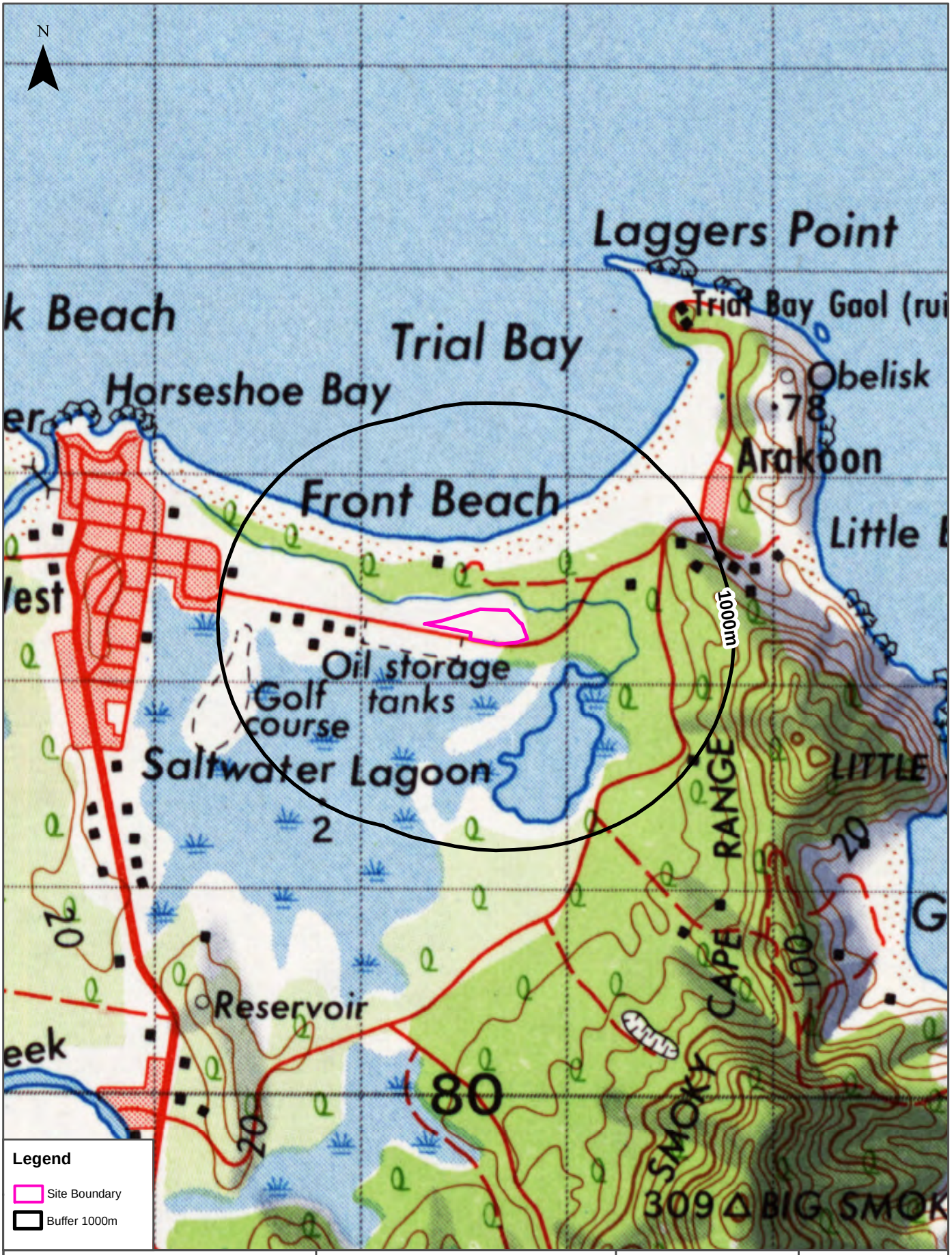
Topographic Map 2015

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Scale: 0 175 350 Meters 525 700	Data Sources: Topographic Map Data © NSW Land and Property Information	Coordinate System: GDA 1994 MGA Zone 56	Date: 26 May 2022

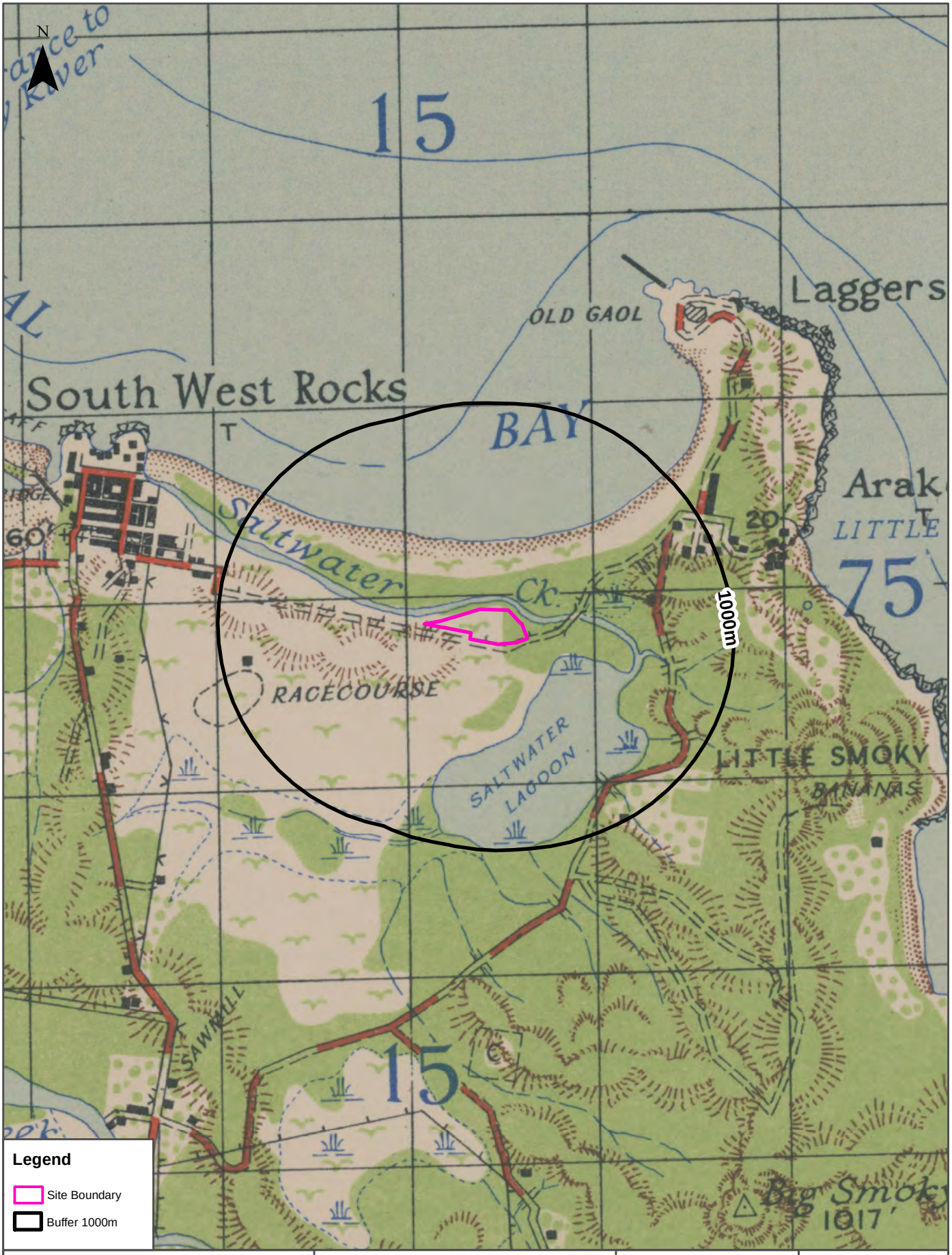
Historical Map 1972

Lot 2 Phillip Drive, South West Rocks, NSW 2431



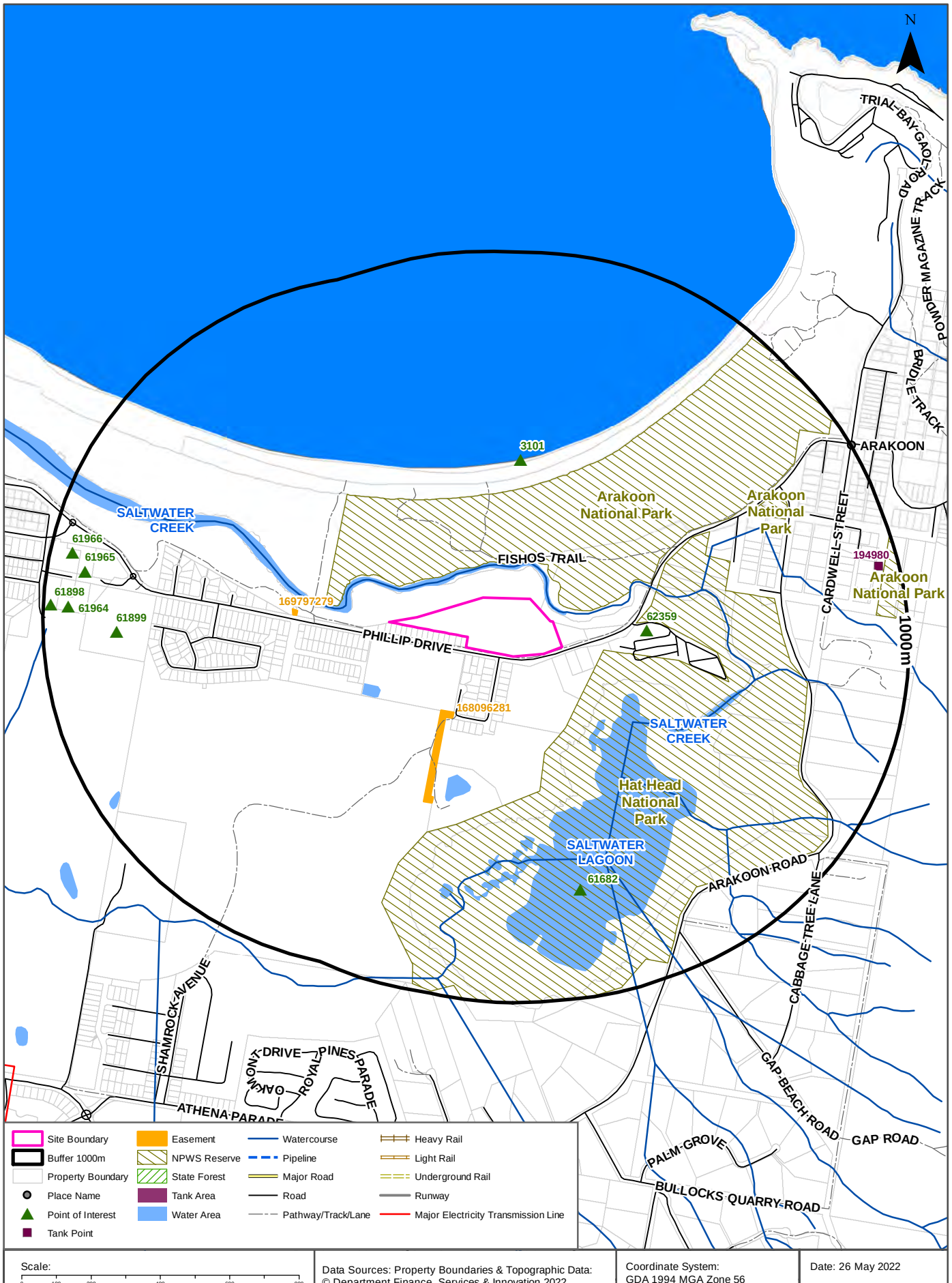
Historical Map c.1942

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Topographic Features

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Topographic Features

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
62359	Tourist Park / Home Village	TRIAL BAY ECO TOURIST PARK	248m	East
3101	Beach	FRONT BEACH	401m	North
61682	Natural Waterbody	SALTWATER LAGOON	689m	South
61899	Sports Field	PLAYING FIELDS	788m	West
61965	Club	SOUTH WEST ROCKS COUNTRY CLUB	890m	West
61964	Swimming Pool	SOUTH WEST ROCKS SWIMMING POOL	928m	West
61966	Sports Field	BOWLING GREENS	936m	West
61898	Sports Court	TENNIS COURTS	978m	West

Topographic Features

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
194980	Water	Operational		01/05/2020	942m	East

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
168096281	Primary	Right of way	17 & VAR	191m	South West
169797279	Primary	Right of way	VAR	267m	West

Topographic Features

Lot 2 Phillip Drive, South West Rocks, NSW 2431

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

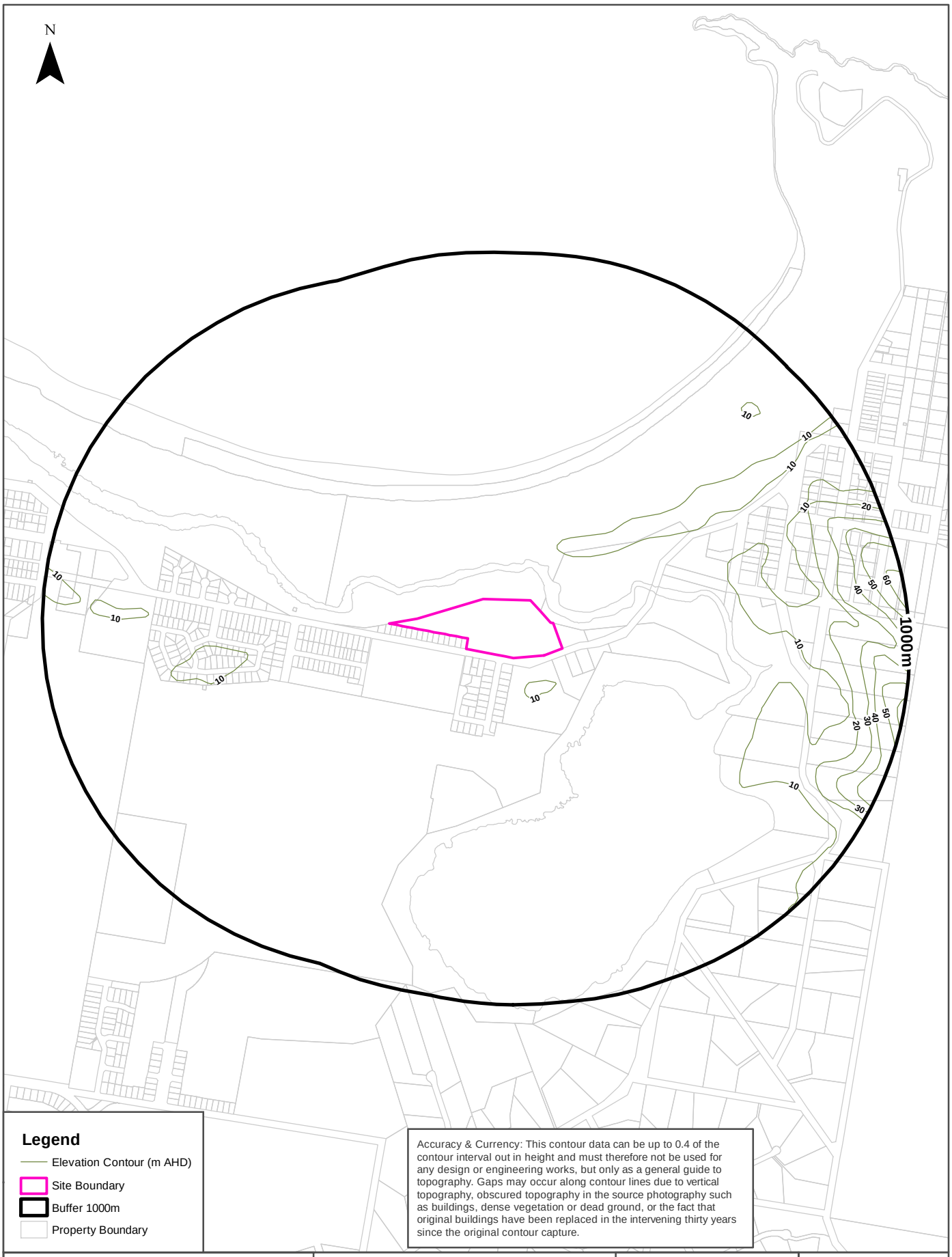
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N1174	NATIONAL PARK	Arakoon National Park	10/12/2010	54m	North East
N0014	NATIONAL PARK	Hat Head National Park	28/07/1972	111m	South East

Elevation Contours (m AHD)

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Hydrogeology & Groundwater

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive highly productive aquifers	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

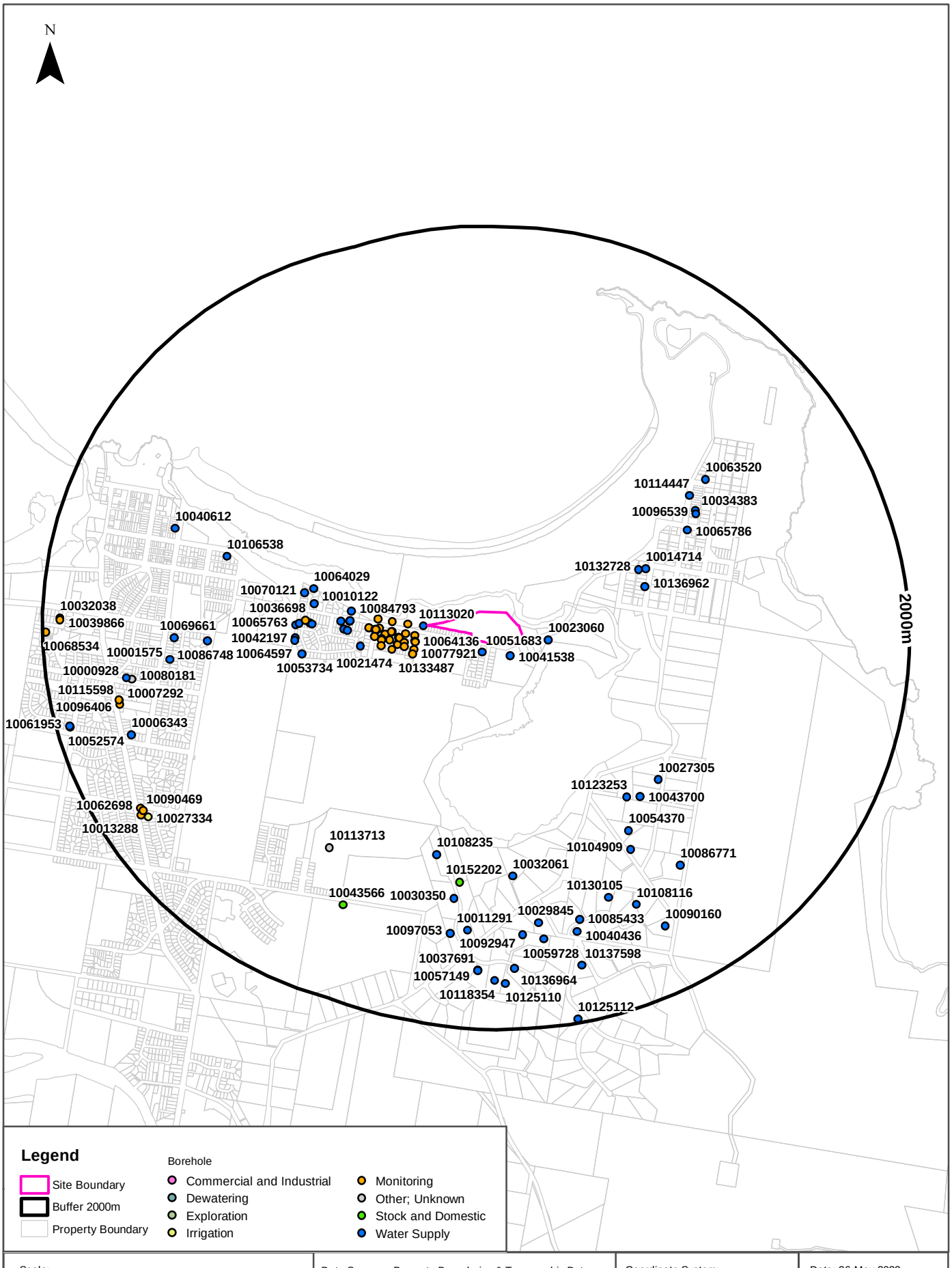
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Hydrogeology & Groundwater

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Groundwater Boreholes

Boreholes within the dataset buffer:

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10113020	GW302106	Water Supply	Unknown	21/07/1997	12.00		AHD		0.315	1.00	23m	West
10051683	GW306927	Water Supply	Functioning	01/01/2005	8.00		AHD				56m	South
10041538	GW064247	Water Supply	Unknown	01/06/1987	19.00		AHD				66m	South East
10064136	GW302870	Monitoring	Unknown	12/04/2000	3.50		AHD				86m	West
10118826	GW302866	Monitoring	Unknown	06/04/2000	2.90		AHD	69			102m	West
10089448	GW302860	Monitoring	Unknown	10/04/2000	5.00		AHD				107m	West
10077921	GW302861	Monitoring	Unknown	11/04/2000	8.70		AHD				108m	West
10117747	GW302862	Monitoring	Unknown	11/04/2000	12.20		AHD	210			109m	West
10107785	GW302875	Monitoring	Unknown	12/04/2000	3.50		AHD				122m	West
10023060	GW070505	Water Supply	Unknown	24/02/1993	17.00		AHD	Fresh	1.500	6.00	126m	East
10123353	GW302867	Monitoring	Unknown	12/04/2000	6.50		AHD	42			145m	West
10107808	GW302869	Monitoring	Unknown	12/04/2000	3.50		AHD				152m	West
10105308	GW302855	Monitoring	Unknown	07/04/2000	4.00		AHD				159m	West
10057441	GW302856	Monitoring	Unknown	07/04/2000	6.50		AHD				161m	West
10048907	GW302857	Monitoring	Unknown	07/04/2000	10.00		AHD				163m	West
10136822	GW302871	Monitoring	Unknown	12/04/2000	4.30		AHD	41			164m	West
10133487	GW302863	Monitoring	Unknown	11/04/2000	7.00		AHD	5			168m	West
10136395	GW302865	Monitoring	Unknown	06/04/2000	3.20		AHD	121			184m	West
10060905	GW302859	Monitoring	Unknown	10/04/2000	10.00		AHD				185m	West
10018415	GW302854	Monitoring	Unknown	05/04/2000	10.50		AHD				186m	West
10017357	GW302858	Monitoring	Unknown	10/04/2000	5.50		AHD				187m	West
10005508	GW302853	Monitoring	Unknown	05/04/2000	7.20		AHD				188m	West
10019341	GW302852	Monitoring	Unknown	05/04/2000	3.50		AHD				190m	West
10021944	GW302872	Monitoring	Unknown	12/04/2000	3.50		AHD				211m	West
10021474	GW302845	Monitoring	Unknown	21/03/2000	8.00		AHD				223m	West
10015328	GW302873	Monitoring	Unknown	12/04/2000	3.50		AHD				225m	West
10036151	GW302851	Monitoring	Unknown	05/04/2000	10.00		AHD				248m	West
10083621	GW302850	Monitoring	Unknown	05/04/2000	6.80		AHD				250m	West
10025634	GW302877	Monitoring	Unknown	12/04/2000	3.50		AHD				251m	West
10115184	GW302849	Monitoring	Unknown	05/04/2000	3.50		AHD				251m	West
10117748	GW302864	Monitoring	Unknown	06/04/2000	3.50		AHD	182			258m	West

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10130876	GW302874	Monitoring	Unknown	12/04/2000	4.00		AHD	49			264m	West
10070237	GW302846	Monitoring	Unknown	04/04/2000	3.50		AHD				266m	West
10093875	GW302847	Monitoring	Unknown	04/04/2000	6.30		AHD				270m	West
10039257	GW302848	Monitoring	Unknown	04/04/2000	9.50		AHD				273m	West
10097694	GW302876	Monitoring	Unknown	12/04/2000	3.50		AHD				282m	West
10021217	GW302878	Monitoring	Unknown	12/04/2000	3.50		AHD				304m	West
10048998	GW305804	Water Supply	Unknown	01/06/2003	6.00		AHD				365m	West
10084793	GW300362	Water Supply	Unknown	31/08/1995	3.60		AHD			0.70	402m	West
10085197	GW300656	Water Supply	Unknown	01/02/1997	5.00		AHD		3.000	1.00	404m	West
10071108	GW300655	Water Supply	Unknown	01/02/1997	5.00		AHD		3.000	1.00	406m	West
10039397	GW305630	Water Supply	Unknown	13/12/1995	6.00		AHD		0.400		416m	West
10034186	GW303694	Water Supply	Unknown	30/12/1996	5.00		AHD	Fresh	0.400		434m	West
10054742	GW305007	Water Supply	Unknown	16/03/2005	3.00		AHD				451m	West
10010122	GW300657	Water Supply	Unknown	31/12/1995	4.00		AHD				598m	West
10099852	GW305246	Water Supply	Unknown	22/08/2005	4.90		AHD	35		1.00	600m	West
10077052	GW301820	Water Supply	Unknown	15/11/1994	24.00		AHD				610m	West
10064029	GW300365	Water Supply	Unknown	31/08/1995	3.00		AHD			2.80	621m	West
10036698	GW073232	Monitoring	Unknown				AHD				633m	West
10070121	GW306134	Water Supply	Functioning	07/03/2007	5.00		AHD		0.500	4.00	661m	West
10083018	GW305561	Water Supply	Unknown	11/12/1994	6.00		AHD				665m	West
10053734	GW303633	Water Supply	Unknown	01/02/1993	7.00		AHD		0.300	2.00	668m	West
10065763	GW303611	Water Supply	Unknown	01/01/1995	4.00		AHD				684m	West
10136962	GW303767	Water Supply	Unknown	06/01/2003	22.50		AHD	670	0.450	8.00	684m	East
10132728	GW300627	Water Supply	Unknown	20/01/1997	30.00		AHD	40	0.370	3.00	686m	East
10042197	GW072038	Water Supply	Unknown				AHD				689m	West
10064597	GW301809	Water Supply	Unknown	25/11/1994	4.00		AHD			2.00	693m	West
10014714	GW073335	Water Supply	Unknown	20/12/1994	23.00		AHD	Good	0.400	2.00	722m	East
10123253	GW301186	Water Supply	Unknown	07/09/1995	10.00		AHD	260	0.250	2.00	978m	South East
10065786	GW073333	Water Supply	Unknown		5.00		AHD				1003m	North East
10027305	GW302549	Water Supply	Unknown				AHD				1010m	South East
10043700	GW302548	Water Supply	Unknown				AHD				1016m	South East
10096539	GW304358	Water Supply	Unknown	07/01/2003	8.00		AHD				1086m	North East
10034383	GW300585	Water Supply	Unknown	31/12/1994	7.00		AHD			5.00	1093m	North East
10106538	GW305626	Water Supply	Unknown	07/03/2006	6.00		AHD				1099m	West
10114447	GW013645	Water Supply	Unknown	01/01/1958	4.90		AHD				1112m	North East
10108235	GW301683	Water Supply	Unknown		24.00		AHD			3.00	1130m	South
10054370	GW070085	Water Supply	Unknown	14/08/1992	32.00		AHD	Good	0.500	6.40	1133m	South East

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10086748	GW306194	Water Supply	Functioning	27/10/2006	4.00		AHD	Good		2.50	1144m	West
10032061	GW072530	Water Supply	Unknown	24/11/1993	42.00		AHD	Good	0.610	20.00	1205m	South
10104909	GW302242	Water Supply	Unknown		39.00		AHD				1226m	South East
10063520	GW302255	Water Supply	Unknown		3.00		AHD				1230m	North East
10152202	GW308027	Stock and Domestic	Functioning	24/06/2015	48.00		AHD				1250m	South
10113713	GW300096	Unknown	Unknown	07/04/1991	39.00		AHD		0.500	8.50	1261m	South West
10069661	GW301819	Water Supply	Unknown	01/11/1992	5.50		AHD			4.20	1316m	West
10030350	GW070073	Water Supply	Unknown	12/06/1992	40.00		AHD	Good	0.300	2.30	1337m	South
10001575	GW302337	Water Supply	Unknown		8.00		AHD	Brackish		1.50	1349m	West
10040612	GW304788	Water Supply	Unknown	25/11/2004			AHD				1403m	West
10130105	GW303787	Water Supply	Unknown	07/01/2003	28.50		AHD	737	1.500	8.00	1410m	South East
10086771	GW301052	Water Supply	Unknown	05/01/1994	30.00		AHD		0.500	8.00	1427m	South East
10029845	GW068336	Water Supply	Unknown	18/02/1990	37.00		AHD				1458m	South
10085433	GW303063	Water Supply	Unknown	17/01/2002	28.50		AHD				1475m	South
10011291	GW302286	Water Supply	Unknown	12/06/1992	26.00		AHD	Good	0.500	13.60	1491m	South
10108116	GW302962	Water Supply	Unknown	02/12/2000	27.00		AHD		780.000	18.00	1497m	South East
10092947	GW303146	Water Supply	Unknown	16/10/2001	26.00		AHD				1513m	South
10043566	GW071775	Stock and Domestic	Unknown	11/01/1994	33.50		AHD	Good	1.760	4.50	1517m	South West
10097053	GW302585	Water Supply	Unknown	17/11/1999	58.00		AHD			12.00	1519m	South
10040436	GW303137	Water Supply	Unknown	19/10/2001	33.00		AHD				1535m	South
10059728	GW306205	Water Supply	Functioning	29/08/2007	53.00		AHD		0.500	7.00	1546m	South
10080181	GW072041	Unknown	Unknown				AHD				1561m	West
10000928	GW301807	Water Supply	Unknown	01/01/1949	11.00		AHD	Good	0.500	4.00	1586m	West
10006343	GW303658	Water Supply	Unknown	16/04/2003			AHD				1639m	West
10007292	GW307172	Monitoring	Functional	03/05/2012	3.60		AHD				1644m	West
10115598	GW307173	Monitoring	Functional	03/05/2012	7.00		AHD				1646m	West
10096406	GW307171	Monitoring	Functional	03/05/2012	5.50		AHD				1648m	West
10090160	GW301565	Water Supply	Unknown	18/08/1998	21.00		AHD	Good	1.000	11.40	1660m	South East
10136964	GW304433	Water Supply	Unknown	24/11/2003	30.00		AHD	500	0.600	9.50	1685m	South
10037691	GW304457	Water Supply	Removed	02/12/2003	60.00		AHD				1694m	South
10057149	GW301014	Water Supply	Unknown	04/11/1997	40.00		AHD				1695m	South
10137598	GW304637	Water Supply	Unknown	16/03/2004	36.00		AHD	500	0.450	11.00	1709m	South
10118354	GW304332	Water Supply	Unknown	26/11/2003	24.00		AHD	200	1.000	7.00	1746m	South
10027334	GW073435	Irrigation	Unknown	21/01/1995	13.70		AHD	Good	1.000	4.00	1759m	South West
10090469	GW307144	Monitoring	Functional	02/05/2012	4.50		AHD				1761m	South West
10125110	GW304434	Water Supply	Unknown	25/11/2003	48.00		AHD	400	0.600	8.50	1762m	South

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10062698	GW307145	Monitoring	Functional	02/05/2013	10.00		AHD				1767m	South West
10013288	GW307143	Monitoring	Functional	02/05/2012	4.50		AHD				1785m	South West
10032038	GW301821	Water Supply	Unknown	27/10/1994	9.00		AHD			6.00	1907m	West
10039866	GW073179	Monitoring	Unknown				AHD				1907m	West
10052574	GW072071	Unknown	Unknown				AHD				1928m	West
10061953	GW301808	Water Supply	Unknown	20/01/1994	8.90		AHD			6.00	1929m	West
10125112	GW305150	Water Supply	Unknown	09/02/2005	50.00		AHD	1000	0.250	15.00	1980m	South
10068534	GW300170	Monitoring	Unknown	15/02/1992	16.00		AHD		0.400		1982m	West

Hydrogeology & Groundwater

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

NGIS Bore ID	Drillers Log	Distance	Direction
10113020	0.00m-3.00m White sand 3.00m-9.00m Very dark coffee rock 9.00m-12.00m Heavy grade water sand	23m	West
10041538	0.00m-6.00m Sand White 6.00m-8.00m Sand White Cream 8.00m-14.00m Rock Light Brown 14.00m-16.00m Sand Light Brown 16.00m-19.00m Sand Grey Yellow Water Supply, Clay Bottom	66m	South East
10064136	0.00m-3.50m Sand	86m	West
10118826	0.00m-2.90m Sand	102m	West
10089448	0.00m-5.00m Sand	107m	West
10077921	0.00m-5.20m Sand 5.20m-5.80m Coffee Rock 5.80m-8.70m Sand	108m	West
10117747	0.00m-5.20m Sand 5.20m-5.70m Coffee Rock 5.70m-9.00m Sand 9.00m-9.20m Coffee Rock 9.20m-12.20m Sand	109m	West
10107785	0.00m-3.50m Sand	122m	West
10023060	0.00m-3.00m WHITE SAND 3.00m-15.00m BLACK SANDY CLAY 15.00m-16.00m RED SAND 16.00m-17.00m WHITE SANDY CLAY 17.00m-33.00m WHITE AND GREY CLAY	126m	East
10123353	0.00m-6.50m Sand	145m	West
10107808	0.00m-3.50m Sand	152m	West
10105308	0.00m-4.00m Sand	159m	West
10057441	0.00m-5.50m Sand 5.50m-6.50m Coffee Rock	161m	West
10048907	0.00m-5.20m Sand 5.20m-6.20m Coffee Rock 6.20m-10.00m Sand	163m	West
10136822	0.00m-4.30m Sand	164m	West
10133487	0.00m-7.00m Sand	168m	West
10136395	0.00m-3.20m Sand	184m	West
10060905	0.00m-6.00m Sand 6.00m-6.50m Coffee Rock 6.50m-10.00m Sand	185m	West
10018415	0.00m-3.50m Sand 3.50m-4.50m Coffee Rock 4.50m-6.20m Sand 6.20m-7.20m Coffee Rock 7.20m-10.50m Sand	186m	West
10017357	0.00m-5.50m Sand	187m	West
10005508	0.00m-3.80m Sand 3.80m-7.20m Coffee Rock	188m	West
10019341	0.00m-3.50m Sand	190m	West
10021944	0.00m-3.50m Sand	211m	West

NGIS Bore ID	Drillers Log	Distance	Direction
10021474	0.00m-6.50m Sand 6.50m-8.00m Coffee Rock	223m	West
10015328	0.00m-3.50m Sand	225m	West
10036151	0.00m-0.50m Gravelly Clay 0.50m-4.20m Sand 4.20m-10.00m Coffee Rock	248m	West
10083621	0.00m-0.50m Gravelly Clay 0.50m-4.00m Sand 4.00m-6.80m Coffee Rock	250m	West
10025634	0.00m-3.50m Sand	251m	West
10115184	0.00m-0.50m Gravelly Clay 0.50m-3.50m Sand	251m	West
10117748	0.00m-3.50m Sand	258m	West
10130876	0.00m-0.50m Gravely Clay 0.50m-4.00m Sand	264m	West
10070237	0.00m-3.50m Sand	266m	West
10093875	0.00m-4.00m Sand 4.00m-6.30m Coffee Rock	270m	West
10039257	0.00m-4.20m Sand 4.20m-6.20m Coffee Rock 6.20m-9.50m Sand	273m	West
10097694	0.00m-3.50m Sand	282m	West
10021217	0.00m-3.50m Sand	304m	West
10136962	0.00m-0.20m TOP SOIL 0.20m-1.00m DRY BROWN CLAY 1.00m-4.50m RED AND GREY MOTTLED CLAY 4.50m-9.00m MOIST GREY CLAY 9.00m-10.00m WEATHERED SILT STONE 10.00m-15.00m HARD PINK AND GREY GRANITE 15.00m-15.80m WATER CUT 15.80m-22.50m HARD PINK AND GREY GRANITE	684m	East
10132728	0.00m-1.50m Top soil 1.50m-12.00m Clay 12.00m-14.00m Shale 14.00m-30.00m Granite	686m	East
10014714	0.00m-1.20m SAND 1.20m-10.00m BENTONITE CLAY 10.00m-12.00m WEATHERED GRANITE 12.00m-23.00m GRANITE	722m	East
10123253	0.00m-8.00m BROKEN SOIL 8.00m-10.00m GREY CLAY	978m	South East
10096539	0.00m-2.00m TOP SOIL 2.00m-3.90m SAND 3.90m-4.20m COFFEY ROCK 4.20m-6.60m SAND 6.60m-6.90m COFFEY ROCK 6.90m-8.00m SAND	1086m	North East
10114447	0.00m-4.88m Sand Water Supply	1112m	North East
10108235	0.00m-3.00m black sand 3.00m-4.00m puggy grey clay 4.00m-6.00m sand (white) 6.00m-14.00m sand and clay bands 14.00m-21.00m shale with clay bands (water bearing - large volume) 21.00m-24.00m black shale	1130m	South
10054370	0.00m-1.00m TOPSOIL 1.00m-6.00m CLAY/SHALE 6.00m-8.00m CLAYBOUND GRAVEL 8.00m-10.00m CLAY 10.00m-24.00m SHALE 24.00m-26.00m SHALE(W) 26.00m-32.00m HARD & SOFT LAYERS BLACK SHALE (W)	1133m	South East
10032061	0.00m-14.00m Clay 14.00m-20.00m Shale - soft yellow 20.00m-28.00m Clay - grey 28.00m-33.00m Shale - soft interbedded with coal 33.00m-43.00m Coal - black interbedded with hard shale	1205m	South

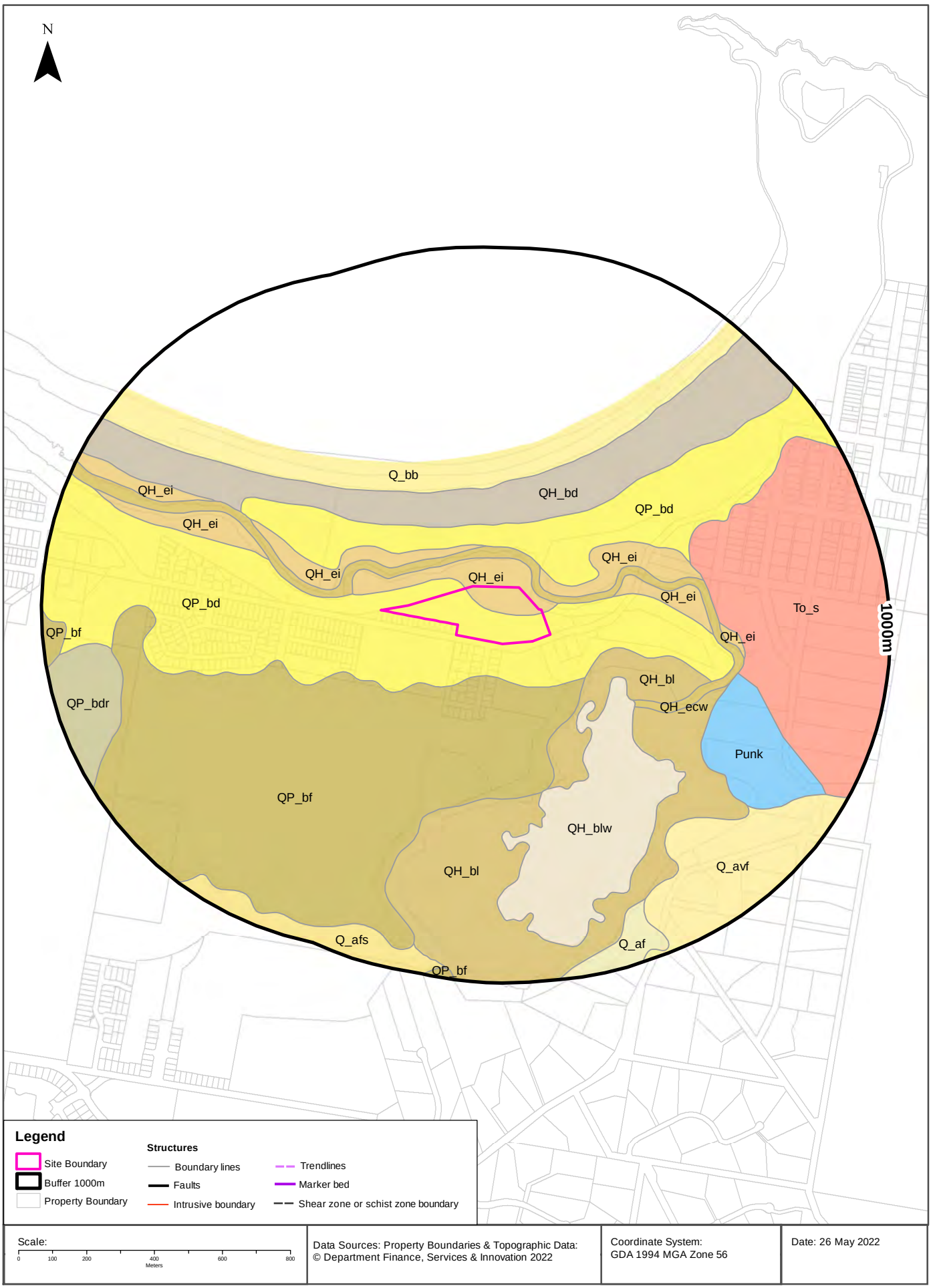
NGIS Bore ID	Drillers Log	Distance	Direction
10104909	0.00m-0.50m top soil/ grey clay 0.50m-3.00m red clay firm 3.00m-6.00m red clay rock bands 6.00m-9.00m puggy red clay 9.00m-12.00m puggy white clay 12.00m-18.00m yellow clay soft 18.00m-24.00m black shale soft 24.00m-27.00m black shale lumps (broken) 27.00m-30.00m broken basalt 30.00m-33.00m hard basalt 33.00m-34.00m broken basalt 34.00m-39.00m hard basalt	1226m	South East
10113713	0.00m-22.00m CLAY 22.00m-28.00m SHALE 28.00m-34.00m SOFT GREY SHALE 34.00m-39.00m HARD SHALE	1261m	South West
10030350	0.00m-24.00m CLAY WEATHERED SHALE 24.00m-40.00m HARD & SOFT LAYERS WEATHERED GREY SHALE	1337m	South
10130105	0.00m-0.50m DRY BROWN CLAY 0.50m-4.50m RED AND GREY MOTTLED CLAY WITH IRONSTONE DEPOSITS 4.50m-7.00m GRAVELY STIFF GREY CLAY 7.00m-11.00m HARD GREY CLAY, SILT STONE 11.00m-21.00m HARD BASALT 21.00m-22.00m WATER CUT 1600gh & 1000ppm 22.00m-28.50m HARD BLACK BASALT	1410m	South East
10086771	0.00m-2.00m soil 2.00m-30.00m sandstone	1427m	South East
10029845	0.00m-3.00m 3.00m-22.00m 22.00m-30.00m Soft Shale 30.00m-34.00m Black Shale 34.00m-37.00m Fractured Shale	1458m	South
10085433	0.00m-0.10m Topsoil 0.10m-2.50m Dry Red Clay with Iron Deposits 2.50m-6.00m Red And Grey Motlted Dry Clay 6.00m-8.00m Moist Silty Grey Sand 8.00m-14.00m Red And Grey Mottled Dry Clay 14.00m-22.50m Weathered Silt Stone 22.50m-24.00m Weathered Basalt 24.00m-24.50m Water Cut 24.50m-27.00m Weathered Basalt 27.00m-27.50m Water Cut 27.50m-28.50m Hard Basalt	1475m	South
10011291	0.00m-2.00m TOPSOIL & CLAY 2.00m-6.00m CLAY 6.00m-14.00m WEATHERED SHALE 14.00m-18.00m WEATHERED SHALE 18.00m-20.00m WEATHERED GREY SHALE 20.00m-26.00m HARD BLACK SHALE	1491m	South
10108116	0.00m-0.50m Soil 0.50m-6.00m Hard Red Clay 6.00m-12.00m Red Clay with Lumps of Shale 12.00m-14.00m Grey Shale 14.00m-15.00m Black Shale 15.00m-21.00m Fractured Rock 21.00m-24.00m Broken Basalt 24.00m-27.00m Fresh Basalt	1497m	South East
10092947	0.00m-1.00m Gravel (Road Base) 1.00m-3.00m Red Clay 3.00m-3.80m Floater Bolder (Basalt) 3.80m-8.00m Orange Motelly Clay 8.00m-14.00m Orange Moist Clay with Ironstone Deposits 14.00m-20.00m White Silty Moist Clay 20.00m-20.50m Water Cut 20.50m-25.00m Orange Silty Clay 25.00m-26.00m Ridge Gravel	1513m	South
10043566	0.00m-13.00m COLOURED CLAYS 13.00m-14.00m BROKEN SHALE 14.00m-33.50m BLACK SHALE	1517m	South West
10097053	0.00m-0.30m soil 0.30m-5.00m hard clay red 5.00m-6.00m soft clay white 6.00m-12.00m soft clay red water table 12.00m-21.00m soft yellow clay 21.00m-27.00m soft grey shale 27.00m-51.00m soft black shale 51.00m-54.00m firm black shale - fractured water bearing 54.00m-58.00m hard black shale - fractured water bearing	1519m	South

NGIS Bore ID	Drillers Log	Distance	Direction
10040436	0.00m-0.05m Topsoil 0.05m-4.00m Red Clay Ironstone Deposits 4.00m-4.50m Red Mottely White Clay 4.50m-8.00m White Clay Moist 8.00m-10.00m White Mottely Red Clay 10.00m-17.00m Red Clay Ironstone Deposits 17.00m-23.50m Weathered Siltstone 23.50m-24.00m Water Cut 24.00m-29.00m Refussal Blade bit, DHH on Basalt 29.00m-29.20m Water Cut 29.20m-29.50m Basalt 29.50m-30.00m Water Cut 30.00m-33.00m Hard Basalt	1535m	South
10059728	0.00m-0.10m Topsoil 0.10m-20.00m Clay, red grey mottled 20.00m-36.00m Weathered Siltstone (cave in) 36.00m-45.00m Siltstone, hard, blue 45.00m-45.50m Water Bearing 45.50m-53.00m Siltstone, hard, blue	1546m	South
10007292	0.00m-0.30m Fill; Concrete 0.30m-0.50m Silty Clay; orange-brown, trace coarse sand 0.50m-1.50m Silty Clay; yellow brown 1.50m-3.60m Silty Clay; white orange, @ 2.5m orange, @ 3.6m refusal	1644m	West
10115598	0.00m-0.30m Fill; Concrete 0.30m-0.50m Sand, Gravelly; yellow brown 0.50m-1.00m Silty Clay; coarse sand, orange 1.00m-4.50m Silty Clay; orange white, trace sand, @ 2m white orange, @ 3m orange, @ 3.5m white orange 4.50m-5.50m Silty Clay; orange, trace coarse sand 5.50m-7.00m Silty Clay; light orange	1646m	West
10096406	0.00m-0.20m Fill; Bitumen 0.20m-0.50m Sand; yellow brown 0.50m-1.50m Silty Clay; orange-brown, trace coarse sand 1.50m-5.50m Silty Clay; @ 2m orange white, @ 2.5m orange, @ 5.5m refusal	1648m	West
10090160	0.00m-3.00m clay 3.00m-5.00m clay and rock 5.00m-7.00m weathered basalt 7.00m-10.00m basalt, hard bands 10.00m-12.00m fractured ground (water bearing) 12.00m-18.00m basalt quartz bands (water bearing) 18.00m-21.00m basalt hard	1660m	South East
10136964	0.00m-0.10m TOPSOIL 0.10m-1.10m ORANGE CLAY 1.10m-18.00m SILTY LIGHT GREY CLAY 18.00m-22.00m TAN SILT STONE 22.00m-23.00m WATER CUT 23.00m-30.00m TAN SILT STONE	1685m	South
10037691	0.00m-0.10m TOPSOIL 0.10m-2.80m TAN CLAY 2.80m-9.00m MOTTLED RED AND GREY CLAY 9.00m-18.00m CREAMY CLAY 18.00m-28.00m RED CLAY 28.00m-60.00m SOFT TAN SILT STONE	1694m	South
10057149	0.00m-2.00m TOP SOIL 2.00m-40.00m CLAY	1695m	South
10137598	0.00m-0.20m TOPSOIL 0.20m-22.00m RED CLAY (GRAVELLY IN CLAYS) 22.00m-28.00m HARD BLUE SILTSTONE 28.00m-28.60m WATER CUT 28.60m-36.00m HARD BLUE SILTSTONE	1709m	South
10118354	0.00m-0.10m TOP SOIL 0.10m-2.20m TAN SILTY CLAY 2.20m-6.00m MOTTLED RED AND GREY CLAY 6.00m-6.50m IRON STONE 6.50m-11.00m LIGHT GREY CLAY 11.00m-18.00m TAN SILT STONE 18.00m-19.00m WATER CUT 19.00m-24.00m SILT STONE	1746m	South
10027334	0.00m-0.50m Topsoil 0.50m-9.00m Clay interbedded with bentonite 9.00m-13.70m Granite - weathered	1759m	South West
10090469	0.00m-0.30m Fill; Concrete 0.30m-0.40m Sand 0.40m-0.50m Sandy Clay; black, trace silt 0.50m-1.00m Sandy Clay; light brown 1.00m-1.50m Sandy Clay; grey 1.50m-2.00m Silty Clay; orange-brown, trace sand 2.00m-2.50m Silty Clay; grey-brown, trace sand 2.50m-4.50m Silty Clay; grey-orange	1761m	South West

NGIS Bore ID	Drillers Log	Distance	Direction
10125110	0.00m-0.20m TOPSOIL 0.20m-3.50m GRAVELLY TAN CLAY 3.50m-18.00m LIGHT GREY SILTY CLAY 18.00m-30.00m SOFT TAN SILT STONE (CORE IN18-30M) 30.00m-37.00m BLUE SILT STONE 37.00m-38.00m WATER CUT 38.00m-48.00m HARD BLUE SILT STONE	1762m	South
10062698	0.00m-0.30m Fill; Concrete 0.30m-0.50m Sandy Clay; black, trace silt 0.50m-1.00m Sandy Clay; grey-brown, trace silt 1.00m-2.00m Silty Clay; orange-grey, trace sand, with yellow mottles 2.00m-4.50m Silty Clay; as above, @ 4.5m becomes orange-white 4.50m-10.00m Silty Clay; reddish-white	1767m	South West
10013288	0.00m-0.20m Fill; Bitumen 0.20m-0.50m Sandy Clay; trace silt, black 0.50m-1.00m Sandy Clay; light brown, coarse gravel 1.00m-2.00m Sandy Clay; orange-grey, trace silt 2.00m-4.00m Silty Clay; grey, trace sand 4.00m-4.50m Silty Clay; grey-orange	1785m	South West
10125112	0.00m-0.20m topsoil 0.20m-4.00m tan clay 4.00m-14.00m weathered basalt 14.00m-25.00m hard basalt 25.00m-25.50m water cut 25.50m-50.00m hard basalt	1980m	South
10068534	0.00m-3.00m SAND 3.00m-6.00m SAND DARK BROWN INDURATED (COFFEE ROCK) 6.00m-16.00m GRITTY YELLOW WHITE CLAY	1982m	West

Geology

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Geology

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Geological Units

What are the Geological Units within the dataset buffer?

Unit Code	Unit Name	Description	Unit Stratigraphy	Age	Dominant Lithology	Distance
QP_bd	Coastal deposits - dune facies	Marine-deposited and aeolian-reworked coastal sand dunes; partially consolidated.	/Coastal deposits//Coastal deposits - dune facies//	Quaternary (base) to Now (top)	Sand	0m
QH_ei	Estuarine interbarrier creek deposits	Fine- to medium-grained lithic-carbonate-quartz sand (marine-deposited), silt, clay, organic mud, peat, gravel, shell material.	/Estuarine deposits//Estuarine interbarrier creek deposits//	Holocene (base) to Now (top)	Clastic sediment	0m
QH_ecw	Estuarine channel deposits (subaqueous)	Fine- to medium-grained lithic-carbonate-quartz sand (marine-deposited), silt, clay, shell, gravel.	/Estuarine deposits//Estuarine channel deposits/Estuarine channel deposits (subaqueous)/	Holocene (base) to Now (top)	Clastic sediment	26m
QP_bf	Coastal deposits - backbarrier flat facies	Fine- to medium-grained quartz-lithic sand with carbonate and humic components (marine-deposited), indurated sand, silt, clay, gravel, organic mud, peat.	/Coastal deposits//Coastal deposits - backbarrier flat facies//	Quaternary (base) to Now (top)	Clastic sediment	100m
QH_bl	Coastal deposits - lagoon facies	Organic-rich mud, silt, clay, very fine- to fine-grained quartz-lithic-carbonate sand (marine-deposited), shell and shell grit.	/Coastal deposits//Coastal deposits - lagoon facies//	Holocene (base) to Now (top)	Organic rich sediment	153m
QH_bd	Coastal deposits - dune facies	Marine-deposited and aeolian-reworked coastal sand dunes.	/Coastal deposits//Coastal deposits - dune facies//	Holocene (base) to Now (top)	Sand	182m
QH_blw	Coastal deposits - lagoon facies (subaqueous)	Organic-rich mud, silt, clay, very fine- to fine-grained quartz-lithic-carbonate sand (marine-deposited), shell and shell grit.	/Coastal deposits//Coastal deposits - lagoon facies/Coastal deposits - lagoon facies (subaqueous)/	Holocene (base) to Now (top)	Organic rich sediment	224m
Q_bb	Coastal deposits - beach facies	Marine-deposited quartz-lithic fine- to medium-grained sand, shell and shell material, polymictic gravel.	/Coastal deposits//Coastal deposits - beach facies//	Quaternary (base) to Now (top)	Sand	287m
To_s	Smoky Cape Syenogranite	White to pink, coarse-grained, equigranular biotite-hornblende syenogranite with a finer-grained, porphyritic margin, and granophyric carapace.	Costal Association Granites///Smoky Cape Syenogranite//	Late Triassic (base) to Late Triassic (top)	Granite	459m
Punk	Kempsey beds	Lithic sandstone, mudstone, siltstone, pebbly sandstone, minor conglomerate.	/Ungrouped Nambucca Block units//Kempsey beds//	Carboniferous (Pennsylvanian) (base) to Permian (top)	Sandstone	525m
Q_avf	Alluvial fan deposits	Fluvially-deposited quartz-lithic sand, silt, gravel, clay.	/Alluvium//Alluvial valley deposits/Alluvial fan deposits/	Quaternary (base) to Now (top)	Clastic sediment	667m
QP_bdr	Coastal deposits - bedrock-mantling dune facies	Indurated marine-deposited and aeolian-reworked fine- to coarse-grained quartz-lithic sand with abundant carbonate, sporadic humic debris in stabilised dunes.	/Coastal deposits//Coastal deposits - dune facies/Coastal deposits-bedrock-mantling dune facies/	Pleistocene (base) to Now (top)	Sand	784m
Q_af	Alluvial floodplain deposits	Silt, very fine- to medium-grained lithic to quartz-rich sand, clay.	/Alluvium//Alluvial floodplain deposits//	Quaternary (base) to Now (top)	Clastic sediment	827m

Unit Code	Unit Name	Description	Unit Stratigraphy	Age	Dominant Lithology	Distance
Q_afs	Alluvial floodplain deposits - swamp facies	Unconsolidated grey to grey-brown silty clay, sporadic very fine-grained sand.	/Alluvium//Alluvial floodplain deposits/Alluvial floodplain deposits - swamp facies/	Quaternary (base) to Now (top)	Clay	897m

Linear Geological Structures

What are the Dyke, Sill, Fracture, Lineament and Vein trendlines within the dataset buffer?

Map ID	Feature Description	Map Sheet Name	Distance
No Features			

What are the Faults, Shear zones or Schist zones, Intrusive boundaries & Marker beds within the dataset buffer?

Map ID	Boundary Type	Description	Map Sheet Name	Distance
No Features				

Naturally Occurring Asbestos Potential

Lot 2 Phillip Drive, South West Rocks, NSW 2431

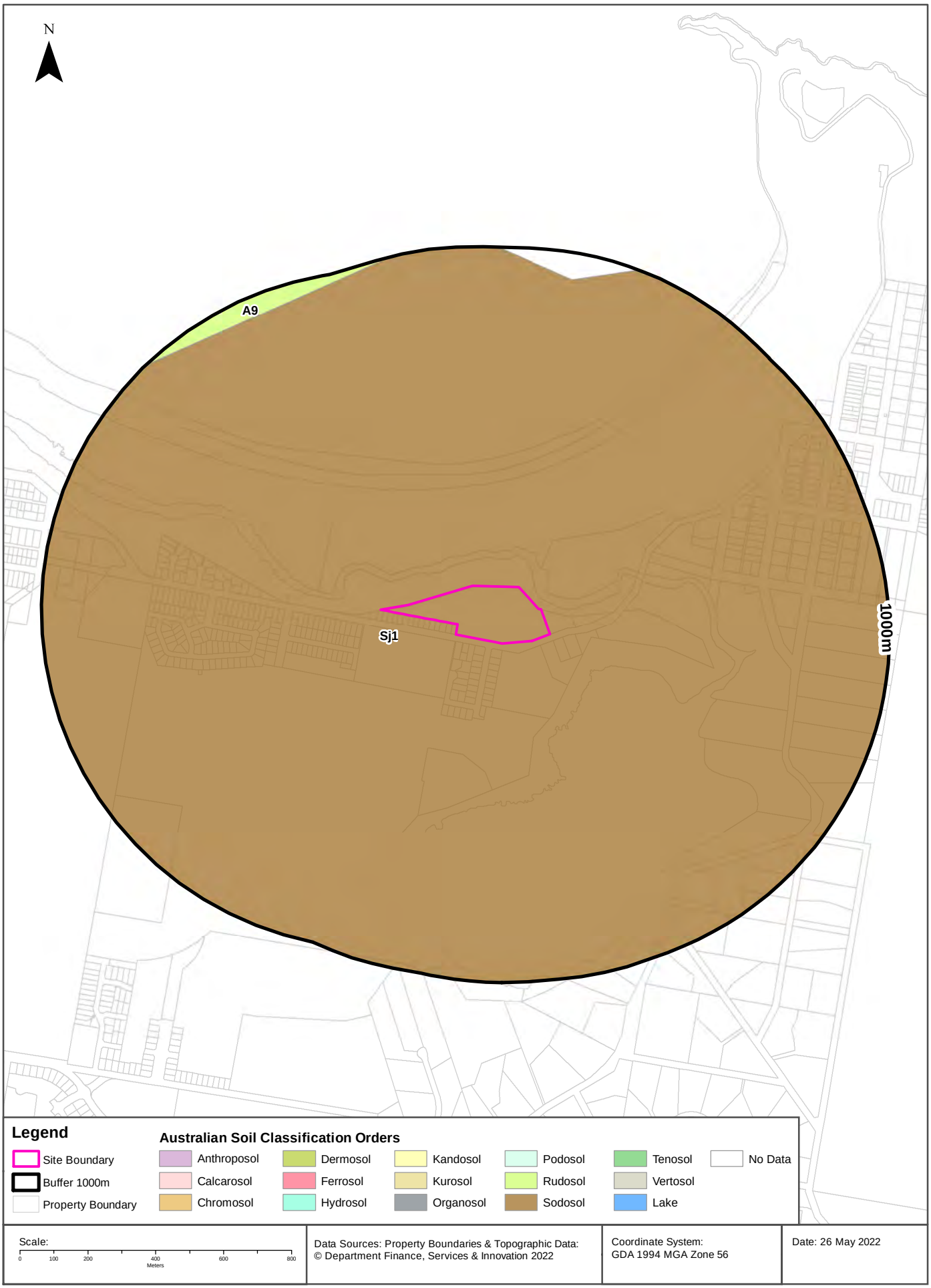
Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Atlas of Australian Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431

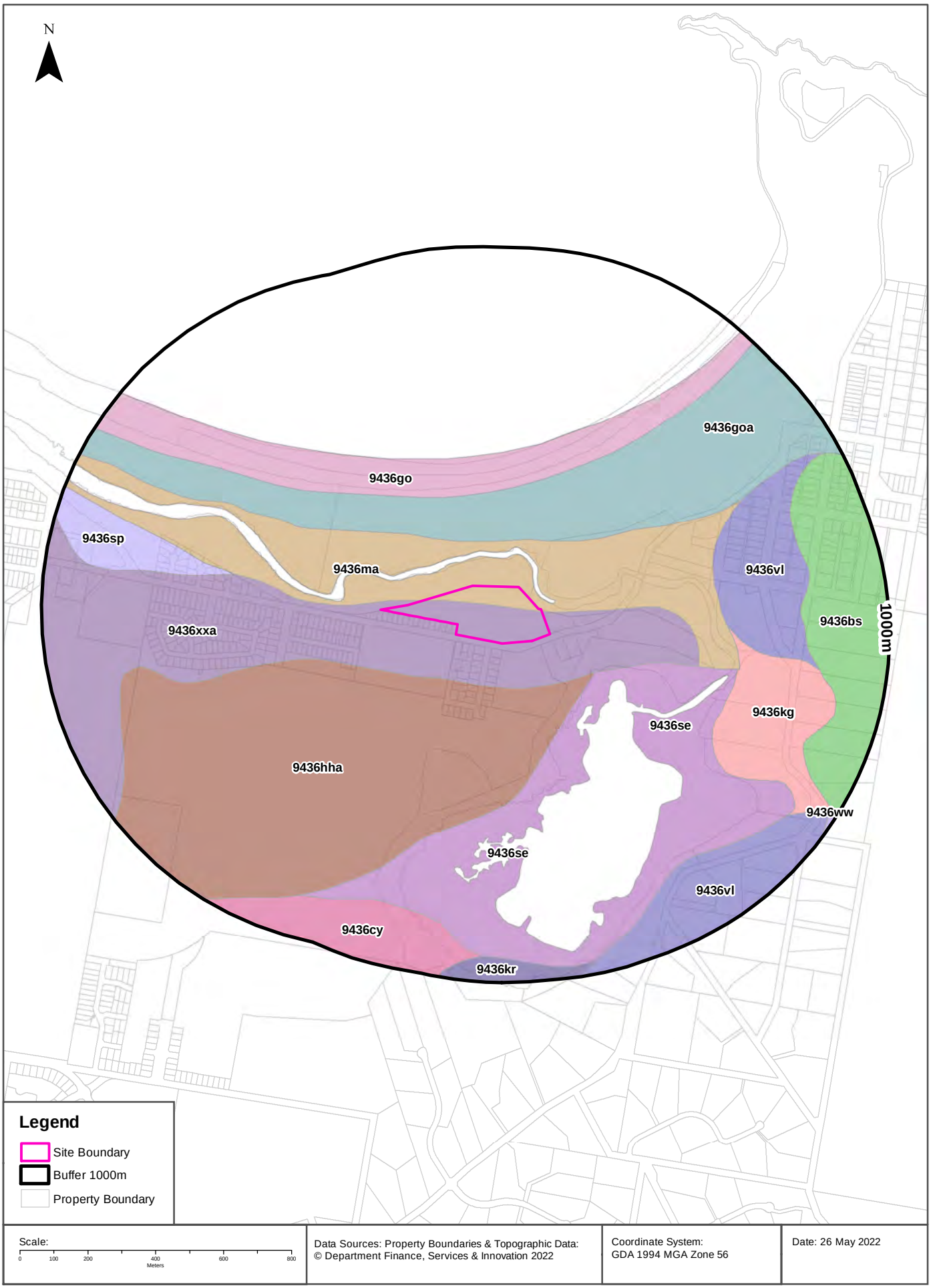
Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Sj1	Sodosol	Steep hilly, rock outcrops: chief soils are hard acidic yellow and yellow mottled soils (Dy2.41) and (Dy3.41). Associated are (Dy3.21) and various shallow soils, such as (Um5.41) and (Um6.21) on ridge crests and upper slopes; and (Dr4.21) and/or (Gn3.14) on lower slopes in some localities and (Uc) soils in others. As mapped, areas of units A9 and Ca7 may be included.	0m	On-site
A9	Rudosol	Present beach system of dunes and estuaries: relatively unstable dunes of calcareous sands (Uc1.11) or siliceous sands (Uc1.21) passing inland to more stable dunes and flatter sandy areas of siliceous sands (Uc1.21) and/or leached sands (Uc2.2 and Uc2.3); some estuarine areas of plastic clays (Uf6.5 or Uf6.6) with sand D horizons. As mapped, areas of unit Ca7 are included. Soil dominance varies locally between (Uc1.11) and (Uc1.21) soils.	940m	North West

Soil Landscapes of Central and Eastern NSW

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431

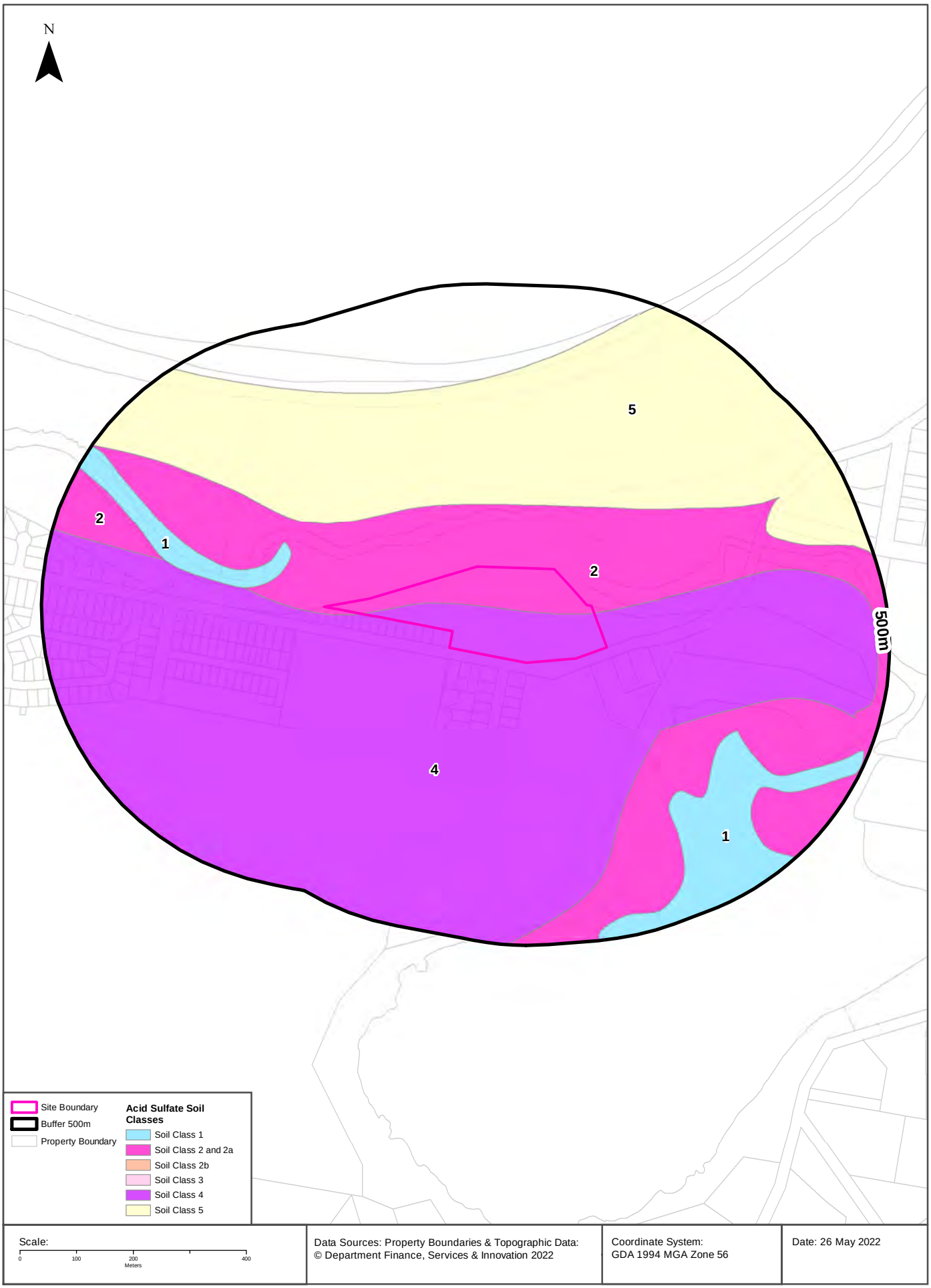
Soil Landscapes of Central and Eastern NSW

Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9436xxa	Disturbed Terrain variant a	0m	On-site
9436ma	Macleay Arm	0m	On-site
9436hha	Hat Head variant a	129m	South West
9436goa	Goolawah variant a	131m	North East
9436se	Seven Oaks	172m	South East
9436go	Goolawah	267m	North West
9436sp	Stuarts Point	444m	West
9436vl	Valla	504m	East
9436kg	Kundabung	521m	East
9436bs	Big Smoky	739m	East
9436cy	Clybucca	815m	South
9436kr	Korogoro	925m	South
9436ww	Way Way	973m	South East

Acid Sulfate Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Acid Sulfate Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

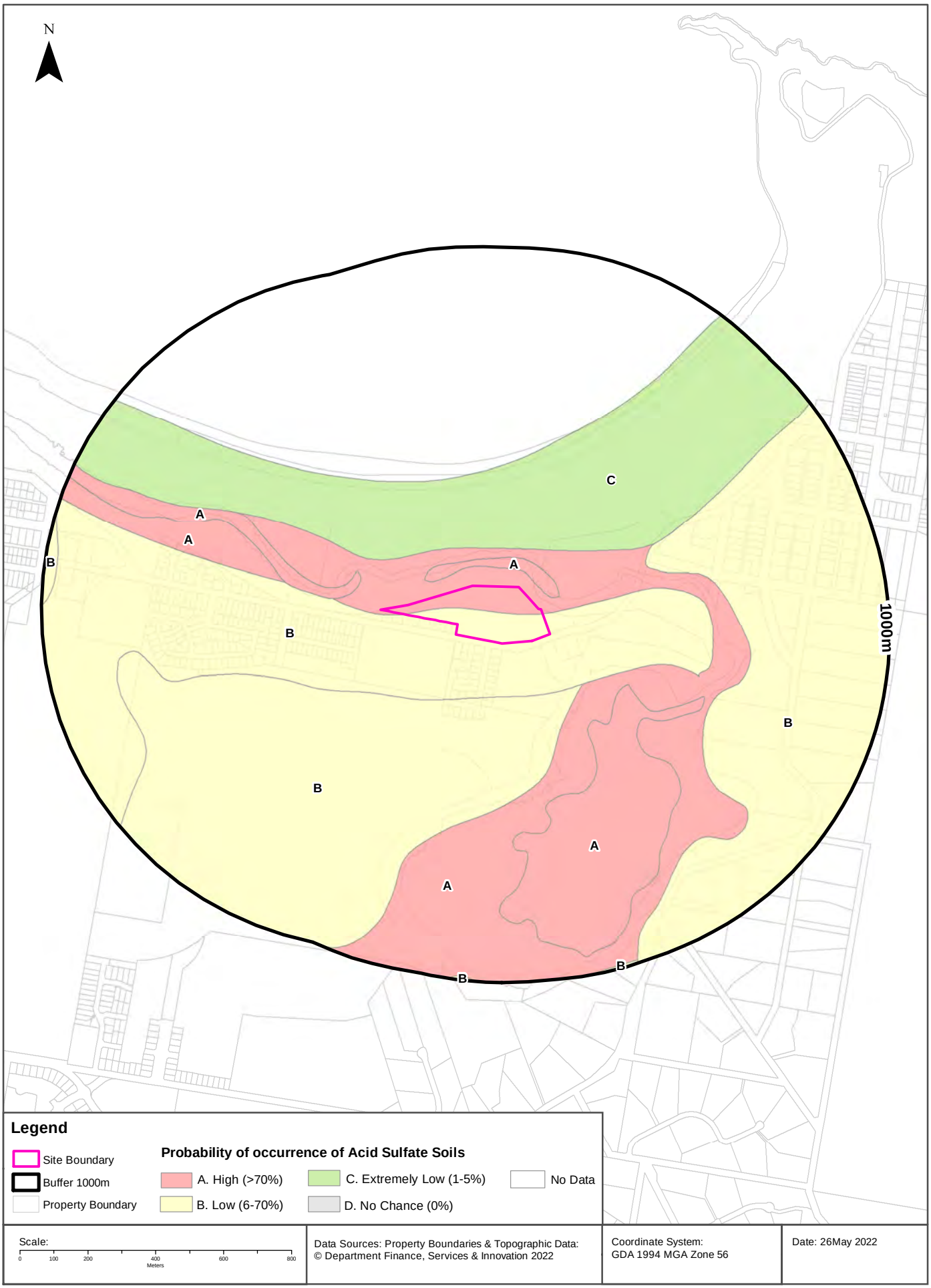
Soil Class	Description	EPI Name
2	Works below natural ground surface present an environmental risk; Works by which the watertable is likely to be lowered present an environmental risk	Kempsey Local Environmental Plan 2013

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Acid Sulfate Soils

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
B	Low Probability of occurrence. 6-70% chance of occurrence.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	0m	On-site
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	111m	North

Dryland Salinity

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Mining

Lot 2 Phillip Drive, South West Rocks, NSW 2431

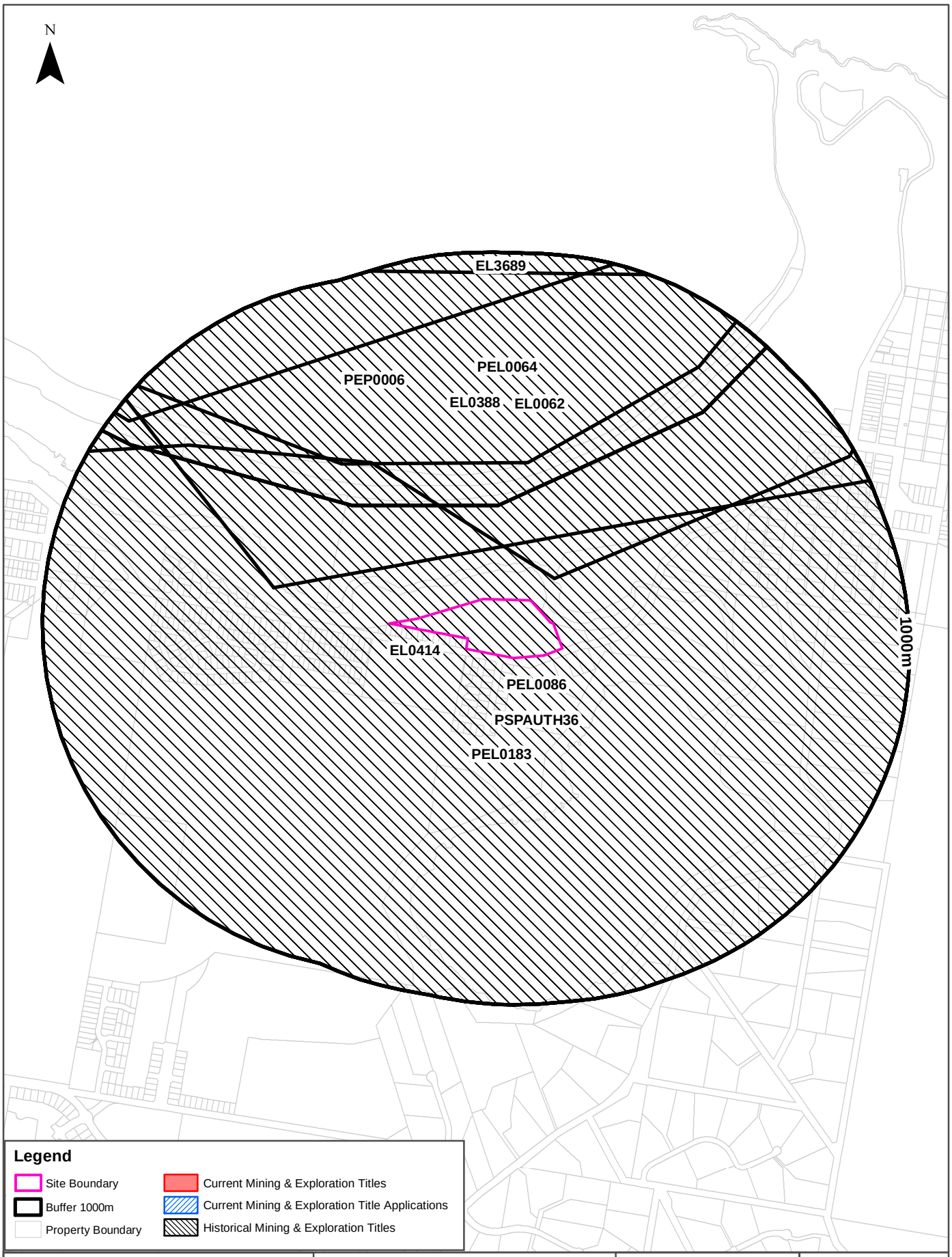
Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining & Exploration Titles

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Mining

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0086	OIL DEVELOPMENT NL			PETROLEUM	Petroleum	0m	On-site
PSPAUTH36	PANGAEA OIL & GAS PTY LIMITED	11/11/2009	11/11/2010	PETROLEUM	Petroleum	0m	On-site
EL0414	TROPIC MINERALS NL	01 Apr 1971	01 Apr 1972	MINERALS	Ag Cu Pb Zn	0m	On-site
PEL0183	APEX PETROLEUM PTY LTD	16/12/1970		PETROLEUM	Petroleum	0m	On-site
EL0062	PLANET MINING COMPANY PTY LIMITED	01 Sep 1966	01 Sep 1968	MINERALS	Heavy mineral sands	91m	North
EL0388	PLANET MINING COMPANY PTY LIMITED	01 Jan 1971	01 Jan 1975	MINERALS	Heavy mineral sands	139m	North
PEL0064	L H SMART OIL EXPLORATION CO. LTD			PETROLEUM	Petroleum	269m	North
PEP0006				PETROLEUM	Petroleum	269m	North
EL3689	CABLE SANDS HOLDINGS PTY. LIMITED	01 Nov 1990	01 Nov 1991	MINERALS	Heavy mineral sands	941m	North

State Environmental Planning Policy

Lot 2 Phillip Drive, South West Rocks, NSW 2431

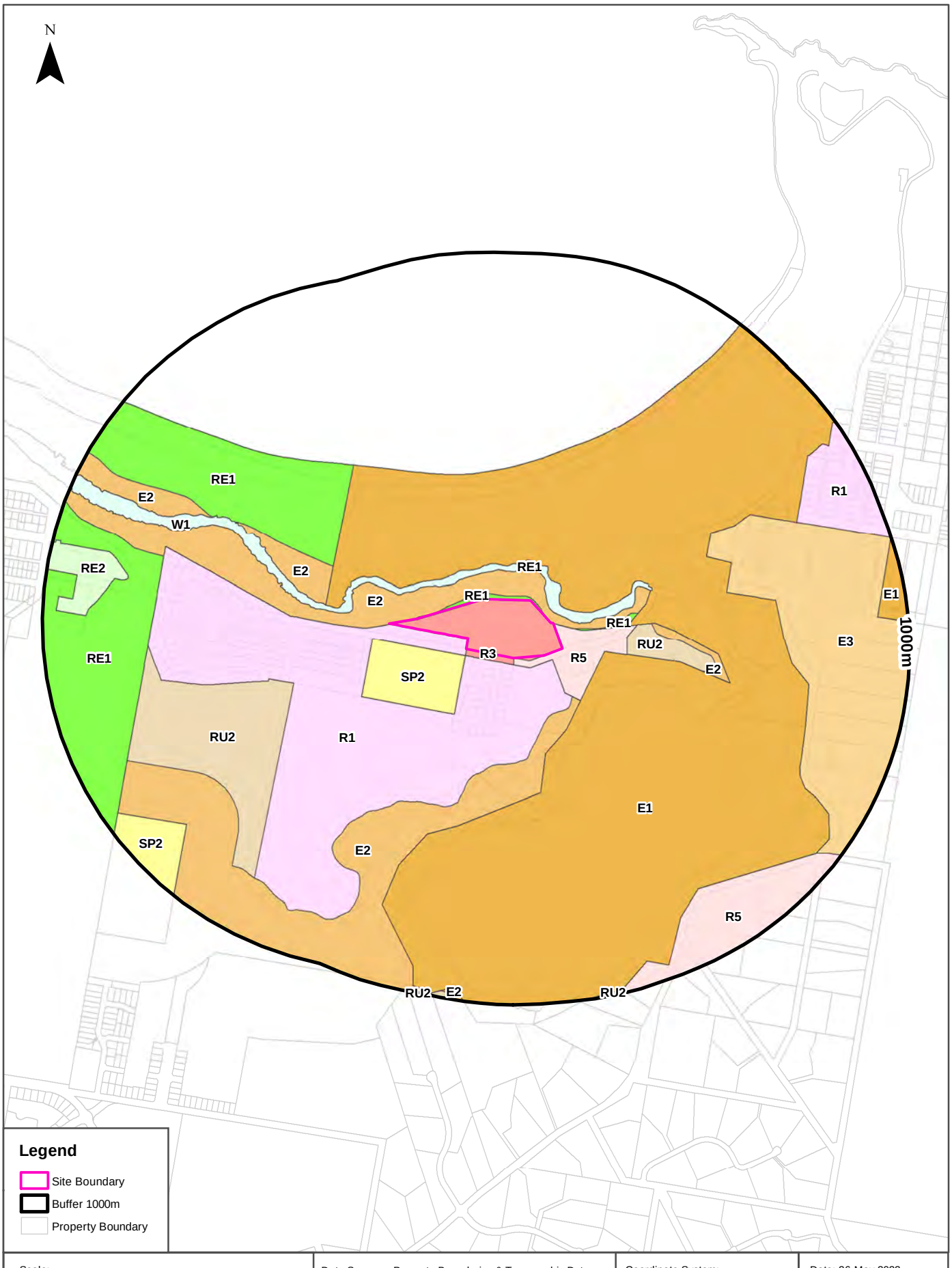
State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

EPI Planning Zones

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Environmental Planning Instrument

Lot 2 Phillip Drive, South West Rocks, NSW 2431

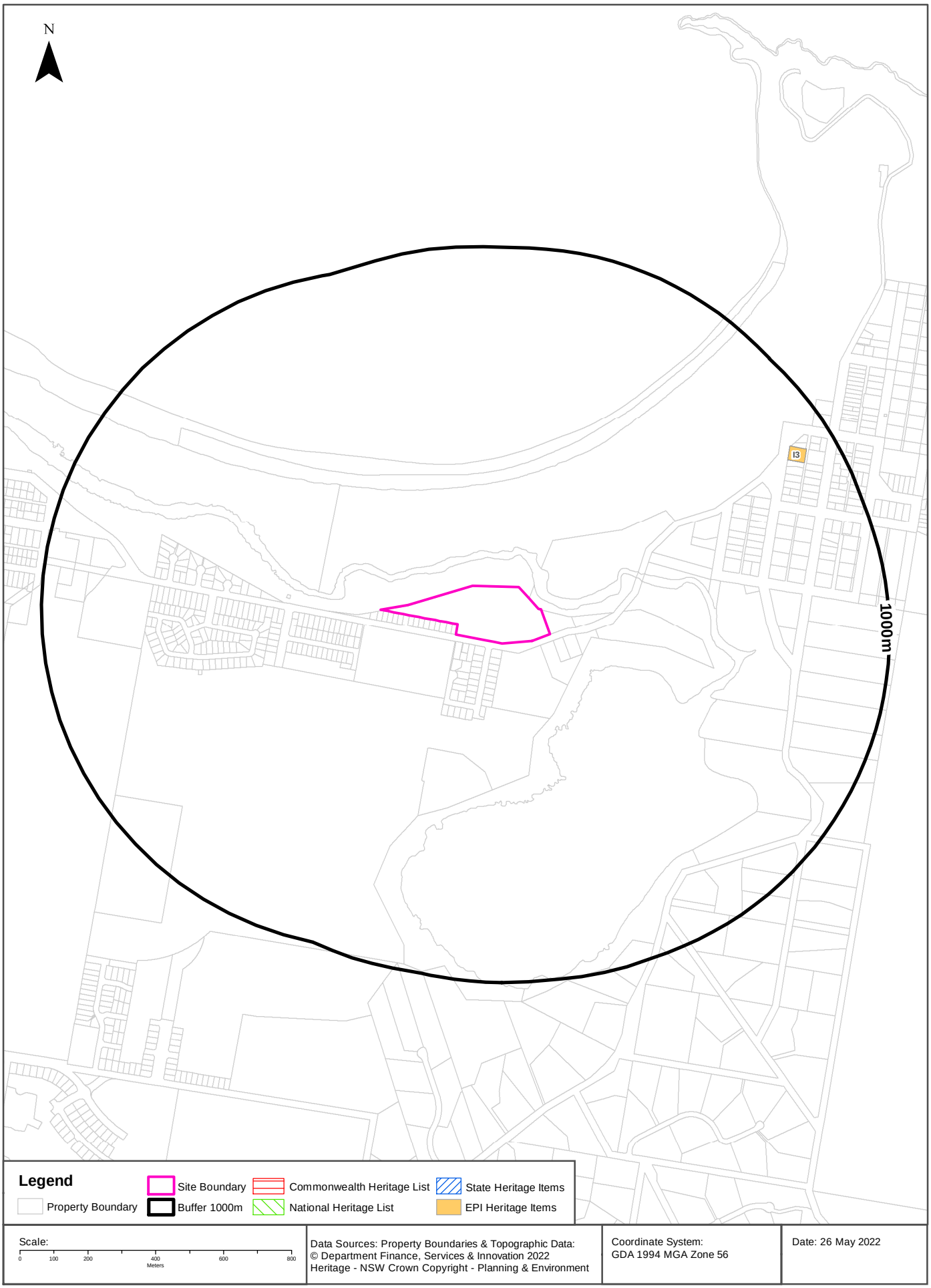
Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R3	Medium Density Residential		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		0m	On-site
R5	Large Lot Residential		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		0m	East
R1	General Residential		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		0m	South West
RE1	Public Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		0m	North
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		0m	West
SP2	Infrastructure	Oil Terminal	Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		20m	South West
W1	Natural Waterways		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		25m	West
RE1	Public Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		52m	East
E1	National Parks and Nature Reserves		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		54m	South East
RE1	Public Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		93m	North East
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		139m	South West
RU2	Rural Landscape		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		184m	East
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		193m	West
RE1	Public Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		232m	North West
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		264m	East
RU2	Rural Landscape		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		327m	West
E3	Environmental Management		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		479m	East
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		595m	West
RE1	Public Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		675m	West
R1	General Residential		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		758m	East
RE2	Private Recreation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		766m	West
R5	Large Lot Residential		Kempsey Local Environmental Plan 2013	17/04/2020	17/04/2020	10/09/2021	Amendment No 27	795m	South East
SP2	Infrastructure	Sewerage System	Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		823m	South West
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		965m	South
RU2	Rural Landscape		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		982m	South
E2	Environmental Conservation		Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	10/09/2021		991m	South

Heritage Items

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Heritage

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

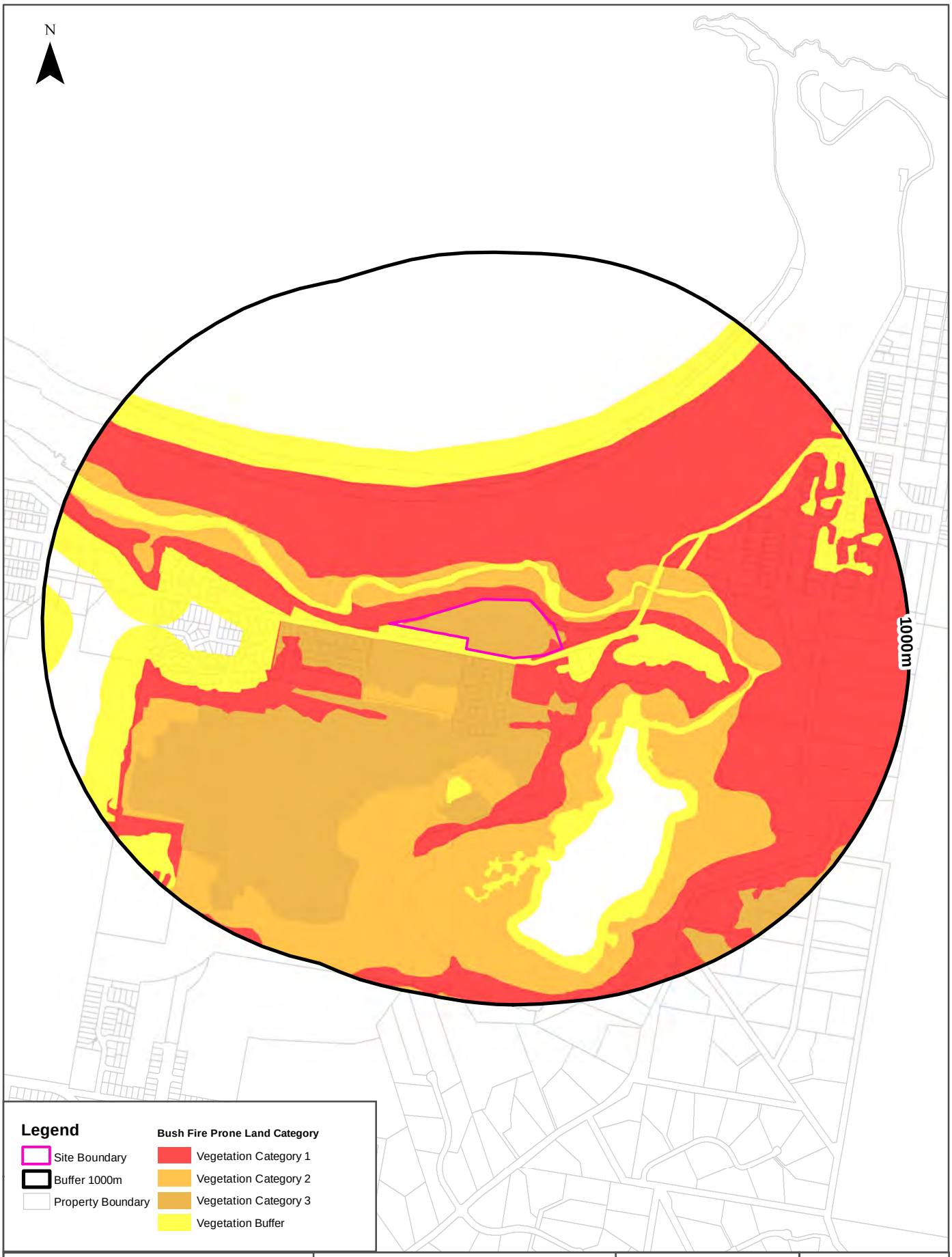
Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I3	Arakoon House	Item - General	Local	Kempsey Local Environmental Plan 2013	20/12/2013	03/02/2014	03/02/2014	848m	North East

Natural Hazards - Bush Fire Prone Land

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2022. Property Boundaries: © Department Finance, Services & Innovation 2022

Coordinate System: GDA 1994 MGA Zone 56

Date: 26 May 2022

Natural Hazards

Lot 2 Phillip Drive, South West Rocks, NSW 2431

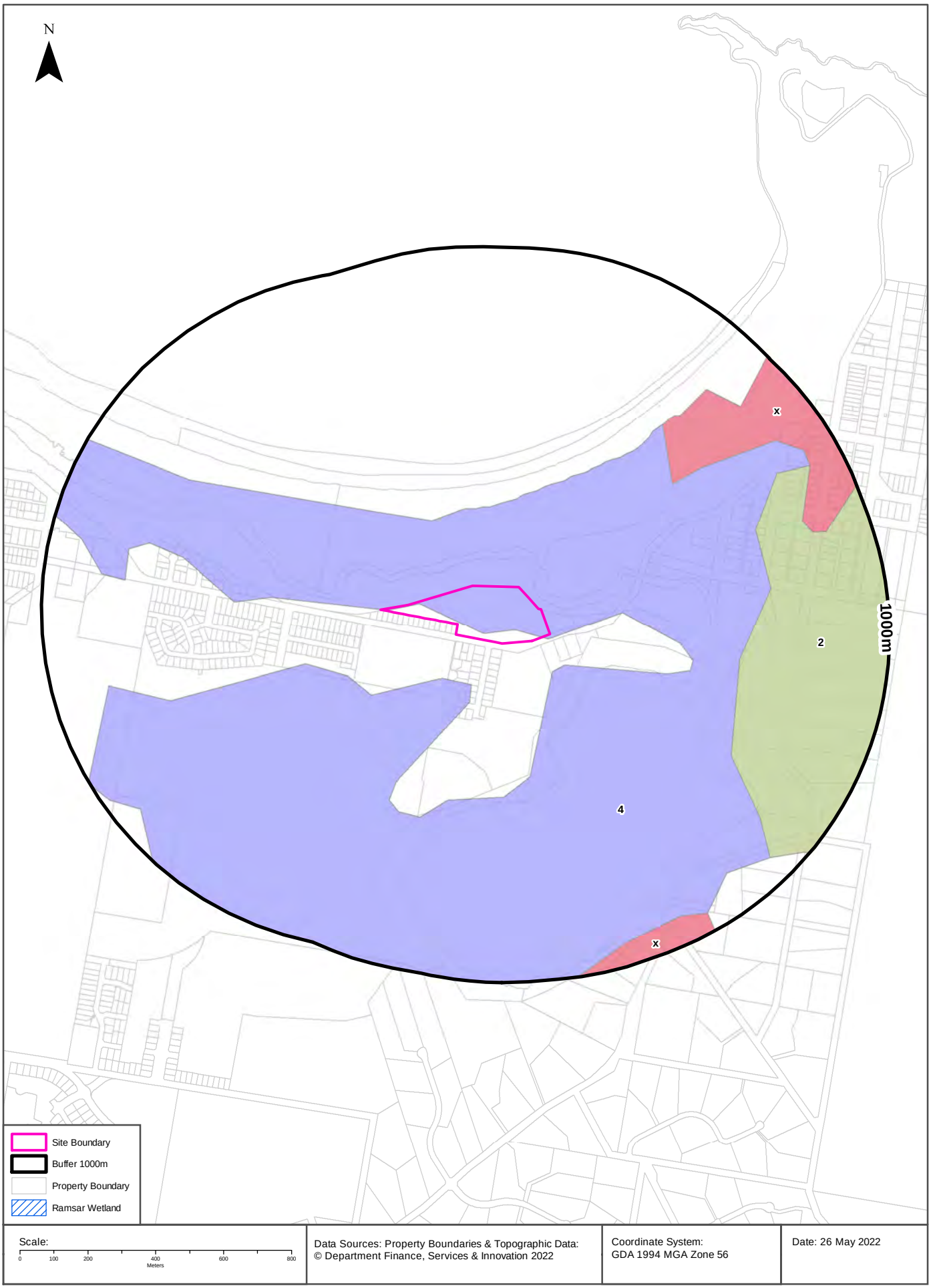
Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Category 1	0m	On-site
Vegetation Category 3	0m	On-site
Vegetation Buffer	0m	On-site
Vegetation Category 2	24m	North West

Ecological Constraints - Vegetation & Ramsar Wetlands

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Ecological Constraints

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Vegetation - Eastern Bushland Database (North Region)

What Vegetation exists within the dataset buffer?

Veg Code	Veg Desc	NVISCode	NVISDesc	Distance	Direction
4	coastal complex	2	Coastal complex	0m	On-site
x	disturbed forest woodland	23	Disturbed bushland	535m	North East
2	moist eucalypt forest	8	Moist forest system	562m	East

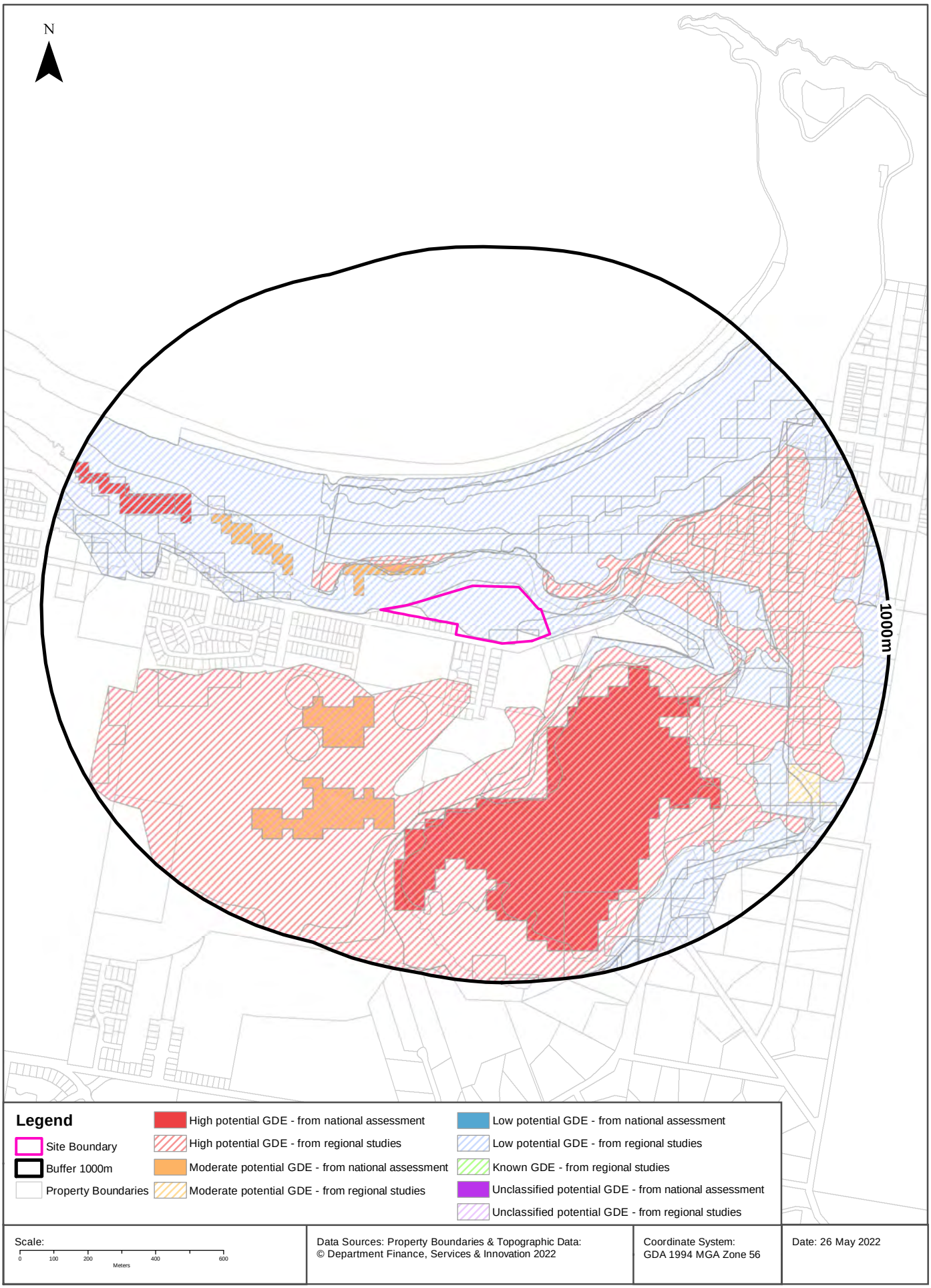
Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Ecological Constraints

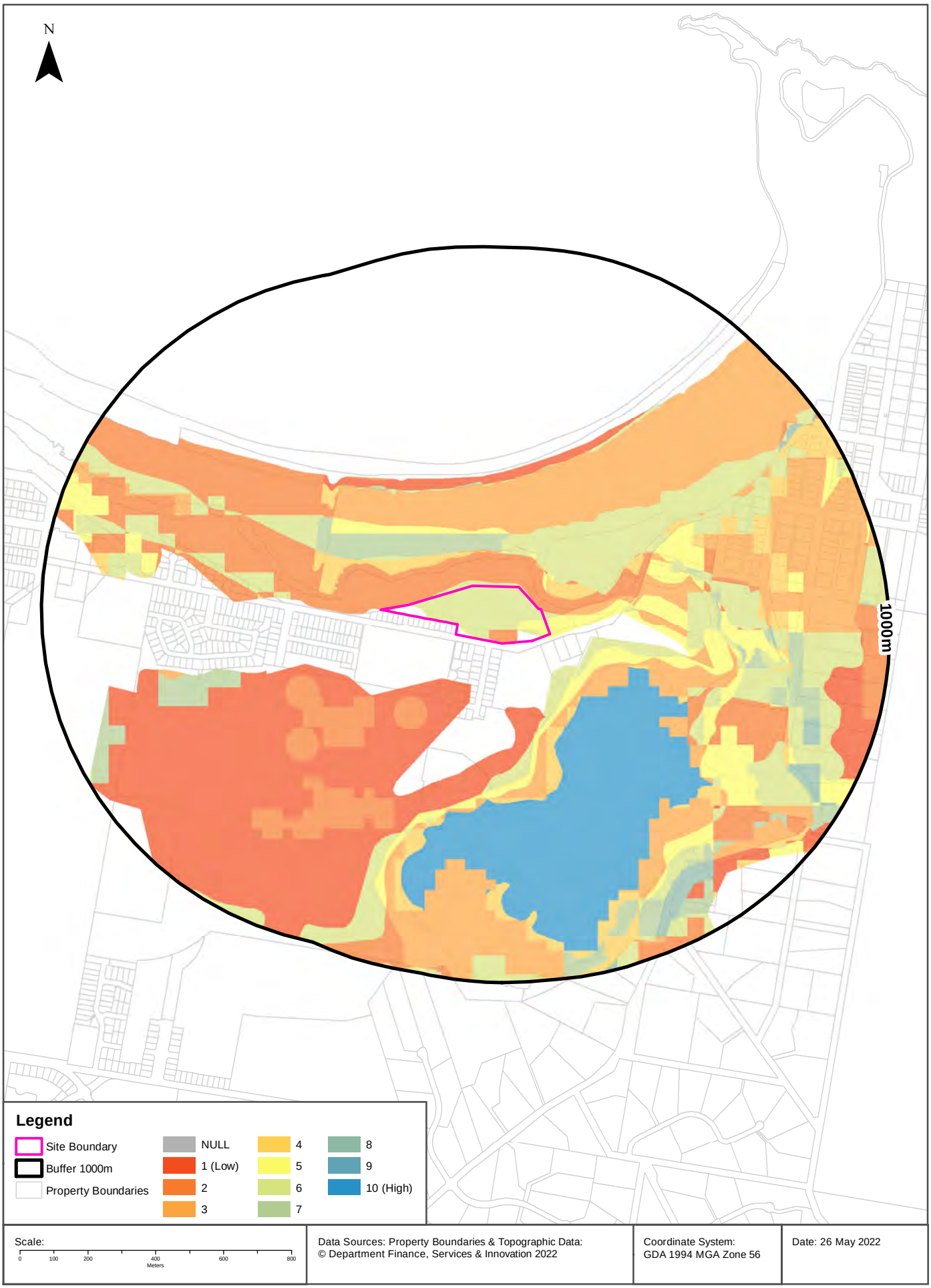
Lot 2 Phillip Drive, South West Rocks, NSW 2431

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	Low potential GDE - from regional studies	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		0m	On-site
Terrestrial	High potential GDE - from regional studies	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		51m	East
Aquatic	Moderate potential GDE - from national assessment	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		67m	West
Aquatic	High potential GDE - from national assessment	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		201m	South
Terrestrial	Low potential GDE - from regional studies	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		295m	North
Terrestrial	Low potential GDE - from regional studies	Undulating granitic plateau with higher residuals including basalt cappings.	Vegetation		296m	North
Terrestrial	Low potential GDE - from regional studies	Baslatic plateau terminating southeast in dissected volcanic pile (Mount Warning).	Vegetation		355m	North West
Terrestrial	Low potential GDE - from regional studies	Coastal lowlands on weak sedimentary rocks, with littoral and alluvial plains.	Vegetation		406m	West
Terrestrial	Moderate potential GDE - from regional studies	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		798m	South East
Terrestrial	High potential GDE - from regional studies	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		940m	South East

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

Lot 2 Phillip Drive, South West Rocks, NSW 2431



Ecological Constraints

Lot 2 Phillip Drive, South West Rocks, NSW 2431

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	5	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		0m	On-site
Terrestrial	2	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		0m	On-site
Terrestrial	6	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		0m	On-site
Terrestrial	4	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		52m	North West
Terrestrial	3	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		54m	East
Aquatic	4	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		67m	West
Terrestrial	1	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		86m	South West
Terrestrial	8	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		87m	North East
Terrestrial	7	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		101m	North West
Aquatic	10	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		201m	South
Terrestrial	10	Plateau flank dissected into narrow strike ridges and valleys.	Vegetation		205m	South East
Aquatic	2	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		256m	South West
Terrestrial	1	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		295m	North
Terrestrial	4	Undulating granitic plateau with higher residuals including basalt cappings.	Vegetation		296m	North
Terrestrial	2	Baslatic plateau terminating southeast in dissected volcanic pile (Mount Warning).	Vegetation		355m	North West
Terrestrial	2	Coastal lowlands on weak sedimentary rocks, with littoral and alluvial plains.	Vegetation		406m	West
Terrestrial	1	Baslatic plateau terminating southeast in dissected volcanic pile (Mount Warning).	Vegetation		433m	North West
Terrestrial	3	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		504m	East
Aquatic	3	Plateau flank dissected into narrow strike ridges and valleys.	Wetland		614m	West
Terrestrial	10	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		675m	East
Terrestrial	4	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		863m	South East
Terrestrial	2	Dissected plateau margin on granite and metamorphic rocks.	Vegetation		953m	South East
Terrestrial	5	Coastal lowlands on weak sedimentary rocks, with littoral and alluvial plains.	Vegetation		965m	East

Ecological Constraints

Lot 2 Phillip Drive, South West Rocks, NSW 2431

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Crinia tinnula	Wallum Froglet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Amphibia	Mixophyes balbus	Stuttering Frog	Endangered	Category 2	Vulnerable	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anous stolidus	Common Noddy	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna carneipes	Flesh-footed Shearwater	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Ardenna grisea	Sooty Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris alba	Sanderling	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Listed	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Endangered	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Vulnerable	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calonectris leucomelas	Streaked Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Charadrius mongolus	Lesser Sand-plover	Vulnerable	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Coracina lineata	Barred Cuckoo-shrike	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Esacus magnirostris	Beach Stone-curlew	Critically Endangered	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Glareola maldivarum	Oriental Pratincole	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Grus rubicunda	Brolga	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus longirostris	Pied Oystercatcher	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Irediparra gallinacea	Comb-crested Jacana	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Oceanites oceanicus	Wilson's Storm-Petrel	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Onychoprion fuscata	Sooty Tern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Podargus ocellatus	Marbled Frogmouth	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Procelsterna cerulea	Grey Ternlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pterodroma solandri	Providence Petrel	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus magnificus	Wompoo Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus regina	Rose-crowned Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stercorarius longicaudus	Long-tailed Jaeger	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Stercorarius parasiticus	Arctic Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stercorarius pomarinus	Pomarine Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sterna hirundo	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sula dactylatra	Masked Booby	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Sula leucogaster	Brown Booby	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Thalassarche cauta	Shy Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Tringa brevipes	Grey-tailed Tattler	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa totanus	Common Redshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto longimembris	Eastern Grass Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Xenus cinereus	Terek Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Mammalia	Arctocephalus pusillus doriferus	Australian Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus nigrogriseus	Hoary Wattled Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Megaptera novaeangliae	Humpback Whale	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Planigale maculata	Common Planigale	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Potorous tridactylus	Long-nosed Potoroo	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Syconycteris australis	Common Blossom-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Dermochelys coriacea	Leatherback Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Eretmochelys imbricata	Hawksbill Turtle	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	Acronychia littoralis	Scented Acronychia	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Allocasuarina defungens	Dwarf Heath Casuarina	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Caesalpinia bonduc	Knicker Nut	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Chamaesyce psammogeton	Sand Spurge	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Cynanchum elegans	White-flowered Wax Plant	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Maundia triglochinoides		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Peristeranthus hillii	Brown Fairy-chain Orchid	Vulnerable	Category 2	Not Listed	
Plantae	Flora	Phaius australis	Southern Swamp Orchid	Endangered	Category 2	Endangered	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Critically Endangered	
Plantae	Flora	Rhodomyrtus psidioides	Native Guava	Critically Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	

Data does not include NSW category 1 sensitive species.

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:
    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or
    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.

Appendix I Borehole Logs

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 3.1m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.75	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 5.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.4	GBH1_0.05-0.15	▽			FILL (Topsoil): Silty sand, medium to coarse grained, loose, brown		NO, NS, NAsb. Roots noted.
0.4						NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb. Possible hydrocarbon odour at approx. 2.7m
0.6	0.4	GBH1_0.6-0.7						
0.8								
1								
1.2								
1.4								
1.6								
1.8								
2								
2.2								
2.4								
2.6								
2.8	0.9	GBH1_2.7-2.8				NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black Alternating layers of coffee rock and sand - SFA hole collapse, unable to determine exact layer depths		NO, NS, NAsb. Slight sulfur odour
3	1.8	GBH1_2.9-3.0						
3.2								
3.4								
3.6								
3.8								
4								
4.2								
4.4								
4.6								
4.8						BH terminated at 4.75m (target depth)		
5								
5.2								
5.4								

produced by ESlog.ESdat.net on 27 Sep 2022

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.1	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 5.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH2_0.1-0.2	▽			FILL (Topsoil): Silty sand, medium to coarse grained, loose, brown		NO, NS, NAsb. Roots noted.
	0.7	GBH2_0.2-0.3				NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb.
0.4								
0.6								
0.8								
1								
1.2								
1.4								
1.6	0.7	GBH2_1.6-1.7						
1.8								
2								
2.2								*Push-tube seized with sand, unable to obtain sample. Unable to see sand / coffee rock interface, change of 3m depth estimated.
2.4								
2.6								
2.8								
3	0.6					NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
3.2								
3.4								
3.6								
3.8								
4								
4.2						BH terminated at 4.1m (PT refusal / target depth)		
4.4								
4.6								
4.8								
5								
5.2								
5.4								

produced by ESlog.ESdat.net on 27 Sep 2022

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 3m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.5	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 5.09.2022 / 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH3_0.1-0.3 (DUP1, TRIP1)				FILL (Topsoil): Silty sand, medium to coarse grained, loose, brown		NO, NS, NAsb. Roots noted.
0.4						NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb.
0.6								
0.8								
1								
1.2								
1.4								
1.6								
1.8								
2	0.5	GBH2_1.8-2.0	▽					
2.2								
2.4								
2.6								
2.8								
3						NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
3.2	0.5							
3.4								
3.6								
3.8								
4								
4.2								
4.4								
4.6						BH terminated at 4.5m (target depth)		
4.8								
5								
5.2								
5.4								

produced by ESlog.ESdat.net on 27 Sep 2022

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 1.8m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.2	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH4_0.1-0.2				NATURAL: Silty sand, medium to coarse grained, brown becoming grey		NO, NS, NAsb.
0.4						NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb.
1	0.5	GBH4_1.0-1.1						
1.6	0.6	GBH4_1.6-1.8	▽					
1.8						NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
4	0.6					NATURAL: Sand, medium to coarse grained, brown		NO, NS, NAsb.
4.2						BH terminated at 4.2m (target depth)		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 1.8m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.2	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH5_0.05-0.15				NATURAL: Silty sand, medium to coarse grained, brown becoming grey		NO, NS, NAsb.
0.4						NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb.
0.6								
0.8								
1								
1.2	0.6	GBH5_1.1-1.2	▽					
1.4								
1.6								
1.8						NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
2								
2.2	0.6							
2.4								
2.6								
2.8								
3								
3.2						NATURAL: Sand, medium to coarse grained, brown		NO, NS, NAsb.
3.4								
3.6								
3.8	0.6							
4								
4.2						BH terminated at 4.2m (target depth)		
4.4								
4.6								
4.8								
5								
5.2								
5.4								

produced by ESlog.ESdat.net on 27 Sep 2022

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 1.8m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.2	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH6_0.05-0.15 GBH6_0.15-0.35	▽			NATURAL: Silty sand, fine to medium grained, grey		NO, NS, NAsb.
0.4						NATURAL: Sand, medium to coarse grained, grey becoming light brown with depth, then change to grey from approx. 2m		NO, NS, NAsb.
1.4	0.5	GBH6_1.3-1.5						
2.8	0.6							
4.2	0.6							Borehole collapse during well installation
5						BH terminated at 5m (target depth)		

Disclaimer This bore log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 27 Sep 2022

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 2.2m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 4.2	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.5	GBH7_0.05-0.15				NATURAL: Silty sand, medium to coarse grained, dark grey to brown		NO, NS, NAsb.
0.4								
0.6	0.5	GBH7_0.5-0.7						
0.8								
1								
1.2								
1.4								
1.6								
1.8								
2	0.6	GBH7_2.0-2.2				NATURAL: Sand, medium to coarse grained, loose, dark grey becoming grey with depth		NO, NS, NAsb.
2.2								
2.4								
2.6						NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
2.8								
3	0.6							
3.2								
3.4								
3.6						NATURAL: Sand, medium to coarse grained, grey		NO, NS, NAsb.
3.8	0.5							
4								Borehole collapse during well installation
4.2						BH terminated at 4.2m (target depth)		
4.4								
4.6								
4.8								
5								
5.2								
5.4								

PROJECT NUMBER AU122217	**DRILLING COMPANY** Tuck Environmental Drilling	**COORDINATES**
PROJECT NAME DSI	**DRILLING METHOD** PT to 3m, SFA to End	**COORD SYS**
CLIENT ECON Environmental	**TOTAL DEPTH** 5.0	**SURFACE ELEVATION**
ADDRESS Phillip Drive, South West Rocks	**DRILLING DATE** 6.09.2022	**LOGGED BY** E.M
		CHECKED BY

COMMENTS NO = No Odour, NS = No Staining, NAsb = No Potential Asbestos Containing Material

Depth (m)	PID	Samples	Water	Well Installation	Graphic Log	Material Description	Moisture	Additional Observations
0.2	0.4	GBH8_0.05-0.15	▽			NATURAL: Silty sand, fine to medium grained, dark grey		NO, NS, NAsb.
0.4						NATURAL: Sand, medium to coarse grained, grey becoming light grey with depth		NO, NS, NAsb.
0.6								
0.8								
1	0.5	GBH8_0.8-1.0						
1.2								
1.4								
1.6								
1.8								
2								
2.2								
2.4								
2.6								
2.8								
3	0.5	GBH8_3.0-3.2						
3.2						NATURAL: Coffee Rock / Cemented Sand, fine to medium grained, dark brown to black		NO, NS, NAsb.
3.4								
3.6	0.5							
3.8								
4								
4.2								
4.4								
4.6								
4.8								NO, NS, NAsb. Borehole collapse during well installation
5	0.5					NATURAL: Sand, medium to coarse grained, dark grey		
5.2						BH terminated at 5m (target depth)		
5.4								

Appendix J Photographic Log

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 1	Date: 5/09/2022
Description: Example of soils from GBH1 (approx. 2m bgl).	

Photo Number: 2	Date: 5/09/2022
Description: Example of soils / coffee rock from GBH1 (approx. 3m bgl).	

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 3	Date: 5/09/2022
Description: Example of soils from GBH2 (approx. 1.5m bgl).	

Photo Number: 4	Date: 6/09/2022
Description: Example of soils / coffee rock from GBH4 (approx. 2m bgl).	

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 5	Date: 6/09/2022
Description: Location of GBH5.	

Photo Number: 6	Date: 6/09/2022
Description: Example of soils from GBH5 (approx. 1.5m bgl).	

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 7	Date: 6/09/2022	
Description: Shallow soil sample location S-4.		

Photo Number: 8	Date: 6/09/2022	
Description: Shallow soil sample location S-2.		

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 9	Date: 6/09/2022
Description: View to the southwest across the western portion of the site, with GMW2 in the background.	

Photo Number: 10	Date: 6/09/2022
Description: View to the northeast across the northern portion of the site.	

Photograph Log

Client Name:	Site Location:	Project Number:
ECON Environmental	Phillip Drive, South West Rocks, NSW	AU122217

Photo Number: 11	Date: 6/09/2022
Description: South-eastern boundary of the site.	

Photo Number: 12	Date: 6/09/2022
Description: View to the south across the eastern portion of the site, with GMW6 in foreground.	

Appendix K GME Field Logs

Hydrasleeve Sampling Data Form

Geosyntec consultants

Job Information	
Date: 11.9.21	
Project Name: South West Rocks DSI	Project Number: 2U22217
Site Location: Phillip Dr. South West Rocks	Operator: E M
	Weather: fine.

onsite 11:15am labelling, setup.

Time	Well ID	SWL mTOC	pH	Temp °C	Cond mS/cm	DO ppm	Redox mV	Comments / observations
12:15	GMW4	1.64	4.85	19.1	0.121	4.1	81.1	clear, brown, no odour (NO), no sheen (NS)
12:45	GMW5	2.51	5.16	19.9	0.113	2.44	129.6	slightly turbid to turbid, NO, NS
1:00	GMW6	1.13	6.20	17.5	0.077	3.92	101.4	slightly turbid to turbid, NO, NS brown
1:25	GMW7	0.44	6.14	19.5	0.127	2.28	99.7	turbid, NO, NS brown
2:00	GMW3	2.39	5.70	16.3	0.046	9.42	116.3	turbid, grey, NO, NS Bailed – see below
2:40	GMW2	1.38	6.36	17.9	0.069	2.46	-128.1	clear, minor sulfur odour, NS (Stuck up 0.8m)
3:10	GMW8	1.07	5.94	17.2	0.091	2.63	-125.1	clear to slightly turbid, minor (DUP/TRIP) sulfur/organic odour, NS.
3:55	GMW8?	2.71	5.29	18.7	0.116	3.29	-9.8	very turbid, brown, NO, NS

Example: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Field QC Checks			
Was pre-cleaning sampling equipment used for these samples?	Y	(N)	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	(NA)
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA

Field Notes

Time	Bail GMW3:	mTOC	pH	temp °C	cond. mS	DO ppm	Redox mV	notes
2:18	~0.5L	2.39	5.81	16.0	0.050	10.28	68.2	turbid, milky/grey, NO, NS
2:24	~0.5L	2.39	5.83	16.4	0.048	9.94	68.9	"
2:25	~0.5L	2.39	5.68	16.5	0.048	9.18	82.8	"
2:27	~0.5L	2.39	5.70	16.3	0.047	9.59	97.0	"
2:29	~0.5L	2.39	5.71	16.3	0.047	9.15	115.5	"
2:31	~0.5L	2.39	5.70	16.3	0.046	9.42	116.3	"

→ sampled

We are
engineers, scientists
and innovators

Geosyntec
consultants

BRISBANE OFFICE
PO Box 41
Indooroopilly Centre QLD 4068

SYDNEY OFFICE
Suite 1, Level 9, 189 Kent Street
Sydney NSW 2000

MELBOURNE OFFICE
Level 26, 360 Collins Street
Melbourne VIC 3000

www.geosyntec.com.au