



REPORT TO  
**URBAN PROPERTY GROUP**

ON  
**DRYLAND SALINITY AND ACID SULFATE SOIL  
ASSESSMENT**

FOR  
**PROPOSED MIXED-USE DEVELOPMENT – CCQ2**

AT  
**26-30 MANN STREET, GOSFORD, NSW**

Date: 4 November 2025  
Ref: E37799Brpt.Rev1-SAL

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## ABBREVIATIONS

Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Below Ground Level	BGL
Borehole	BH
Cation Exchange Capacity	CEC
Calcium	Ca
Cement, Concrete and Aggregates Australia	CCAA
Chain of Custody	COC
Damp Proof Course	DPC
Department of Land and Water Conservation	DLWC
Dissolved Oxygen	DO
International Organisation of Standardisation	ISO
JK Environments	JKE
Local Government Authority	LGA
Map Grid of Australia	MGA
Magnesium	Mg
National Association of Testing Authorities	NATA
Potassium	K
Polyvinyl Chloride	PVC
Practical Quantitation Limit	PQL
Redox Potential	Eh
Site Assessment Criteria	SAC
Standard Penetration Test	SPT
Standard Sampling Procedure	SSP
Standing Water Level	SWL
Standard Sampling Procedure	SSP
Sodium	Na
Western Sydney Regional Organisation of Councils	WSROC
<b>Units</b>	
deci Siemens per Metre	dS/m
Electrical Conductivity	EC
Exchangeable Sodium Percentage (Sodicity)	ESP%
Litres	L
Metres	m
Metres Below Ground Level	mBGL
Millivolts	mV
Millilitres	ml
Milliequivalents	meq
Milligrams per Litre	mg/L
Milligrams per Kilogram	mg/kg
ohm Centimetres	ohm.cm
Parts Per Million	ppm
micro Siemens per Centimetre	$\mu$ S/cm



## 1 INTRODUCTION

This dryland salinity and acid sulfate soil (ASS) assessment report has been prepared by JK Environments (JKE) on behalf of Urban Property Group ('the client') for the proposed Central Coast Quarter 2 (CCQ2) mixed-use development at 26-30 Mann Street, Gosford, NSW. The site location is shown on Figure 1 and the assessment was confirmed to the site boundaries as shown on Figure 2 attached in the appendices.

A geotechnical investigation was undertaken in conjunction with this assessment by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 37790PrptRev1, dated 3 November 2025)<sup>1</sup>. This report should be read in conjunction with the JKG report.

JKE were issued with previous investigation reports prepared for the site. A brief summary of information relevant to this assessment has been included in Section 2.

### 1.1 Proposed Development Details

A review of the supplied information indicates that the proposed development will comprise two mixed-use towers and a retail pavilion over a common ground floor level and basement car parking.

The proposed lowest basement will be constructed at approximately RL-9.0mAHD, requiring bulk excavation to approximately RL-9.5mAHD to allow for a hydrostatic slab if tanking is adopted, and will require excavation to depths of approximately 12.5m in the majority of the site, but to approximately 17.5m where the eastern side of the basement will be excavated along the side of the electricity substation near the north-eastern corner of the site. There will likely be localised excavations to depths of less than 2.5m below the basement such as for lift over-run pits, detention tanks etc. We understand the proposed basements will extend to the northern, western and southern site boundaries, and will be set back up to approximately 12m from the eastern site boundary.

### 1.2 Aim and Objectives

The primary aim of the assessment was to characterise the dryland salinity and potential ASS (PASS) conditions at the site in the context of the proposed development works.

The assessment objectives were to:

- Assess the current site conditions via a site walkover inspection;
- Assess the dryland salinity and PASS conditions via implementation of a sampling and analysis program; and
- Assess the requirement for preparing an ASS management plan (ASSMP) and/or a salinity management plan (SMP), if required for the proposed development.

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<sup>1</sup> JKG, (2025). *Report to Urban Property Group on Geotechnical Investigation for Mixed-Use Development – CCQ2 at 26-30 Mann Street, Gosford, NSW.* (referred to as JKG report)

### 1.3 Scope of Work

The assessment was undertaken generally in accordance with a JKG proposal (Ref: P72125Prev1) of 1 July 2025 and commission by the client via a Consultancy Agreement (CA).

The scope of work included the following:

- Review of previous geotechnical investigation reports issued by the client (reports by Cardno, Coffey and EI Australia);
- Review of site information including topography, soil maps, salinity risk maps, ASS risk maps, ASS planning maps, regional geology and hydrogeology in the vicinity of the site;
- A walkover site inspection to identify obvious visual indicators of salinity or potential problem areas;
- Design and implementation of a field sampling and laboratory analysis program;
- Interpretation of the analytical results based on established assessment criteria; and
- Preparation of a report presenting the results of the assessment.

The assessment was designed and the report was prepared with reference to regulations/guidelines outlined in the table below. Individual guidelines/documents are also referenced within the text of the report.

Table 1-1: Guidelines

Guidelines/Regulations/Documents
Site Investigations for Urban Salinity (2002) <sup>2</sup>
Salinity Code of Practice (2004) <sup>3</sup>
Managing Urban Stormwater – Soil and Construction (4 <sup>th</sup> ed.) (2004) <sup>4</sup>
Salinity Potential in Western Sydney Map (2002) <sup>5</sup>
Piling – Design and Installation AS2159-2009 (2009) <sup>6</sup>
Industry Guide T56: Residential Slabs and Footings in Saline Environments (2018) <sup>7</sup>
National Acid Sulfate Soils Sampling and Identification Methods Manual (2018) <sup>8</sup>
National Acid Sulfate Soils Identification and Laboratory Methods Manual (2018) <sup>9</sup>
Acid Sulfate Soil Manual (1998) <sup>10</sup>

<sup>2</sup> Department of Land and Water Conservation (DLWC), (2002). *Site Investigations for Urban Salinity*, (referred to as DLWC 2002)

<sup>3</sup> Western Sydney Regional Organisation of Councils (WSROC) and Department of Infrastructure, Planning and Natural Resources (DIPNR), (2003 amended 2004). *Western Sydney Salinity Code of Practice* (referred to as Salinity Code of Practice)

<sup>4</sup> NSW Government/Landcom, (2004). *Managing Urban Stormwater – Soil and Construction*, (4<sup>th</sup> ed.) (referred to as Blue Book)

<sup>5</sup> DIPNR, (2002). *1:100,000 Map – Salinity Potential in Western Sydney*, (referred to as Salinity Potential Map)

<sup>6</sup> Standards Australia, (2009). *Piling – Design and Installation, AS2159-2009* (referred to as AS2159-2009)

<sup>7</sup> Cement, Concrete and Aggregates Australia (CCA), (2018). *Industry Guide T56: Residential Slabs and Footings in Saline Environments* (referred to as CCA 2018)

<sup>8</sup> Sullivan. L (et al), (2018). National Acid Sulfate Soils guidance: National acid sulfate soils sampling and identification methods manual

<sup>9</sup> Sullivan. L (et al), (2018). National Acid Sulfate Soils guidance: National acid sulfate soils identification and laboratory methods manual

<sup>10</sup> Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (referred to as ASS Manual 1998)



## 2 SITE INFORMATION

### 2.1 Summary of Previous Site Investigations

Cardno have previously undertaken a Preliminary Geotechnical Assessment in 2016<sup>11</sup>, and Geotechnical Investigation in 2022<sup>12</sup>, and Coffey have previously prepared a Geotechnical Interpretative Report in 2019<sup>13</sup>. The investigations/assessments encountered fill material ranging in depth from approximately 0.2m below ground level (BGL) to 1.6mBGL, overlying natural alluvial sands and/or clays extending to depths of approximately 1.9mBGL to 10mBGL. Residual clays were encountered beneath the alluvium between depths of approximately 4.6mBGL to 10.5mBGL. Sandstone bedrock was encountered between depths of approximately 6.4mBGL to 15.9mBGL, and groundwater seepage was between depths of approximately 0.4mBGL to 2.4mBGL.

The Cardno assessment undertaken in 2016 included analysis for soil aggressivity and ASS characteristics. The results of the aggressivity assessment indicated that the soils are non-aggressive to steel and non-to mildly-aggressive towards concrete buried structural elements. The ASS assessment indicated that actual acid sulfate soils (AASS) are present within the alluvial soil profiles on site, and that an ASSMP was required. Following review of the results presented in the Cardno 2016 report, JKE is of the opinion that the results were likely indicative of potential ASS (PASS), as opposed to AASS.

EI Australia (EIA) has previously prepared a Hydrogeological Report including Groundwater Seepage Analysis and Dewatering Management Plan (DMP) in 2025<sup>14</sup>. Relevant information from the EIA report is included in the JKG geotechnical report.

### 2.2 Site Identification

Table 2-1: Site Identification

<b>Site Address:</b>	26-30 Mann Street, Gosford, NSW
<b>Lot &amp; Deposited Plan:</b>	Lots 3 and 4 in DP1296100
<b>Current Land Use:</b>	Vacant (construction site)
<b>Proposed Land Use:</b>	Mixed-use (commercial and residential)
<b>Local Government Authority (LGA):</b>	Central Coast Council
<b>Site Area/Area of Proposed Development (m<sup>2</sup>):</b>	5,800

<sup>11</sup> Cardno, (2016). *Preliminary Geotechnical Assessment, 32 Man Street, Gosford, prepared for Government Property NSW, dated 29 April 2016.*

<sup>12</sup> Coffey, (2019). *SH Gosford Residential Pty Ltd, Central Coast Quarter, 26 Mann Street, Gosford, Geotechnical Interpretative Report, dated 20 August 2019.*

<sup>13</sup> Cardno, (2022). *Geotechnical Investigation Factual Report, Gosford North Tower, prepared for St Hilliers Contracting, dated 5 July 2022.*

<sup>14</sup> EI Australia, (2025). *Hydrogeological Report Including Groundwater Seepage Analysis and Dewatering Management Plan, Reference E26584.E16\_Rev0, dated 9 May 2025.*



<b>Geographical Location (decimal degrees) (approx.):</b>	Latitude: -33.429946 Longitude: 151.340522
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### 2.3 Site Location, Topography and Regional Setting

The site is located in a predominantly commercial area of Gosford and is bound by Mann Street to the east Vaughan Avenue to the south as shown on Figure 1. The site is located approximately 120m to the north-east of Brisbane Water.

The regional topography is characterised by a west facing hillside which falls towards the Brisbane Water. The site itself is located towards the toe of the hillside. The site is located toward the southern end of the Gosford City Centre, at the transition from the toe of a hillside to the east, to flat and possibly reclaimed land adjacent to the Brisbane Water.

### 2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 14 August 2025. The inspection was limited to accessible areas of the site and was focussed on assessing the site conditions relevant to PASS and dryland salinity.

At the time of the inspection, the site was predominantly utilised as a construction compound for the first stage of the Central Coast Quarter development (CCQ1), which is located to the immediate north of the site. The site was formerly used as part of the Gosford Public School, comprising single and double storey brick buildings which have since been demolished. The majority of the site surface was gravel covered, with minor concrete or asphalt-paved areas. The on-site pavement appeared in poor condition, based on a cursory inspection, with visible subsidence/potholing.

Minor ponding of water was observed within areas of depression across the site and was associated recent rainfall events. No obvious indicators of PASS or dryland salinity were observed during the site inspection.

### 2.5 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Construction site with commercial properties (Services Australia, hair salon, food vendors) and Georgina Terrace beyond;
- South – Vaughan Avenue with Gosford Rotary Park and Brisbane Water beyond;
- East – Mann Street with Gosford Police Station and residential properties beyond; and
- West – Gosford Waterfront Park with Dane Drive and Brisbane Water beyond.



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### **3 GEOLOGY AND HYDROGEOLOGY**

#### **3.1 Regional Geology and Soils**

Regional geological information was reviewed for the assessment. The information was sourced from the Lotsearch report attached in the appendices. The report indicates that the western portion of the site is underlain by anthropogenic deposits, which typically consists of varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix. The report indicates that the eastern portion of the site is underlain by the Terrigal Formation, which typically consists of interbedded laminite, shale and fine- to coarse-grained quartz- to quartz-lithic sandstone, and minor red claystone.

#### **3.2 Dryland Salinity**

The dryland salinity national assessment information presented in the Lotsearch report indicated that the site is not located within a dryland salinity risk area.

#### **3.3 Acid Sulfate Soil Risk and Planning**

A review of the acid sulfate soil (ASS) risk map prepared by Department of Land and Water Conservation (1997<sup>15</sup>) indicated that the site is located in an area classed as 'disturbed terrain'. The 'disturbed terrain' classification is adopted in large scale filled areas which often occurring during reclamation of low-lying swamps for urban development or the construction of dams and levees. The majority of landforms within these areas are not expected to encounter PASS. However, localised occurrences may be found at depth. Disturbance of these materials will result in risk that will vary with elevation and depth of disturbance. Soil investigation is required to assess these areas for PASS.

#### **3.4 Central Coast Council Environmental Plan (LEP)**

A review of the Central Coast Council LEP indicates that a majority of the site is located within a Class 2 ASS risk area. The eastern extent of the site along the site boundary is located in a Class 5 ASS risk area. Works in a Class 2 risk area that could pose an environmental risk in terms of ASS include all works below the existing ground level and works by which the water table is likely to be lowered. Works in a Class 5 risk area that could pose an environmental risk in terms of ASS include works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1mAHD on the adjacent 1,2,3,4 land (refer to appendices for further details on each risk class).

#### **3.5 Hydrogeology**

Hydrogeological information presented in the Lotsearch report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There was a total of 42 registered bores within the report buffer of 2,000m. In summary:

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<sup>15</sup> Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 913152, Ed 2)*

- 
- The nearest registered bore was located approximately 140m from the site. This was utilised for unknown purposes;
  - The majority of the bores were registered for monitoring purposes;
  - There were one nearby bore (i.e. within 1000m) registered for irrigation uses, located approximately 210m to the north-west of the site; and
  - The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of approximately 1.5-25m, underlain by sandstone bedrock. Standing water levels (SWLs) in the bores ranged from approximately 3mBGL to 5.5mBGL.

### **3.6 Receiving Water Bodies**

The site location and regional topography indicates that excess surface water flows have the potential to enter the Brisbane Waters estuary located approximately 120 to the south-west of the site. We have considered Brisbane Waters as a potential receptor.



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## **4 SAMPLING AND ANALYSIS PLAN**

### **4.1 Soil Sampling Rationale**

The investigation included soil sampling from four boreholes BH1 to BH4 placed across the site as shown on Figure 2. This number of sampling points meets the initial investigation requirements of 2-4 locations per hectare recommended in the *Site Investigations for Urban Salinity* (2002) publication for moderately intensive construction and the minimum number of sampling locations recommended in the *National Acid Sulfate Soil Guidance* (2018) based on the site area of approximately 0.58 hectares.

Soil sampling from the boreholes extended to the maximum depth of approximately 9mBGL.

### **4.2 Soil Sampling Methods**

Fieldwork for this investigation was undertaken between 30 and 31 July 2025. Sampling locations were set out using a differential GPS (DGPS) unit. Locations were marked using spray paint and were cleared for underground services prior to drilling.

The sample locations were drilled using a truck mounted hydraulically operated drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) sampler or directly from the auger when conditions did not allow use of the SPT sampler.

Soil samples were collected from the fill and natural profiles encountered during the investigation based on distinct change in lithology or field observations. All samples were recorded on the borehole logs attached in the appendices.

Samples were placed in plastic bags and sealed using twist ties with minimal headspace. Sampling personnel used disposable nitrile gloves during sampling activities. The samples were labelled with the job number, sampling location, sampling depth and date.

The samples were preserved by immediate storage in an insulated sample container with ice and frozen upon return to the JKE office. Samples were subsequently delivered in the insulated sample container (on ice or with ice packs) to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

### **4.3 Groundwater Sampling Rationale**

The investigation included groundwater sampling from four groundwater monitoring wells installed as part of the JKG geotechnical investigation in selected boreholes MW1A, MW3, MW4 and MW5. The well locations are shown on Figure 2. The wells were positioned for site coverage and included low lying areas and potential dryland salinity risk areas identified during the site inspection.



#### 4.4 Monitoring Well Installation

The monitoring well construction details are documented on appropriate borehole logs presented in the appendices. The wells were installed to depths of approximately 3m to 16.3mBGL. The wells were generally constructed as follows:

- 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater;
- 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed);
- A 2mm sand filter pack was used around the screen section for groundwater infiltration;
- A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and
- A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water.

The surface RLs for the monitoring wells were obtained from the survey plan provided by the client.

#### 4.5 Monitoring Well Development and Groundwater Sampling

The monitoring wells were developed by JKG using a submersible electric pump on 11 August 2025. Groundwater samples were obtained by JKE on 14 August 2025 from four monitoring wells MW1a, MW3, MW4 and MW5 using a peristaltic pump. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers.

The pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) were monitored during sampling using calibrated field instruments. The sampling data sheets and field calibration information are attached in the appendices. The samples were preserved in accordance with the requirements detailed in AS/NZS 5667.1-1998<sup>16</sup> and placed in an insulated container with ice.

On completion of the fieldwork, the samples were delivered in an insulated sample container to a NATA registered laboratory for analysis under standard chain of custody procedures.

#### 4.6 Laboratory Analysis

Samples were analysed by Envirolab Services Pty Ltd (NATA accreditation number 2901). Reference should be made to the laboratory reports (Ref: 387581, 387581-A, 388639 and 387577) attached in the appendices for further details of the analytical methods.

#### 4.7 Analytical Schedule

The analytical schedule is outlined in the following table:

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<sup>16</sup> Standards Australia, (1998). *Water Quality – Part 1: Sampling, Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples*, (AS/NZS 5667.1:1998)



Table 4-1: Analytical Schedule

Analyte	Fill Samples	Natural Soil Samples	Natural Bedrock Samples	Groundwater Samples
pH	4	12	-	4
Electrical Conductivity (EC)	4	12	-	4
Resistivity	4	12	-	-
Texture (used to determine EC extract – ECe)	4	12	-	-
Sulphate	4	12	-	4
Chloride	4	12	-	4
Cation Exchange Capacity (CEC)	4	-	-	-
pH <sub>f</sub> and pH <sub>fox</sub>	16	24	3	-
Chromium Reducible Sulfur Suite (SCR)	3	7	2	-

## 5 SITE ASSESSMENT CRITERIA (SAC) – SALINITY

### 5.1 Soil Salinity and Plant Growth

The electrical conductivity (EC) of a 1:5 soil:water extract is commonly used as an indicator of soil salinity conditions as the reading is directly related to the electrolyte (salt) concentration of the extract. In order to compare the laboratory data with published salinity classes, the results are converted to equivalent saturated paste (ECe) using texture adjustment values presented in DLWC 2002.

The following table provides a summary of plant response with reference to salinity:

Table 5-1: Plant Response to Soil Salinity

ECe (dS/m)	Salinity Class	Plant Response <sup>1</sup>
<2	Non-saline	Salinity effects mostly negligible
2-4	Slightly saline	Yields of very sensitive crops may be affected
4-8	Moderately saline	Yield of many crops affected
8-16	Very saline	Only tolerant crops yield satisfactorily
>16	Highly saline	Only a few very tolerant crops yield satisfactorily

**Note:**

1 - Plant Response to Salinity Class has been adopted from DLWC 2002

### 5.2 Soil pH and Plant Growth

Soil pH is a measure of the acidity or alkalinity of the soils and values have been assessed as an indicator of soil fertility with respect to plant growth. The optimal pH for plant growth is between 5.5 and 7. Beyond this range, effective revegetation of exposed soil following disturbance is increasingly difficult and the potential for erosion is considered to increase.

Highly alkaline soils are commonly associated with saline and sodic soil conditions and can limit the ability of plants to take up water and nutrients. Highly acidic soils exhibit aluminium toxicity toward plants and can limit the ability of plants to take up other essential nutrients including molybdenum.

Interpretation of soil pH with respect to plant growth is undertaken using the ratings published in Bruce and Rayment (1982)<sup>17</sup> presented below:

<sup>17</sup> Bruce, R.C. and Rayment, G.E., (1982). *Analytical Methods and Interpretations used by the Agricultural Chemistry Branch for Soil and Land Use Surveys*, (referred to as Bruce and Rayment 1982)

Table 5-2: Plant Response to Soil pH

pH	Rating
<4.5	Extremely acidic
4.5-5.0	Very strongly acidic
5.1-5.5	Strongly acidic
5.6 – 7.3	Optimal plant growth
7.4-7.8	Mildly alkaline
7.9-8.4	Moderately alkaline
8.5-9.0	Strongly alkaline
>9.1	Very strongly alkaline

### 5.3 Cation Exchange Capacity (CEC) in Soil

The ability of soils to attract, retain and exchange cations (positively charged ions) is estimated by the calculated CEC value. CEC represents the major controlling factor in stability of clay soil structure, nutrient availability for plant growth, soil pH and the reaction of the soil to chemical applications (fertilisers, conditioners etc.).

High CEC soils have a greater capacity to retain nutrients, however, deficient soils require greater applications of nutrients to correct imbalances. Low CEC soils have a reduced capacity to retain nutrients and may result in leaching of nutrients from the soil in the event of excess nutrient applications.

Metson (1961)<sup>18</sup> developed a set of ratings for effective CEC and the most abundant cations. These are summarised below (values are in meq/100g):

Table 5-3: CEC Rating

Rating	eCEC	Exch Na	Exch K	Exch Ca	Exch Mg
Very low	<6	0-0.1	0-0.2	0-2	0-0.3
Low	6-12	0.1-0.3	0.2-0.3	2-5	0.3-1
Moderate	12-25	0.3-0.7	0.3-0.7	5-10	1-3
High	25-40	0.7-2	0.7-2	10-20	3-8
Very high	>40	>2	>2	>20	>8

<sup>18</sup> Metson, A.J., (1961). *Methods of Chemical Analysis for Soil Survey Samples* (referred to as Metson 1961)

### 5.3.1 Ratio of Exchangeable Calcium to Magnesium

To maintain soil structure there should be a ratio of around 4:1 to 6:1 calcium to magnesium for a balanced soil (Eckert 1987)<sup>19</sup>. At ratios of less than 4:1 calcium is considered to be deficient, whilst at ratios of greater than 6:1 are considered to be magnesium deficient.

### 5.4 Exchangeable Sodium Percentage or Sodicity (ESP%)

Exchangeable sodium is an important soil stability and salinity parameter. Excessive exchangeable sodium leads to unstable soils, increased runoff, potential salinity, dispersivity and water logging problems.

Normally the sodium content is expressed as a percentage of the CEC as other cations counteract the negative effects of sodium (known as ESP% and termed sodicity). The effect of the exchangeable sodium (exchangeable sodium percentage, ESP) varies with other soil factors such as the type of clay, the relative quantity of magnesium and the quantity of organic matter. However, Charman & Murphy (2000<sup>20</sup>) indicate that a soil is generally considered sodic if the ESP exceeds 6% and extremely sodic if the ESP exceeds 15%.

### 5.5 Groundwater Salinity

EC values in groundwater are dependent on numerous factors and can vary with changes in temperature and pH conditions. Suttar (1990<sup>21</sup>) has classed water into different types based on EC values as outlined in the table below.

Table 5-4: EC Ranges in Water

Water Type	EC ( $\mu\text{S}/\text{cm}$ )
Deionised Water	0.5 – 3
Pure Rainwater	<15
Freshwater Rivers	0 – 800
Marginal River Water	800 – 1600
Brackish Water	1600 – 4800
Saline Water	>4800
Seawater	51,500
Industrial Waters	100 – 10,000

<sup>19</sup> Eckert, D.J, (1987) *Soil Test Interpretation: Basic Cation Saturation Ratios and Sufficiency Levels* (referred to as Eckert 1987)

<sup>20</sup> Charman, P.E.V and Murphy, B.W (eds), (2000). *Soils: Their Management and Properties*, (referred to as Charman and Murphy 2000)

<sup>21</sup> Suttar, S., (1990). *Ribbons of Blue Handbook*, Scitech, Victoria (referred to as Suttar 1990)

## 5.6 Recommendations for Concrete Slabs and Footings in Saline Soils

In the absence of endorsed recommendations for buildings in saline environments, reference is made to the CCAA 2018. The guide provides recommendations on the minimum concrete grade/strength required for slabs and footings in saline soils. Reference should be made to the CCAA 2018 publication for further information:

Table 5-5: Minimum Concrete Grade for Slabs and Footings in Saline Soils

ECe (dS/m)	Salinity Class	Concrete Grade <sup>1</sup>
<2	Non-saline	N20
2-4	Slightly saline	N20
4-8	Moderately saline	N25
8-16	Very saline	N32
>16	Highly saline	≥N40

**Note:**

1 - Concrete Grade for Salinity Class has been adopted from CCAA 2018

## 5.7 Recommendations for Durability with Reference to AS2159-2009

In designing for durability, reference should be made to the requirements listed in the AS2159-2009. The exposure classification for concrete and steel piles and foundations is outlined in the following tables.

Table 5-6: Exposure Classification for Concrete Piles

Exposure Conditions				Exposure Classification	
Sulphate (expressed as SO <sub>4</sub> )		pH	Chlorides in Groundwater (ppm)	Soil Conditions A <sup>1</sup>	Soil Conditions B <sup>2</sup>
In Soil (ppm)	In Groundwater (ppm)				
<5,000	<1,000	>5.5	<6,000	Mild	Non-aggressive
5,000-10,000	1,000-3,000	4.5-5.5	6,000-12,000	Moderate	Mild
10,000-20,000	3,000-10,000	4-4.5	12,000-30,000	Severe	Moderate
>20,000	>10,000	<4	>30,000	Very severe	Severe

**Notes:**

1 - High permeability soils (e.g. sands and gravels) which are in groundwater

2 - Low permeability soils (e.g. silts and clays) or all soils above groundwater

Table 5-7: Exposure Classification for Steel Piles

Exposure Conditions				Exposure Classifications	
pH	Chlorides		Resistivity (ohm.cm)	Soil Conditions A <sup>1</sup>	Soil Conditions B <sup>2</sup>
	In Soil (ppm)	In Groundwater (ppm)			
>5	<5,000	<1,000	>5,000	Non-aggressive	Non-aggressive
4-5	5,000-20,000	1,000-10,000	2,000-5,000	Mild	Non-aggressive
3-4	20,000-50,000	10,000-20,000	1,000-2,000	Moderate	Mild
<3	>50,000	>20,000	<1,000	Severe	Moderate

**Notes:**

- 1 - High permeability soils (e.g. sands and gravels) which are in groundwater
- 2 - Low permeability soils (e.g. silts and clays) or all soils above groundwater

## 5.8 ASS Investigation Requirements

The National Acid Sulfate Soil Guidance (2018) requires sampling to a depth of 1m beyond the depth of disturbance (including the depth of any groundwater disturbance). A summary of the sampling densities and analysis requirements outlined in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) is provided in the following tables:

Table 5-8: Minimum Soil Sampling Densities for ASS Investigations

Type of disturbance	Extent of site	Sample point frequency
Small volumes ( $\leq 1000 \text{ m}^3$ ) – prior to disturbance	Volume of disturbance ( $\text{m}^3$ )	Number of boreholes
	< 250	2
	251–500	3
	501–1000	4
Large volumes ( $> 1000 \text{ m}^3$ ) – prior to disturbance	Project area (ha)	Number of boreholes
	<1	4
	1-2	6
	2-3	8
	3-4	10
	>4	10 plus 2 per additional hectare
Linear	Width and volume	Intervals (m)
	Minor <sup>1</sup>	100
	Major <sup>2</sup>	50

Type of disturbance	Extent of site	Sample point frequency
Existing stockpiles & verification testing	Volume (m <sup>3</sup> )	Number of samples
	<250	2
	251-500	3
	1,000	4
	>1,000	4 plus 1 per additional 500m <sup>3</sup>

<sup>1</sup> Minor Linear Disturbance – for example underground services, narrow shallow drains (less than 1 m below ground level).

<sup>2</sup> Major Linear Disturbance – for example roads, railways, canals, deep sewer, wide drains, deep drains and dredging projects<sup>#</sup>.

<sup>#</sup> Further guidance is provided in the Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Simpson et al. 2017).

Table 5-9: Minimum Number of Soil Samples to be Submitted for Laboratory Analysis (small-scale disturbance)

Volume of disturbed soils	Maximum disturbance depth			
	< 1 m	1–2 m	2-3 m	3-4 m
≤ 250m <sup>3</sup>	3	4	5	6
251–500m <sup>3</sup>	4	5	6	7
500–1,000m <sup>3</sup>	5	6	7	8

Note: Small scale is considered less than or equal to 1,000 m<sup>3</sup> and does not involve dewatering or groundwater pumping (excluding linear disturbances). Number of samples to be analysed per total volume of soil to be disturbed, not per borehole. Depth of disturbance to be measured from ground surface. Borehole depth must be at least 1 m below maximum proposed depth of disturbance.

## 5.9 ASS Action Criteria

The action criteria presented in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) are summarised in the following table:

Table 5-10: ASS Action Criteria Based on Soil Texture and Volume of Material Being Disturbed

Type of material		Net Acidity			
Texture range* (NCST 2009)	Approximate clay content (%)	1–1000 t materials disturbed		> 1000 t materials disturbed	
		% S-equiv. (oven-dried basis)	mol H <sup>+</sup> /t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H <sup>+</sup> /t (oven-dried basis)
Fine - light medium to heavy clays	>40	≥0.10	≥62	≥0.03	≥18
Medium - clayey sand to light clays	5–40	≥0.06	≥36	≥0.03	≥18
Coarse and Peats - sands to loamy sands	<5	≥0.03	≥18	≥0.03	≥18

\* If bulk density values are not available for the conversion of cubic meters to tonnes of soil, then default bulk densities, based on the soil texture, may be used.

The action criteria for 'coarse textured soils' were used for this investigation considering that the proposed development includes bulk excavation works that will disturb more than 1,000t of material.

### **5.10 ASS Field Tests**

The soil field tests commonly used for investigations for ASS materials include field pH ( $pH_F$ ) and field pH peroxide ( $pH_{FOX}$ ) tests. The  $pH_F$  test can help identify Actual ASS. While a  $pH_F$  of less than or equal to pH 4 is indicative of the presence of Actual ASS, it is not conclusive of the presence of ASS on its own, as naturally occurring, non-ASS soils such as many organic soils (for example peats) and heavily leached soils may also have  $pH_F$  less than or equal to pH 4. To identify an Actual ASS, other evidence must be presented that indicates the low  $pH_F$  has been mainly caused by the oxidation of reduced inorganic sulfur. Such information includes the presence of jarosite in the soil layer/horizon, or the location of other Actual ASS or PASS materials within the sampling location or in the nearby vicinity.

The difference between the  $pH_F$  and the  $pH_{FOX}$  is helpful in the preliminary identification of PASS. Combined, the  $pH_F$  and  $pH_{FOX}$  results can be a useful aid with soil sample selection for laboratory analysis. Additional Information in relation to interpretation of the pH field tests is provided in the appendices.

## 6 INVESTIGATION RESULTS

### 6.1 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the table below. Reference should be made to the borehole logs attached in the appendices for further details.

Table 6-1: Summary of Subsurface Conditions

Profile	Description (metres below ground level - mBGL)
Pavement	Concrete pavement was encountered at the ground surface in BH1 and BH2, ranging between 100mm to 200mm in thickness.
Fill	<p>Fill material was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 1.6mBGL to 2.3mBGL.</p> <p>The fill typically comprised silty sand, silty clay, clayey silty sand, sandy clay, silty sandy clay, clayey gravel, sandy gravel and sandy silt, with inclusions of igneous, ironstone and sandstone gravels, clay fines, sand, slag and root fibres.</p> <p>No odorous or stained fill soils were encountered during the investigation.</p>
Natural Soil	<p>Natural alluvial sands or clays were encountered beneath the fill in all boreholes and extended to depths of approximately 5.1mBGL to 9.8mBGL.</p> <p>No odorous or stained alluvial soils were encountered during the investigation.</p>
Bedrock	Sandstone bedrock was encountered beneath the alluvial soils in all boreholes and extended to the termination depths of approximately 16mBGL to 25mBGL.
Groundwater	Groundwater seepage was encountered in all boreholes during auger drilling, between depths of approximately 1.5mBGL to 2.3mBGL.

### 6.2 Salinity Laboratory Results

The results are presented in the attached report tables and are summarised below.

Table 6-2: Summary of Laboratory Results

Analyte	Results
EC & ECe	<p>The EC results ranged from 30<math>\mu</math>S/m to 230<math>\mu</math>S/m.</p> <p>The ECe results ranged from &lt;PQL to 2.1dS/m.</p>
Resistivity	Resistivity values were calculated based on the EC values. The resistivity values for the soil samples ranged from 4,348ohm.cm to 33,333ohm.cm.
pH	The results of the analysis ranged from 5.3 to 8.1.
CEC	<p>The results of the analysis ranged from:</p> <ul style="list-style-type: none"> <li>• CEC – 1.3meq/100g to 10.0meq/100g;</li> <li>• Exchangeable Na – &lt;0.1 to 0.40meq/100g;</li> </ul>

Analyte	Results
	<ul style="list-style-type: none"> <li>Exchangeable K – &lt;0.1 to 0.30meq/100g;</li> <li>Exchangeable Ca – 0.80meq/100g to 7.60meq/100g; and</li> <li>Exchangeable Mg – 0.40meq/100g to 1.90meq/100g.</li> </ul>
Sulphate	The results ranged from <10mg/kg to 75mg/kg.
Chloride	The results ranged from <10mg/kg to 53mg/kg.
Groundwater	The results of the analysis ranged from: <ul style="list-style-type: none"> <li>pH – 6.2 to 6.4;</li> <li>EC – 690µS/cm to 1,000µS/cm;</li> <li>Chloride - 66mg/L to 170mg/L; and</li> <li>Sulphate - 23mg/L to 35mg/L.</li> </ul>

**Note:**

Na – Sodium, K – Potassium, Ca – Calcium, Mg – Magnesium

### 6.3 ASS Laboratory Results

The soil laboratory results were assessed against the action criteria adopted for the assessment. The results are presented in the attached report tables and are summarised below.

Table 6-3: Summary of Results

Results	Comments
pH <sub>F</sub> and pH <sub>FOX</sub>	The pH <sub>F</sub> results ranged from pH 4.7 to pH 8.6. The pH <sub>FOX</sub> results ranged from pH 2.6 to pH 6.5. The maximum difference from pH <sub>F</sub> to pH <sub>FOX</sub> was 3.9 pH units.
pH <sub>FOX</sub> reaction rates	<p>Reaction rates ranged from low to volcanic/extreme. Three samples recorded volcanic/extreme reactions, and four samples recorded high reactions. All other reactions were classed as low or medium.</p> <p>The pH<sub>F</sub>, pH<sub>FOX</sub>, and reaction rates indicated that some of the soils may contain PASS. Twelve samples were selected for analysis of ASS characteristics using acid base accounting methods (SCr testing). The samples were selected on a combination of the pH<sub>F</sub>, pH<sub>FOX</sub>, and reaction rates, and to provide spatial coverage and vertical distribution through the soil profiles.</p>
Net Acidity % S-equiv.	The net acidity results ranged from 0.01% to 0.07%. The net acidity (%/S) results exceeded the action criterion in three samples at relatively shallow depths (<3mBGL) as shown on Table A.
Net Acidity mol H <sup>+</sup> /t	The net acidity results ranged from 7.8 mol H <sup>+</sup> /t to 41.0 mol H <sup>+</sup> /t. The net acidity (mol H <sup>+</sup> /t) results exceeded the action criterion in three samples at relatively shallow depths (<3mBGL) as shown on Table A.



Results	Comments
SCR%	The $S_{CR}\%$ results ranged from 0.008 %SCr to 0.02 %SCr. All 12 analysed soil samples recorded $S_{CR}\%$ results above the laboratory PQL. The highest results correlated with the highest net acidity results. All of the %SCr results were less than the action criteria of 0.03 %w/wS.
Liming Rate	The liming rate required for neutralisation ranged from <0.75 kgCaCO <sub>3</sub> /tonne to 3.1 kgCaCO <sub>3</sub> /tonne.

## 7 RESULTS INTERPRETATION

### 7.1 Salinity

The laboratory results are compared to the relevant SAC in the attached report tables. Interpretation of the results against the SAC is provided in the following table.

Table 7-1: Interpretation of Laboratory Results

Parameter	Notes
Soil Salinity and Plant Growth	The ECe results generally ranged from <PQL to 2.1dS/m. The majority of the samples were classed as non-saline. One sample collected from BH2 (0.1-0.2m) was classed as slightly saline.
Soil pH and Plant Growth	The soil pH results ranged from 5.3 to 8.1 and are classed as strongly acidic to moderately alkaline. The majority of the were generally within the optimum range for plant growth.  The proposed excavations will generally expose acidic soils and may require treatment with lime or gypsum in order to make the soils suitable for plant growth.
CEC in Soil	The CEC values ranged from 1.3meq/100g to 10meq/100g in the very low to low range. The majority of the samples were within the very low to low range which is typical of the soil formation encountered at the site and are generally indicative of the low levels of organic matter within the soils.
Ratio of Calcium to Magnesium	The results indicate that the soils have more calcium than magnesium. The CEC of the soil is generally very low to low. Lime and/or gypsum can be used to stabilise the soil which will improve soil structure for both engineering and fertility purposes.
ESP%	The ESP% values of the samples ranged from 2.0% to 7.7%. The majority of the ESP results were below 5% threshold and were classed as non-sodic. One soil sample collected from BH1 (0-0.2m) was classed as sodic.
Groundwater Salinity	The laboratory results indicate that the groundwater is generally saline and within the 'marginal river water' water type.
Concrete Slabs and Footings in Saline Soils (CCAA 2018)	The proposed earthworks are anticipated to expose soil and bedrock generally classed as non-saline to slightly saline. The CCAA 2018 recommended concrete grade for slabs and footings in slightly saline soils is N20.  Reference should also be made to AS2159-2009 for minimum concrete strengths and reinforcement cover for concrete piles/foundations.
Soil Conditions for Exposure Classification (AS2159-2009)	The boreholes drilled for the investigation have indicated that the subsurface conditions at the site generally comprise of high permeability soils (i.e. sands and gravels). Based on this, the exposure classification outlined under 'Soil Conditions A' has been adopted for the assessment.
Exposure Classification for Concrete Piles/Foundations (AS2159-2009)	The soil pH and sulphate results indicate that the soils are moderately aggressive towards buried concrete.  The groundwater pH, sulphate and chloride results indicate that the groundwater is mildly aggressive towards buried concrete.



Parameter	Notes
	The results should be assessed by the project design team as applicable for the proposed development.
Exposure Classification for Steel Piles/Foundations (AS2159-2009)	<p>The soil resistivity, pH and chloride results indicate that the soils are mildly-aggressive towards buried steel.</p> <p>The groundwater pH and chloride results indicate that the groundwater is non-aggressive towards buried steel.</p> <p>The results should be assessed by the project design team as applicable for the proposed development.</p>

## 7.2 PASS

The results of the field tests and other laboratory results identified acidic conditions greater than the action criteria. However, these results are considered to be indicative of acid soils associated with organic/humic material rather than PASS materials as significant concentrations of oxidisable sulfur, demonstrated by the low  $S_{CR}\%$  results, were not encountered in the samples.

Considering the information reviewed for this assessment (risk maps, subsurface conditions etc.), PASS or AASS conditions that would be expected to pose a risk to the environment if disturbed during the proposed development works described in Section 1.1 of this report have not been identified.

On this basis, an ASSMP is not considered necessary for the proposed development.

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## **8 CONCLUSIONS**

### **8.1 PASS Conditions**

Based on the information reviewed for this assessment, JKE is of the opinion that there is a low potential for PASS or AASS materials to be disturbed during the proposed development. This conclusion is based on the following:

- No visible or olfactory indications of PASS or AASS were encountered during the investigation; and
- The analytical results did not identify significant concentrations of oxidisable sulfur.

Based on this information, an ASSMP is not considered necessary for the proposed development.

### **8.2 Salinity Conditions**

The assessment identified the following salinity conditions:

- The soils are classed as strongly acidic to strongly alkaline;
- The soils are generally classed as slightly saline;
- The soils are generally sodic;
- The soils are generally moderately aggressive towards buried concrete;
- The soils were mildly aggressive towards buried steel;
- The groundwater is classed as saline;
- The groundwater is mildly aggressive towards buried concrete; and
- The groundwater is non-aggressive towards buried steel.

Based on the results, JKE is of the opinion that a SMP is not required for the proposed development.

The soil and groundwater aggressivity results outlined in this report should be reviewed and incorporated into the design of the proposed structures by the project team (civil and structural).



## 9 LIMITATIONS

The report limitations are outlined below:

- Salinity is a natural phenomenon and can change over time-based on-site conditions and climatic variations. Changes to existing drainage patterns can also impact the salinity at the site. The results outlined in this report are a snapshot of conditions present at the time of the investigation and is bound to change over time;
- JKE accepts no responsibility for any unidentified salinity or PASS issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- JKE accepts no responsibility for non-compliance of recommends outlined in this report;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential salinity sources or may have been impacted by adverse salinity conditions, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or land use. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a salinity viewpoint, and vice versa;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of JKE. JKE has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;
- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of JKE; and



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- Any third party who seeks to rely on this report without the express written consent of JKE does so entirely at their own risk and to the fullest extent permitted by law, JKE accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.



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## Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

### **The Report is based on a Unique Set of Project Specific Factors**

This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, e.g. addition of basement levels, or deeper filling/cut excavations; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

### **Changes in Subsurface Conditions**

Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater salinity concentrations may also vary over time through migration and accumulation of salts, importation of materials, construction and landscaping. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

### **This Report is based on Professional Interpretations of Factual Data**

Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of salinity, the likely impact on the proposed development and appropriate management measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

### **Assessment Limitations**

The assessment is designed to identify major salinity risks at the site. Implementing the management recommends can minimise the risks. No assessment can identify all risks as salinity is a natural phenomenon which can change over time. Even a rigorous professional assessment may not detect all potential salinity impacts on a site. Salinity may be present in areas that were not surveyed or sampled, or may accumulate in areas which showed no signs of salinity when sampled.



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### **Misinterpretation of Site Assessments by Design Professionals**

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

### **Logs Should not be Separated from the Assessment Report**

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site management or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

### **Read Responsibility Clauses Closely**

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.



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## Appendix A: Report Figures

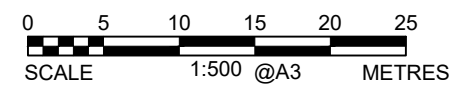




**LEGEND**

- - - APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- ✚ BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



This plan should be read in conjunction with the Environmental report.

<b>Title:</b>		<b>SAMPLE LOCATION PLAN</b>
<b>Location:</b>		26-30 MANN STREET, GOSFORD, NSW
<b>Project No:</b>	E37799B	<b>Figure No:</b> 2
<b>JKEnvironments</b>		





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## Appendix B: Site Information



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# Lotsearch Environmental Risk and Planning Report



# LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

**Date: 06 Aug 2025 18:01:26**

**Reference: LS090994 EP**

**Address: 26-30 Mann Street, Gosford, NSW 2250**

**Disclaimer:**

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features. You should obtain independent advice before you make any decision based on the information within the report. The detailed terms applicable to use of this report are set out at the end of this report.

## Dataset Listing

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

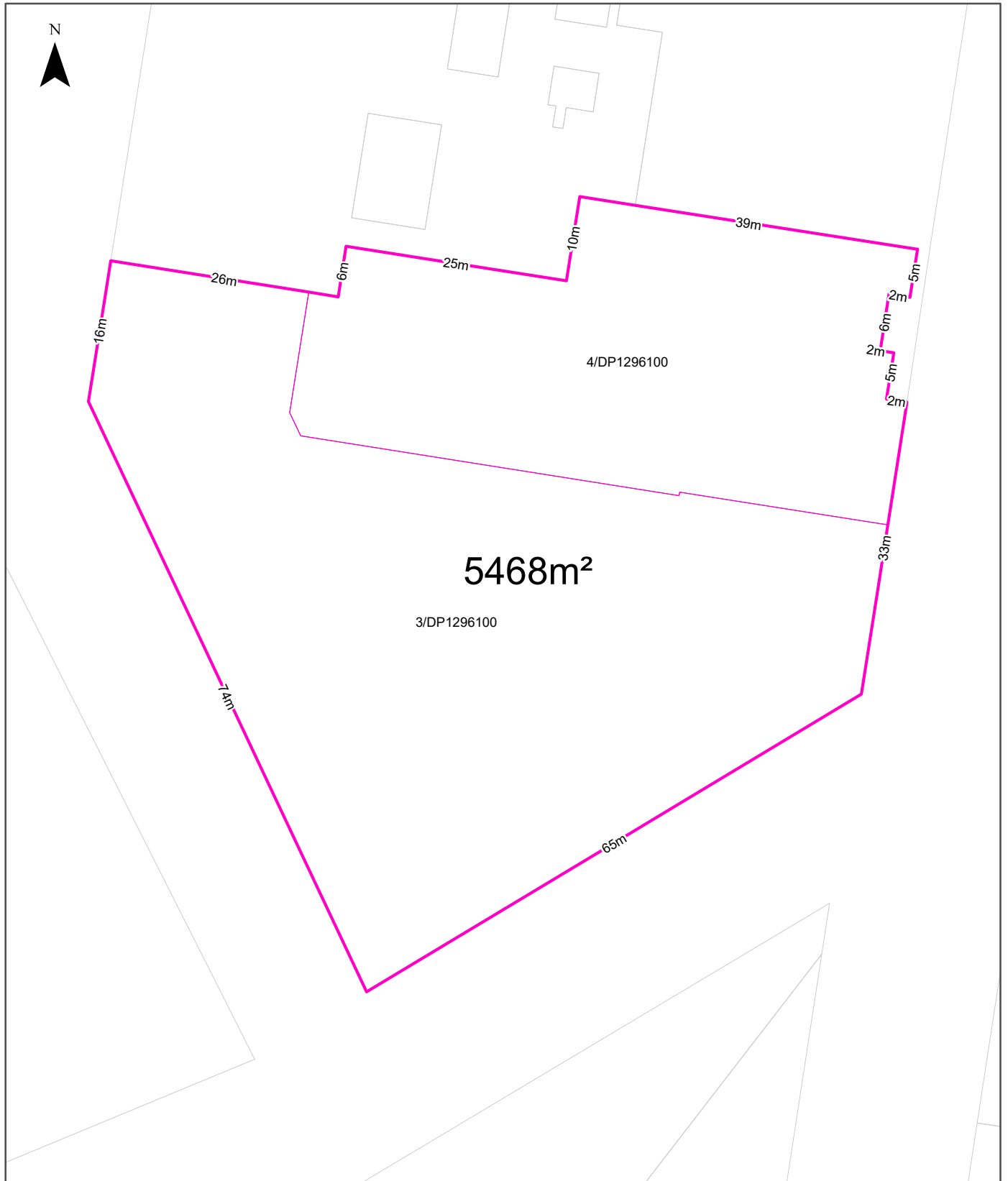
Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Customer Service - Spatial Services	30/07/2025	30/07/2025	Monthly	-	-	-	-
Topographic Data	NSW Department of Customer Service - Spatial Services	20/05/2025	20/05/2025	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority NSW	15/07/2025	08/07/2025	Monthly	1000m	0	0	1
Contaminated Land Records of Notice	Environment Protection Authority NSW	15/07/2025	15/07/2025	Monthly	1000m	0	0	1
Former Gasworks	Environment Protection Authority NSW	20/05/2025	15/05/2025	Quarterly	1000m	0	0	0
Notices under the POEO Act 1997	Environment Protection Authority NSW	04/08/2025	04/08/2025	Monthly	1000m	0	0	1
National Waste Management Facilities Database	Geoscience Australia	30/05/2025	19/01/2023	Annually	1000m	0	0	1
National Liquid Fuel Facilities	Geoscience Australia	16/10/2024	19/01/2023	Annually	1000m	0	0	2
EPA PFAS Investigation Program	Environment Protection Authority NSW	01/08/2025	05/02/2025	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Australian Department of Defence	15/07/2025	15/07/2025	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Australian Department of Defence	15/07/2025	15/07/2025	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	15/07/2025	21/05/2025	Monthly	2000m	0	0	0
Defence Controlled Areas	Australian Department of Defence	15/07/2025	15/07/2025	Quarterly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Australian Department of Defence	11/06/2025	02/09/2022	Quarterly	2000m	0	0	0
National Unexploded Ordnance (UXO)	Australian Department of Defence	15/07/2025	15/07/2025	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority NSW	28/11/2024	15/12/2022	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority NSW	24/07/2025	24/07/2025	Monthly	1000m	0	0	2
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority NSW	24/07/2025	24/07/2025	Monthly	1000m	0	0	1
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority NSW	24/07/2025	24/07/2025	Monthly	1000m	0	0	6
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	0	12	27
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	176	203
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	13
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	15	48
Points of Interest	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	0	4	55
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	0	0	1
Major Easements	NSW Department of Customer Service - Spatial Services	20/05/2025	20/05/2025	Quarterly	1000m	0	1	18
State Forest	Forestry Corporation of NSW	18/12/2024	11/11/2024	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Geoscience Australia	22/04/2025	19/08/2019	Annually	1000m	1	1	1

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024	NSW Department of Climate Change, Energy, the Environment and Water	13/05/2025	28/06/2024	Quarterly	1000m	0	0	0
National Groundwater Information System (NGIS) Boreholes	Bureau of Meteorology; Water NSW	30/05/2025	04/03/2025	Annually	2000m	0	0	42
NSW Seamless Geology Single Layer: Rock Units	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	2	2	7
NSW Seamless Geology Single Layer: Geological Boundaries and Faults	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
NSW Seamless Geology Single Layer: Trendlines	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
NSW Seamless Geology Single Layer: Fold Axes	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Department of Primary Industries and Regional Development	05/05/2025	30/09/2015	Annually	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	15/01/2025	17/02/2011	Annually	1000m	1	1	2
Soil Landscapes of Central and Eastern NSW	NSW Department of Climate Change, Energy, the Environment and Water	18/12/2024	27/07/2020	Annually	1000m	1	2	5
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Housing and Infrastructure	31/07/2025	09/05/2025	Monthly	500m	6	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	15/01/2025	21/02/2013	Annually	1000m	3	3	3
Dryland Salinity - National Assessment	Australian Bureau of Agricultural and Resource Economics and Sciences	03/06/2025	15/04/2025	Annually	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service	20/05/2025	20/05/2025	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	13	13	13
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Housing and Infrastructure	31/07/2025	08/09/2023	Monthly	1000m	1	1	1
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Housing and Infrastructure	31/07/2025	25/07/2025	Monthly	1000m	1	4	59
Commonwealth Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	0
National Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	20/05/2025	21/03/2025	Quarterly	1000m	0	0	1
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Housing and Infrastructure	31/07/2025	25/07/2025	Monthly	1000m	0	8	39
Bush Fire Prone Land	NSW Rural Fire Service	30/07/2025	29/07/2025	Monthly	1000m	0	0	2
NSW Native Vegetation Type Map	NSW Department of Climate Change, Energy, the Environment and Water	28/05/2025	04/10/2024	Quarterly	1000m	2	2	35
Ramsar Wetlands of Australia	Australian Department of Climate Change, Energy, the Environment and Water	19/05/2025	05/03/2025	Annually	1000m	0	0	0
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Terrestrial	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	19/06/2024	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
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Marine	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	30/06/2022	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	0	0	3
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	0	0	7
NSW BioNet Species Sightings	NSW Department of Climate Change, Energy, the Environment and Water	29/07/2025	29/07/2025	Monthly	10000m	-	-	-

# Site Diagram

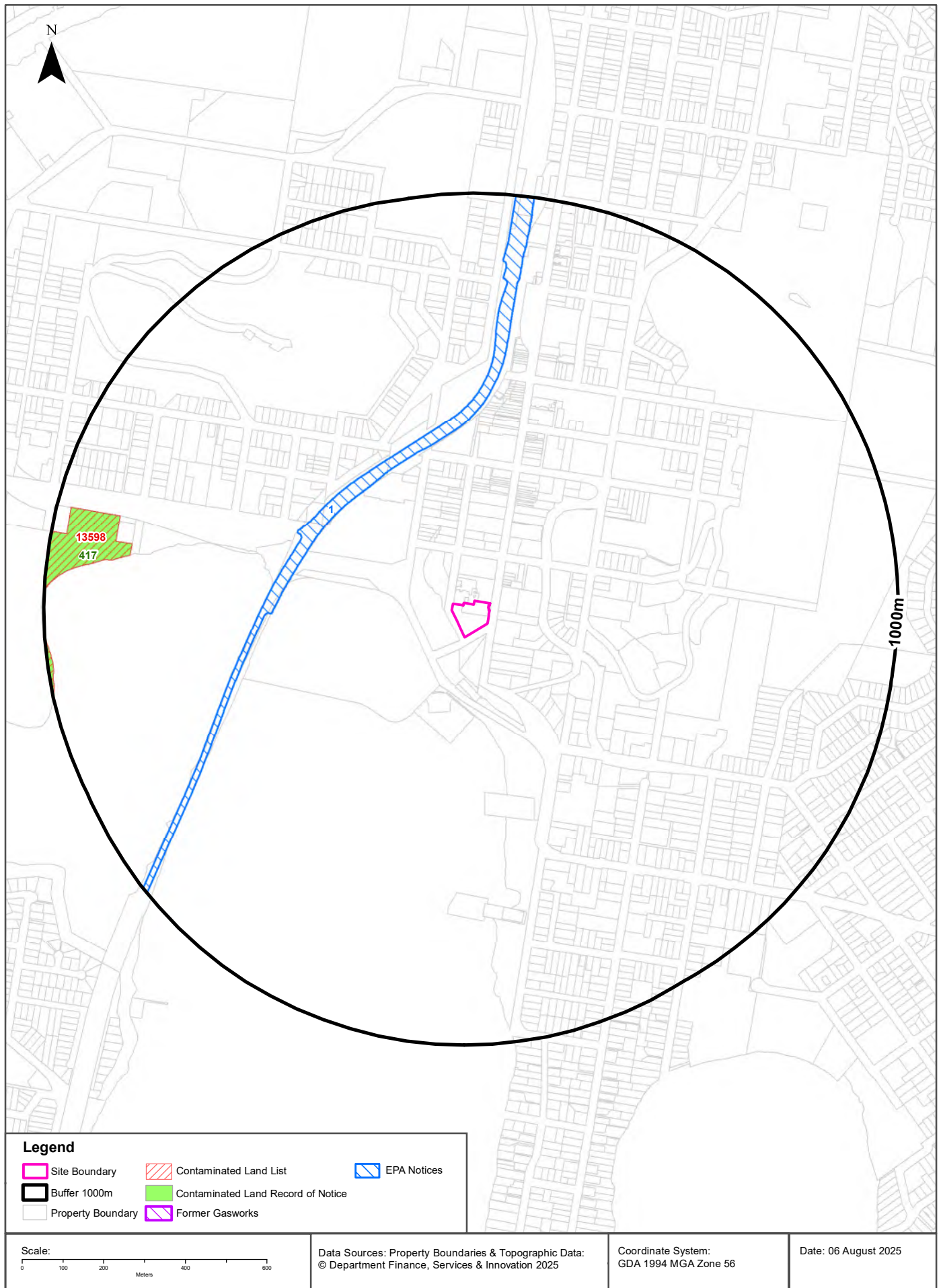
26-30 Mann Street, Gosford, NSW 2250



<b>Legend</b> Site Boundary Internal Parcel Boundaries	<b>Total Area:</b> 5468m <sup>2</sup> <b>Total Perimeter:</b> 318m	<b>Scale:</b> 
	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.	<b>Coordinate System:</b> GDA 1994 MGA Zone 56

# Contaminated Land

26-30 Mann Street, Gosford, NSW 2250



# Contaminated Land

26-30 Mann Street, Gosford, NSW 2250

## 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
13598	Adcock Memorial Park	Central Coast HIGHWAY	WEST GOSFORD	Landfill	Contamination currently regulated under CLM Act	Current EPA List	Premise Match	800m	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

© State of New South Wales through the Environment Protection Authority

## Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
417	Adcock Memorial Park	Central Coast Highway	West Gosford	3 current and 2 former	3459	Premise Match	800m	West

Contaminated Land Records of Notice Data Source: Environment Protection Authority

© State of New South Wales through the 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

© State of New South Wales through the Environment Protection Authority

## EPA Notices

Penalty Notices, s.91 & s.92 Clean up Notices and s.96 Prevention Notices within the dataset buffer:

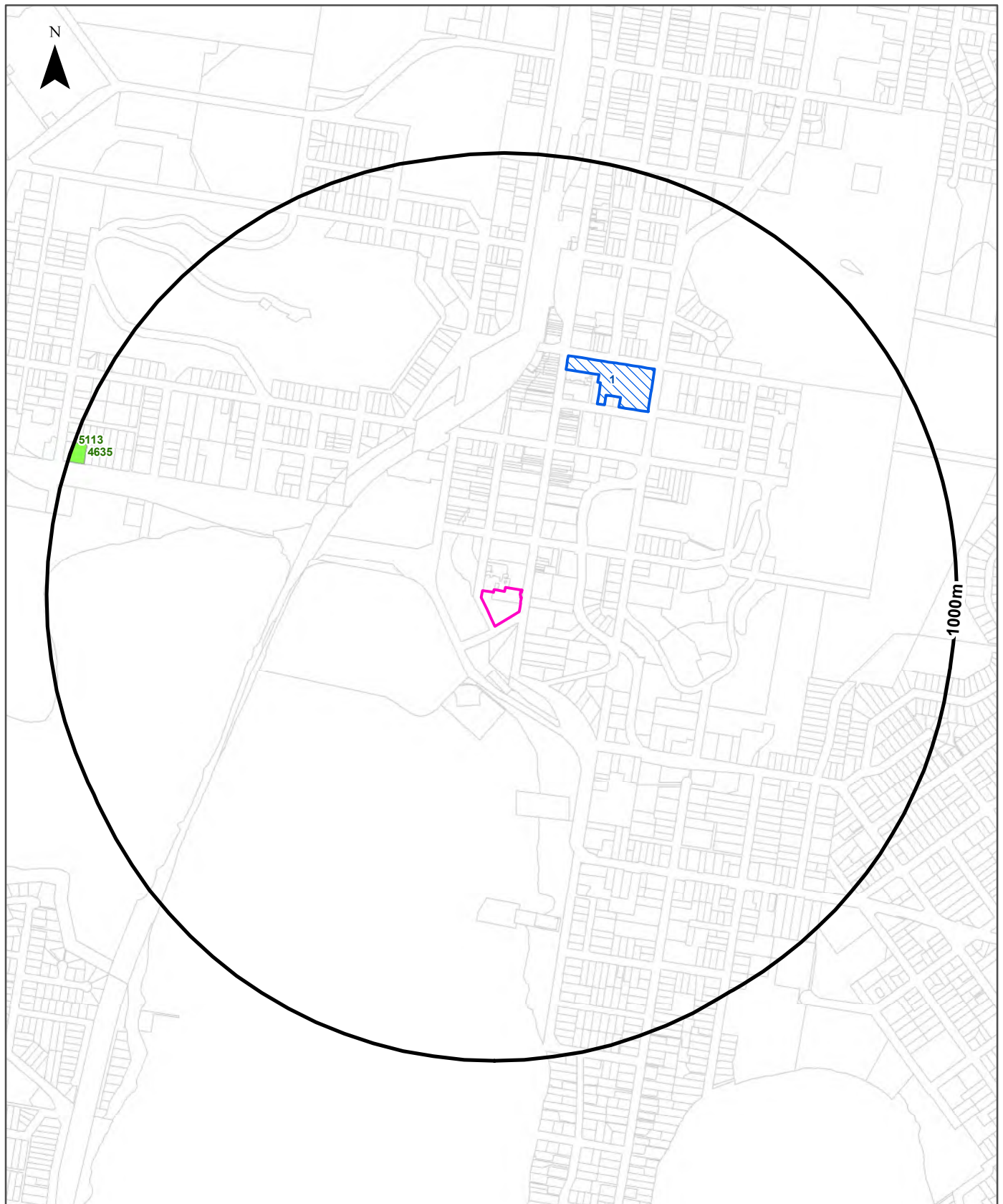
Map ID	Number	Type	Name	Address	Status	Issued Date	Act	Offence	Offence Date	Loc Conf	Dist	Dir
1	3173530755	Penalty Notice	SYDNEY TRAINS	SYDNEY TRAINS, HAYMARKET, NSW 1238	Issued	10/11/2021	Protection of the Environment Operations Act 1997 - 64(1)	Contravene condition of licence - Corporation	31/05/2021	Network of Features	353m	North West

NSW EPA Notice Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

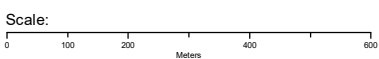
# Waste Management & Liquid Fuel Facilities

26-30 Mann Street, Gosford, NSW 2250



## Legend

- Site Boundary
- Waste Management Facilities
- Buffer 1000m
- National Liquid Fuel Facilities
- Property Boundary



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2025

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

# Waste Management & Liquid Fuel Facilities

26-30 Mann Street, Gosford, NSW 2250

## National Waste Management Facilities Database

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

Map ID	Owner	Name	Address	Management Type	Facility Type	Status	Loc Conf	Dist	Dir
1	WOOLWORTHS	WOOLWORTHS SUPERMARKET	171 MANN STREET, GOSFORD	DROP-OFF	SOFT PLASTICS DROP-OFF FACILITY	OPERATIONAL	Premise Match	462m	North East

Source: Waste Management Facilities Database  
Creative Commons 4.0 © Commonwealth of Australia (Geoscience Australia) 2022

## National Liquid Fuel Facilities

National Liquid Fuel Facilities within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
4635	7-Eleven Pty Ltd	Gosford West	1 Hely Street	Gosford	Petrol Station	Operational		13/07/2012	Premise Match	962m	West
5113	7-ELEVEN	7-ELEVEN GOSFORD WEST	55 CENTRAL COAST HIGHWAY	GOSFORD WEST	PETROL STATION	OPERATIONAL			Premise Match	962m	West

National Liquid Fuel Facilities Data Source: Geoscience Australia  
Creative Commons 4.0 © Commonwealth of Australia

# PFAS Investigation & Management Programs

26-30 Mann Street, Gosford, NSW 2250

## 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  
© State of New South Wales through the 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 and Unexploded Ordnance

26-30 Mann Street, Gosford, NSW 2250

### Defence Controlled Areas (DCA)

Defence Controlled Areas provided by the Department of Defence within the dataset buffer:

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

Defence Controlled Areas, Data Custodian: Department of Defence, Australian Government

### Defence 3 Year Regional Contamination Investigation Program (RCIP)

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

### National Unexploded Ordnance (UXO)

Sites which have been assessed by the Department of Defence for the potential presence of unexploded ordnance within the dataset buffer:

Site ID	Location Name	Category	Area Description	Additional Information	Commonwealth	Loc Conf	Dist	Dir
N/A	No records in buffer							

National Unexploded Ordnance (UXO), Data Custodian: Department of Defence, Australian Government

## EPA Other Sites with Contamination Issues

26-30 Mann Street, Gosford, NSW 2250

### 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
- Pasmenco Lead Abatement Strategy Area

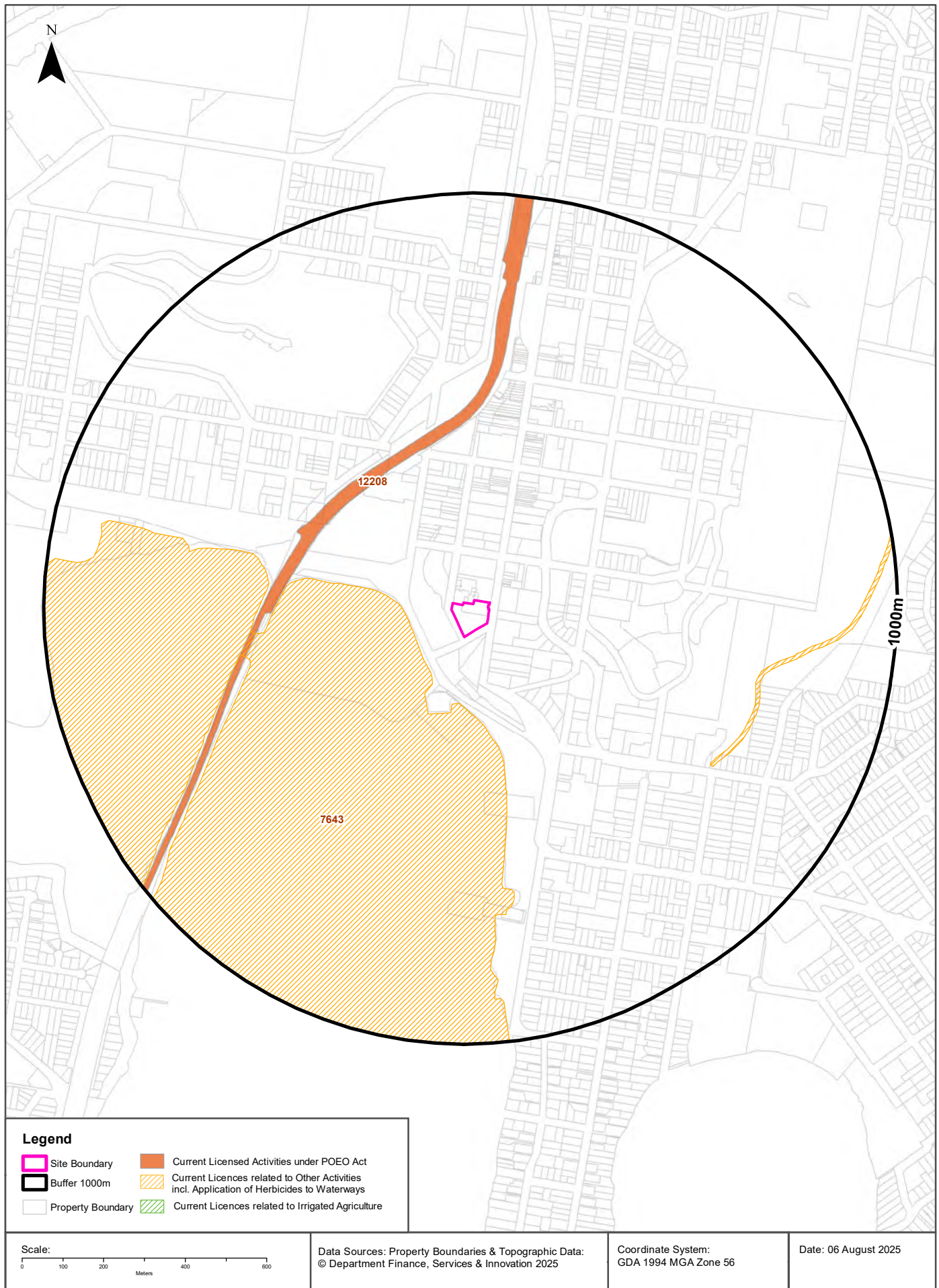
Sites within the dataset buffer:

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  
© State of New South Wales through the Environment Protection Authority

# Current EPA Licensed Activities

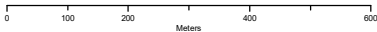
26-30 Mann Street, Gosford, NSW 2250



### Legend

- Site Boundary
- Buffer 1000m
- Property Boundary
- Current Licensed Activities under POEO Act
- Current Licences related to Other Activities incl. Application of Herbicides to Waterways
- Current Licences related to Irrigated Agriculture

Scale:



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2025

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

## EPA Activities

26-30 Mann Street, Gosford, NSW 2250

### Licensed Activities under the POEO Act 1997

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

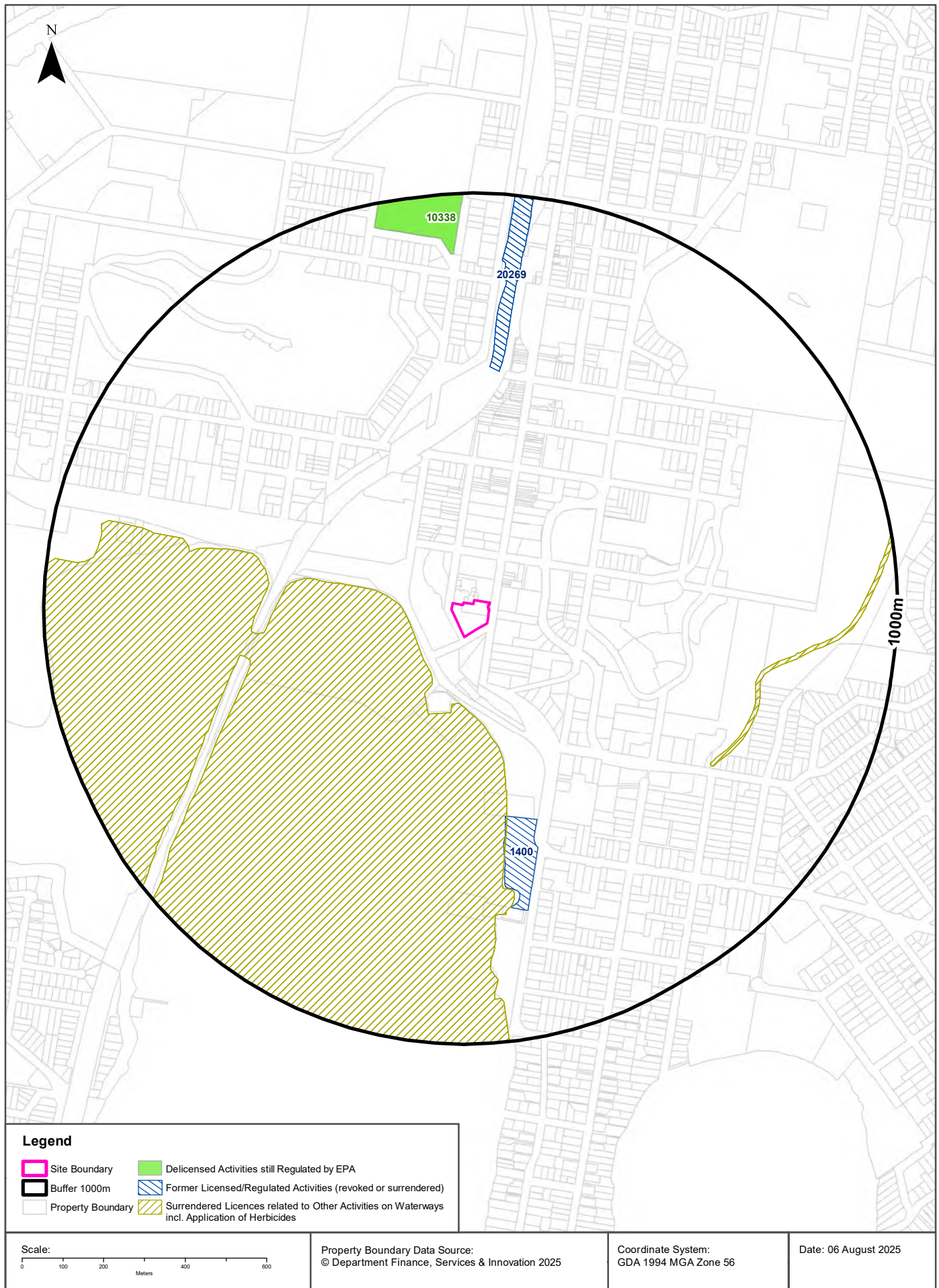
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
7643	Central Coast Council	THE WATERS WITHIN THE CENTRAL COAST LOCAL GOVERNMENT AREA	MULTIPLE WATERWAYS, CENTRAL COAST MC, NSW 2252	GOSFORD	Other activities	Network of Features	108m	South West
12208	SYDNEY TRAINS		SYDNEY TRAINS, HAYMARKET, NSW 1238		Railway systems activities	Network of Features	353m	North West

POEO Licence Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

# Delicensed & Former Licensed EPA Activities

26-30 Mann Street, Gosford, NSW 2250



## EPA Activities

26-30 Mann Street, Gosford, NSW 2250

### 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
10338	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	GOSFORD HOSPITAL	HOLDEN STREET	GOSFORD	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	852m	North

Delicensed Activities Data Source: Environment Protection Authority

© State of New South Wales through the 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:

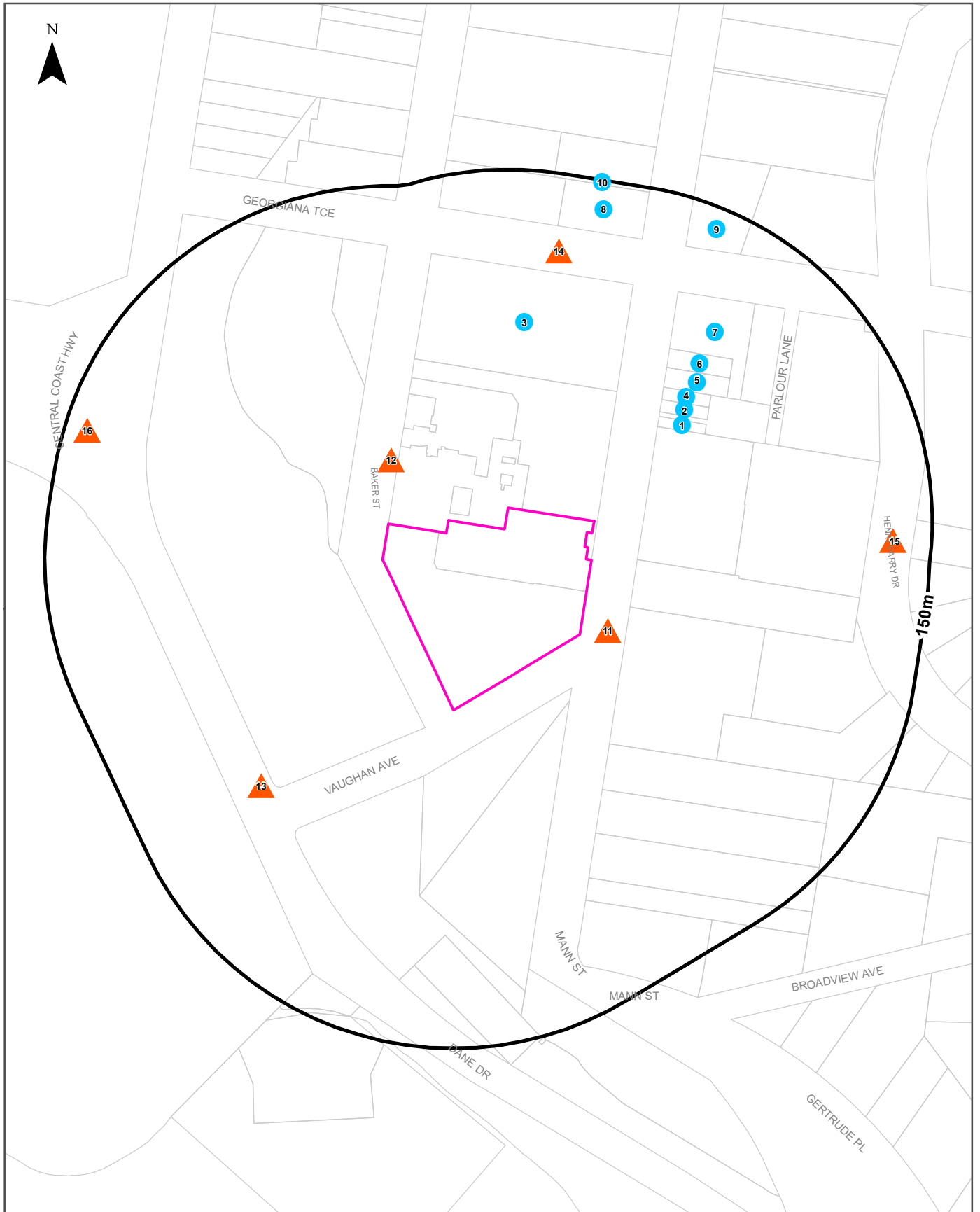
Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	108m	South West
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	108m	South West
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	108m	South West
1400	GOSFORD CITY COUNCIL	MASONS PARADE, GOSFORD, NSW 2250	Surrendered	24/07/2000	Miscellaneous licensed discharge to waters (at any time)	Premise Match	450m	South
20269	DOWNER EDI WORKS PTY LTD	Gosford Passing Loops Project, Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD	Surrendered	14/05/2013	Crushing, grinding or separating	Network of Features	566m	North
20269	DOWNER EDI WORKS PTY LTD	Gosford Passing Loops Project, Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD	Surrendered	14/05/2013	Railway systems activities	Network of Features	566m	North

Former Licensed Activities Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

# Historical Business Directories

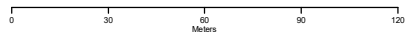
26-30 Mann Street, Gosford, NSW 2250



## 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:



Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018  
Property Boundaries © NSW Department Finance, Services & Innovation 2025

# Historical Business Directories

26-30 Mann Street, Gosford, NSW 2250

## Business Directory Records 1950-1982 Premise or Road Intersection Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 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	SECURITY SERVICES	Lakes Security Services, The., 27 Mann St., Gosford 2250	125241	1982	Premise Match	50m	North East
2	JEWELLERS &/OR WATCHMAKERS - RETAIL	Turner, A. D., 29A Mann St., Gosford 2250	124462	1982	Premise Match	56m	North East
3	SCHOOLS	Gosford Public School, Georgiana Ter., Gosford	184652	1950	Premise Match	58m	North
4	PUMP EQUIPMENT MANUFACTURER & DISTRIBUTOR	Rural General & Technical Services Pty. Ltd., 31a Mann St., Gosford	204212	1961	Premise Match	62m	North East
5	DENTISTS.	Benson, J. D., 33 Mann St., Gosford 2250	123925	1982	Premise Match	67m	North East
	DENTISTS	Benson, J. D., 33 Mann St. Gosford 2250	538103	1970	Premise Match	67m	North East
	DENTISTS	Benson, J. O., 33 Mann St., Gosford	203534	1961	Premise Match	67m	North East
6	NEWSPAPER PUBLISHERS & PRINTERS	Gosford Times (The), 35 Mann St., Gosford	204121	1961	Premise Match	75m	North East
	PRINTERS-LETTERPRESS	Gosford Times (The), 35 Mann St., Gosford	204201	1961	Premise Match	75m	North East
7	FUNERAL DIRECTORS	Creighton, R. H. Central Coast Funeral Service Pty. Ltd., 37 Mann St., Gosford 2250	124174	1982	Premise Match	80m	North East
	FUNERAL DIRECTORS	Creighton, R. H. Central Coast Funeral Service Pty. Ltd., 37 Mann St. Gosford 2250	538287	1970	Premise Match	80m	North East
	FUNERAL DIRECTORS	Creighton, R. H. Central Coast Funeral Service Pty. Ltd., 37 Mann St., Gosford	203697	1961	Premise Match	80m	North East
8	DATA PROCESSING SERVICE BUREAUX &/OR TIME SHARING SERVICES.	Central Coast Computer Services Ltd., 40 Mann St., Gosford 2250	123910	1982	Premise Match	127m	North
9	PASTRYCOOKS &/ OR CAKE SHOPS	Aiton, L., 45 Mann St., Gosford 2250	124965	1982	Premise Match	129m	North East
	TILE FIXERS - FLOOR &/OR WALL	Price Tiles Pty. Ltd., 45 Pacific Highway., West Gosford 2250	125411	1982	Premise Match	129m	North East
	TILE MFRS. &/OR DISTS. - FLOOR &/OR WALL	Price Tiles Pty. Ltd., 45 Pacific Highway., West Gosford 2250	125416	1982	Premise Match	129m	North East
10	ELECTRONIC EQUIPMENT REPAIRS &/OR SERVICING	Adderley Electronics., 42 Mann St., Gosford 2250	124048	1982	Premise Match	148m	North
	ENGINEERS - CIVIL	Anderson & Barr Pty. Ltd., 42 Mann St., Gosford 2250	124057	1982	Premise Match	148m	North
	ENGINEERS - STRUCTURAL	Anderson & Barr Pty. Ltd., 42 Mann St., Gosford 2250	124086	1982	Premise Match	148m	North
	SKI-SNOW EQUIPMENT &/ OR APPAREL	Central Coast Ski Hire., 44 Mann St., Gosford 2250	125269	1982	Premise Match	148m	North
	PHOTOGRAPHERS - COMMERCIAL &/OR INDUSTRIAL	Hingstrom, N. Images., 42 Mann St., Gosford 2250	124990	1982	Premise Match	148m	North
	CAKE SHOPS &/OR PASTRYCOOKS	Nolan Bros., 46 Mann St. Gosford 2250	538017	1970	Premise Match	148m	North
	HARDWARE & BUILDERS' SUPPLIES	Shepherd's Hardware, 44 Mann St. Gosford 2250	538377	1970	Premise Match	148m	North
	SEED MERCHANTS	Shepherd's Hardware, 44 Mann St. Gosford 2250	538880	1970	Premise Match	148m	North

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
10	CEMENT & LIME MERCHANTS	White, W. R., 46 Mann St., Gosford	184261	1950	Premise Match	148m	North
	HARDWARE DEALERS & IRONMONGERS	White, W. R., 46 Mann St., Gosford	184419	1950	Premise Match	148m	North
	PLUMBERS' SUPPLIES	White, W. R., 46 Mann St., Gosford	184607	1950	Premise Match	148m	North

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## Business Directory Records 1950-1982 Road or Area Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 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
11	MOTOR ACCESSORIES &/ OR SPARE PARTS-RETAIL	Advank. (Gosford) Motor Service Pty. Ltd., Pacific Highway., North Gosford 2250	124637	1982	Road Match	0m
	MOTOR CAR &/OR TRUCK DEALERS - NEW &/OR USED.	Advank. (Gosford) Motor Service Pty. Ltd., Pacific Highway., North Gosford 2250	124689	1982	Road Match	0m
	MOTOR CAR &/OR TRUCK DEALERS - NEW &/OR USED.	Ashley Reid Motor Mart., Pacific Highway., North Gosford 2250	124690	1982	Road Match	0m
	AMUSEMENTS.	Australian Reptile Park., Pacific Highway., North Gosford. 2250	123471	1982	Road Match	0m
	MOTOR ACCESSORIES &/ OR SPARE PARTS-RETAIL	Golden Fleece Service Station., Pacific Highway, North Gosford 2250	124646	1982	Road Match	0m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Golden Fleece Service Station., Pacific Highway., North Gosford 2250	124772	1982	Road Match	0m
	BUILDERS &/ OR BUILDING CONTRACTORS	Gould, K. B. Real Estate Pty. Ltd., Pacific Highway, Gosford 2250	123657	1982	Road Match	0m
	MOTOR WHEEL REPAIRERS &/OR SPECIALISTS	Rabies Wheel Alignment & Spares., Pacific Highway., North Gosford 2250	124879	1982	Road Match	0m
	CARRIERS &/OR CARTAGE CONTRACTORS	Rightway Transport Pty. Ltd., Railway Goods Shed, Mann St., Gosford 2250	123770	1982	Road Match	0m
	MOTOR STEERING SPECIALISTS	Robies Wheel Alignment & Spares., Pacific Highway, North Gosford 2250	124858	1982	Road Match	0m
	MOTOR ACCESSORIES &/OR SPARE PARTS -WHOLESALE	Robies Wheel Alignment & Spares., Pacific Highway., North Gosford 2250	124663	1982	Road Match	0m
	TYRE DEALERS, RETREADERS &/OR VULCANIZERS	Robies Wheel Alignment & Spares., Pacific Highway., North Gosford 2250	125474	1982	Road Match	0m
	ALUMINIUM PRODUCTS MANUFACTURER	Brisbane Water Blind Mfrg. Co., Mann St. Gosford 2250	537849	1970	Road Match	0m
	AWNINGS-ALUMINIUM-MFRS. &/OR DIST.	Brisbane Water Blind Mfrg. Co., Mann St. Gosford 2250	537887	1970	Road Match	0m
	BLIND MANUFACTURERS & SPECIALISTS	Brisbane Water Blind Mfrg. Co., Mann St. Gosford 2250	537929	1970	Road Match	0m
	CANVAS GOODS MANUFACTURERS & WHOLESALERS	Brisbane Water Blind Mfrg. Co., Mann St. Gosford 2250	538021	1970	Road Match	0m
	FLYSCREEN, DOOR &/OR WINDOW MFRS. &/OR DIST.	Brisbane Water Blind Mfrg. Co., Mann St. Gosford 2250	538265	1970	Road Match	0m
	AIR CONDITIONING SALES &/OR SERVICE	Brisbane Water County Council, 60 Mann St. Gosford 2250	537843	1970	Road Match	0m
	UPHOLSTERERS	Clarke's Upholsterers, Mann St. Gosford 2250	538995	1970	Road Match	0m
	MOTOR TRIMMERS	Clarkes Upholsterers, Mann St. Gosford 2250	538703	1970	Road Match	0m
	CAKE & PASTRYCOOKS-WHOLESALE	Dixie Pies, Pacific Hghwy., North Gosford	538012	1970	Road Match	0m
	DOUGHNUT MANUFACTURERS	Dixie Pies, Pacific Hghwy., North Gosford	538139	1970	Road Match	0m
	AGRICULTURAL MACHINERY HIRERS &/OR DEALERS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	537834	1970	Road Match	0m
	EARTH MOVING EQUIPMENT MANUFACTURER &/OR DISTRIBUTOR	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538172	1970	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538564	1970	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538594	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538634	1970	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
11	TRACTOR IMPORTERS, MFRS. &/OR DISTRIBUTORS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538980	1970	Road Match	0m
	TRACTOR REPAIR SPECIALISTS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538978	1970	Road Match	0m
	MOTOR ENGINE RECONDITIONERS	Eagle, A. E. and Sons, Pacific Hghwy., North Gosford	538623	1970	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Golden Fleece Service Station, Pacific Hghwy., North Gosford	538566	1970	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Golden Fleece Service Station, Pacific Hghwy., North Gosford	538596	1970	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Golden Fleece Service Station, Pacific Hghwy., North Gosford	538685	1970	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Gosford Auto Electrics, Pacific Hghwy., Gosford North	538687	1970	Road Match	0m
	BATTERY SALES & SERVICE	Gosford Auto Electrics, Pacific Hghwy., North Gosford	537905	1970	Road Match	0m
	CARAVAN DEALERS & HIRERS	Gosford Caravans, Pacific Hghwy., North Gosford	538023	1970	Road Match	0m
	CRANES-MOBILE-PROPRIETORS &/OR HIRERS	Gosford Earthmovers, Pacific Hghwy., North Gosford	538087	1970	Road Match	0m
	EARTH-MOVING MACHINERY HIRERS	Gosford Earthmovers, Pacific Hghwy., North Gosford	538174	1970	Road Match	0m
	HAULAGE CONTRACTORS	Gosford Earthmovers, Pacific Hghwy., North Gosford	538385	1970	Road Match	0m
	SHIPPING & FORWARDING AGENTS	Gosford Tourist & Travel Centre, Mann St, Gosford 2250	538885	1970	Road Match	0m
	AIR SERVICES BOOKING AGENTS	Gosford Tourist & Travel Centre, Mann St, Gosford 2250	537847	1970	Road Match	0m
	VETERINARY SURGEONS	Gosford Veterinary Clinic, Mann St, Gosford 2250	538998	1970	Road Match	0m
	HARDWARE & BUILDERS' SUPPLIES	Hill's Building & Hardware Store, 72 Pacific Hghwy, Gosford 2250	538375	1970	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Hilton, Brian Pty. Ltd., Pacific Hghwy., North Gosford	538600	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Hilton, Brian Pty. Ltd., Pacific Hghwy., North Gosford	538643	1970	Road Match	0m
	CONCRETE BRICK & BLOCK MANUFACTURERS	Jayworth Masonry (Sydney) Pty. Ltd., Pacific Hghwy., North Gosford	538071	1970	Road Match	0m
	AGRICULTURAL MACHINERY HIRERS &/OR DEALERS	Joyce, G. J. Pty. Ltd., Pacific Hghwy., North Gosford	537839	1970	Road Match	0m
	EARTH MOVING EQUIPMENT MANUFACTURER &/OR DISTRIBUTOR	Joyce, G. T. Pty. Ltd., Pacific Hghwy., North Gosford	538173	1970	Road Match	0m
	TRACTOR IMPORTERS, MFRS. &/OR DISTRIBUTORS	Joyce, G. T. Pty. Ltd., Pacific Hghwy., North Gosford	538982	1970	Road Match	0m
	ENGINEERS-FABRICATING	Lansdowne Engineering, Pacific Hghwy., North Gosford	538223	1970	Road Match	0m
	ENGINEERS-GENERAL, MFRG. & MECHANICAL	Lansdowne Engineering, Pacific Hghwy., North Gosford	538225	1970	Road Match	0m
	WELDERS-ELECTRIC &/OR OXY	Lansdowne Engineering, Pacific Hghwy., North Gosford	539014	1970	Road Match	0m
	PHOTOGRAPHERS	Masters Studios, Mann St, Gosford 2250	538757	1970	Road Match	0m
	ELECTROPLATERS	Nethery, A. & M., Pacific Hghwy., North Gosford	538217	1970	Road Match	0m
	MERCHANTS-WHOLESALE	Producers Co-op. Dist. Society Ltd. (The), 66 Pacific Hghwy, Gosford 2250	538514	1970	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Shell Co. of Aust. Ltd., Pacific Hghwy., North Gosford	538663	1970	Road Match	0m
	BUILDERS &/OR BUILDING CONTRACTORS	Thompson, S. & Son Pty. Ltd., Mann St, Gosford 2250	537976	1970	Road Match	0m
	BUILDERS' EQUIPMENT HIRERS	Turner, S. & Son Pty. Ltd., Mann St, Gosford 2250	537979	1970	Road Match	0m
	CONCRETE MIXER EQUIPMENT HIRE SERVICE	Turner, S. & Son Pty. Ltd., Mann St, Gosford 2250	538080	1970	Road Match	0m
	CRANES-MOBILE-PROPRIETORS &/OR HIRERS	Turner, S. & Son Pty. Ltd., Mann St, Gosford 2250	538090	1970	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
11	HAULAGE CONTRACTORS	Waters & McPhan Pty. Ltd., Pacific Hwy., North Gosford	538387	1970	Road Match	0m
	ROAD TRANSPORT SERVICES-INTERSTATE	Waters & McPhan Pty. Ltd., Pacific Hwy., North Gosford	538853	1970	Road Match	0m
	PLUMBERS' SUPPLIES	West Gosford Building Supplies Pty. Ltd., 60 Pacific Hwy. Gosford 2250	538792	1970	Road Match	0m
	MOTOR CAR & TRUCK DEALERS - NEW & USED	A.E. Eagle & Sons Pacific Highway, North Gosford	203193	1961	Road Match	0m
	BUILDERS & CONTRACTORS	Ashwell & Carroll Tourist Bureau Pty. Ltd., Mann St., Gosford	203348	1961	Road Match	0m
	EARTH MOVING EQUIPMENT MANUFACTURER, IMPORTER & DISTRIBUTOR	Eagle, A. E. & Sons, Pacific Highway., North Gosford	203555	1961	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Eagle, A. E. & Sons, Pacific Highway., North Gosford	204006	1961	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Eagle, A. E. and Sons, Pacific Highway, Gosford	204007	1961	Road Match	0m
	AGRICULTURAL MACHINERY DEALERS	Eagle, A. E. and Sons, Pacific Highway., North Gosford	203190	1961	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Eagle, A. E. and Sons, Pacific Highway., North Gosford	203978	1961	Road Match	0m
	MOTOR ENGINE RECONDITIONERS	Eagle, A. E. and Sons, Pacific Highway., North Gosford	204021	1961	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle, A. E. and Sons, Pacific Highway., North Gosford	204030	1961	Road Match	0m
	ENGINEERS-GENERAL, MFRG. & MECHANICAL	Fairlie, C. and Son Pty. Ltd., 58 Pacific Highway., Gosford	203601	1961	Road Match	0m
	MOTOR ENGINE RECONDITIONERS	Fairlie, C. and Son Pty. Ltd., 58 Pacific Highway., Gosford	204022	1961	Road Match	0m
	FIBRE GLASS, PLASTIC PRODUCTS MFRS.	Fairlite Plastics, 58 Pacific Highway., Gosford	203628	1961	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Golden Fleece Service Station, Pacific Highway., North Gosford	204009	1961	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Golden Fleece Service Station, Pacific Highway., North Gosford	204081	1961	Road Match	0m
	AIR SERVICES BOOKING AGENTS	Gosford Tourist Bureau, Ashwell & Carroll Pty. Ltd., Mann St., Gosford	203232	1961	Road Match	0m
	BOAT, LAUNCH, YACHT BUILDERS & REPAIRERS	Kiwi Caravans, 58 Pacific Highway., Gosford	203327	1961	Road Match	0m
	ENGINEERS-GENERAL, MFRG. & MECHANICAL	Lansdowne Engineering, 23 Pacific Highway., North Gosford	203603	1961	Road Match	0m
	WELDERS-ELECTRIC & OXY	Lansdowne Engineering, 23 Pacific Highway., North Gosford	204441	1961	Road Match	0m
	ELECTROPLATERS	Lansdowne, B., 23 Pacific Highway., North Gosford	203595	1961	Road Match	0m
	METAL POLISHER	Lansdowne, B., 23 Pacific Highway., North Gosford	203935	1961	Road Match	0m
	BAKERS-BREAD	Nolan Bros., Mann St., Gosford	203278	1961	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	North Gosford Transport Centre, Pacific Highway., North Gosford	204086	1961	Road Match	0m
	MERCHANTS-WHOLESALE	Producers Co-op. DIST., Society Ltd. (The), 66 Pacific Highway., Gosford	203934	1961	Road Match	0m
	MOTOR BUS SERVICES	Robert's Brisbane Water Coaches, Mann St., North Gosford	203998	1961	Road Match	0m
	BATTERY SERVICE STATIONS	Roberts Fleetline Service Station & Restaurant, Mann St., North Gosford	203301	1961	Road Match	0m
	ENGINEERS-DIESEL	Roberts Fleetline Service Station & Restaurant, Mann St., North Gosford	203596	1961	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Robert's Fleetline Service Station & Restaurant, Mann St., North Gosford	203986	1961	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Robert's Fleetline Service Station & Restaurant, Mann St., North Gosford	204042	1961	Road Match	0m
	TYRE & TUBE DEALERS	Robert's Fleetline Service Station & Restaurant, Mann St., North Gosford	204419	1961	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Shell Co. of Aust., Ltd., Pacific Highway., North Gosford	204061	1961	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
11	CARRIERS & CARTAGE CONTRACTORS	Waters & McPhan, Pacific Highway., North Gosford	203472	1961	Road Match	0m
	ROAD TRANSPORT SERVICES-INTERSTATE	Waters and McPhan, Pacific Highway., North Gosford	204277	1961	Road Match	0m
	PLUMBERS' SUPPLIES	West Gosford Building Supplies Pty. Ltd., 60 Pacific Highway., Gosford	204195	1961	Road Match	0m
	RANGES-ELECTRIC-DEALER	West Gosford Building Supplies Pty. Ltd., 60 Pacific Highway., Gosford	204230	1961	Road Match	0m
	AMBULANCES	Ambulance, Brisbane Water District, Mann St., Gosford	184139	1950	Road Match	0m
	AIR SERVICES BOOKING AGENTS	Ash and Cox (J. A. Brown, Propr.) (T.A.A., A.N.A. and Ansett), Main St., Gosford	184138	1950	Road Match	0m
	ENGINEERS-GENERAL &/OR MANUFACTURING &/OR MECHANICAL	Batt, A. H., 60 Pacific Highway., Gosford	184330	1950	Road Match	0m
	WELDERS-OXY & ELECTRIC	Batt, A. H., 60 Pacific Highway., Gosford	185919	1950	Road Match	0m
	DENTISTS	Carroll, W. R., Mann St., Gosford	184295	1950	Road Match	0m
	PLUMBERS, GASFITTERS & DRAINLAYERS	Cleary and Son, Mann St., Gosford	184601	1950	Road Match	0m
	FUNERAL DIRECTORS	Creighton, R. H., Mann St., Gosford	184365	1950	Road Match	0m
	MOTOR OIL & SPIRIT MERCHANTS	Eagle and Corner (Agents, C.O.R.), Pacific Highway., North Gosford	184550	1950	Road Match	0m
	MOTOR CAR & TRUCK DEALERS	Eagle and Corner (Agents, Hudson, Packard and Standard), Pacific Highway., North Gosford	184528	1950	Road Match	0m
	AGRICULTURAL MACHINERY DEALERS &/OR SERVICEMEN	Eagle and Corner (International Harvester), Pacific Highway., North Gosford	184131	1950	Road Match	0m
	MOTOR ACCESSORIES DEALERS	Eagle and Corner, Pacific Highway., North Gosford	184512	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle and Corner, Pacific Highway., North Gosford	184539	1950	Road Match	0m
	BRICK, PIPE & TILE MANUFACTURERS	Gosford Brick, Pipe and Tile Pty. Ltd., Mann St., Gosford	184177	1950	Road Match	0m
	BUILDERS & BUILDING CONTRACTORS	Gosford Estate and Builder Pty. Ltd (C/o. Ash and Cox), Mann St., Gosford	184186	1950	Road Match	0m
	FOOTWEAR RETAILERS & REPAIRERS	Harils, N., Mann St., Gosford	184345	1950	Road Match	0m
	TENNIS RACQUET REPAIRERS & RESTRINGERS	Haslems, Mann St., Gosford	185884	1950	Road Match	0m
	DENTISTS	Johns, A. E., Mann St., Gosford	184296	1950	Road Match	0m
	FIBROUS PLASTER MANUFACTURERS	King, R. H., Mann St., Gosford	184338	1950	Road Match	0m
	ELECTRICAL CONTRACTORS & ELECTRICIANS	Massier and Goodliffe, Mann St., Gosford	184323	1950	Road Match	0m
	HOSPITALS-PRIVATE	Omrah Private Hospital., Mann St., Gosford	184421	1950	Road Match	0m
	CARRIERS & CARTAGE CONTRACTORS	Pink, C. S., Mann St., Gosford	184244	1950	Road Match	0m
	BUILDERS & BUILDING CONTRACTORS	Pryor, T. H., Mann St., Gosford	184190	1950	Road Match	0m
	MOTOR PAINTERS & PANEL BEATERS	Smith, L. R., 60 Pacific Highway., Gosford	184560	1950	Road Match	0m
	MOTOR CAR & TRUCK DEALERS	Standard), Pacific Highway., North Gosford	184529	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Stephenson's Garage, Pacific Highway., North Gosford	184546	1950	Road Match	0m
	MOTOR ACCESSORIES DEALERS	Sungold Motors, Pacific Highway., Gosford	184517	1950	Road Match	0m
	TYRE DEALERS	Sungold Motors, Pacific Highway., Gosford	185911	1950	Road Match	0m
	ELECTRICAL CONTRACTORS & ELECTRICIANS	Wainwright, R. W., Mann St., Gosford	184326	1950	Road Match	0m
	BUILDERS' SUPPLIES	White, W. R., Mann St., Gosford	184200	1950	Road Match	0m
	CHEMISTS	Whitler, F. M., Mann St., Gosford	184267	1950	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
11	PHOTOGRAPHERS-PORTRAIT	Woods, Mrs. M., Mann St., Gosford	184597	1950	Road Match	0m
12	CURTAIN MFRS. &/OR W/SALERS	Petersen Interiors., 7 Baker St., Gosford 2250	123902	1982	Road Match	0m
	CARPORT &/OR AWNING MFRS.	Superior Outdoor Living., 9 Baker St., Gosford 2250	123756	1982	Road Match	0m
	INCINERATOR BUILDERS &/OR MFRS. &/ OR W/SALERS	Superior Outdoor Living., 9 Baker St., Gosford 2250	124401	1982	Road Match	0m
	SWIMMING POOL EQUIPMENT & SUPPLIES	Superior Outdoor Living., 9 Baker St., Gosford 2250	125370	1982	Road Match	0m
	AGRICULTURAL MACHINERY MFRS. &/OR DIST.	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	537841	1970	Road Match	0m
	BLACKSMITHS & FARRIERS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	537926	1970	Road Match	0m
	ENGINEERS-FABRICATING	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538222	1970	Road Match	0m
	ENGINEERS-STRUCTURAL	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538231	1970	Road Match	0m
	MOTOR BODY BUILDERS & REPAIRERS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538579	1970	Road Match	0m
	SPRING MANUFACTURERS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538918	1970	Road Match	0m
	STEEL FABRICATORS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538924	1970	Road Match	0m
	TRAILER & SEMI-TRAILER MFRS. &/OR DISTRIBUTORS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	538985	1970	Road Match	0m
	WELDERS-ELECTRIC &/OR OXY	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	539011	1970	Road Match	0m
	WROUGHT IRON WORKERS	Frewin, R. G. & Son, 16 Baker St. Gosford 2250	539026	1970	Road Match	0m
	MOTOR CAR RADIO SPECIALISTS	J. & K. Radio & Appliances, Baker St. Gosford 2250	538606	1970	Road Match	0m
	RADIO & T.V. SALES, SERVICE &/OR HIRERS	J. & K. Radio & Appliances, Baker St. Gosford 2250	538819	1970	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, Baker St. Gosford 2250	538166	1970	Road Match	0m
	SECONDHAND DEALERS	Baker Street Agencies, 18 Baker St., Gosford	204295	1961	Road Match	0m
	INSULATION MATERIAL SUPPLIER	Baker Street, Agencies, 18 Baker St., Gosford	203811	1961	Road Match	0m
	MOTOR CAR RADIO SPECIALISTS	Baker Street, Agencies, 18 Baker St., Gosford	204002	1961	Road Match	0m
	COOPER & VAT MAKERS	Central Coast Cooperage, Baker St., Gosford	203517	1961	Road Match	0m
	MACHINERY MFRS.	Central Coast Cooperage, Baker St., Gosford	203909	1961	Road Match	0m
	PIPE MFRS.-WOOD	Central Coast Cooperage, Baker St., Gosford	204177	1961	Road Match	0m
	FIBRE GLASS PRODUCTS-MANUFACTURERS, IMPORTERS/DISTRIBUTORS	Fibre Glass Products Limited., 18 Baker Street, Gosford	203639	1961	Road Match	0m
	BOAT, LAUNCH, YACHT BUILDERS & REPAIRERS	Fibre Glass Products Limited., Baker St., Gosford	203325	1961	Road Match	0m
	FIBRE GLASS PRODUCTS-MANUFACTURERS, IMPORTERS/DISTRIBUTORS	Fibre Glass Products Limited., Baker. St., Gosford	203629	1961	Road Match	0m
	AGRICULTURAL MACHINERY MFRS. & DIST.	Frewin, R. G. & Son, Baker St., Gosford	203220	1961	Road Match	0m
	ENGINEERS-FABRICATING	Frewin, R. G. & Son, Baker St., Gosford	203598	1961	Road Match	0m
	ENGINEERS-STRUCTURAL	Frewin, R. G. & Son, Baker St., Gosford	203609	1961	Road Match	0m
	WELDERS-ELECTRIC & OXY	Frewin, R. G. and Son Baker St., Gosford	204438	1961	Road Match	0m
BLACKSMITHS & FARRIERS	Frewin, R. G. and Son, Baker St., Gosford	203318	1961	Road Match	0m	
MOTOR BODY BUILDERS & REPAIRERS	Frewin, R. G. and Son, Baker St., Gosford	203991	1961	Road Match	0m	
SPRING MANUFACTURERS	Frewin, R. G. and Son, Baker St., Gosford	204341	1961	Road Match	0m	

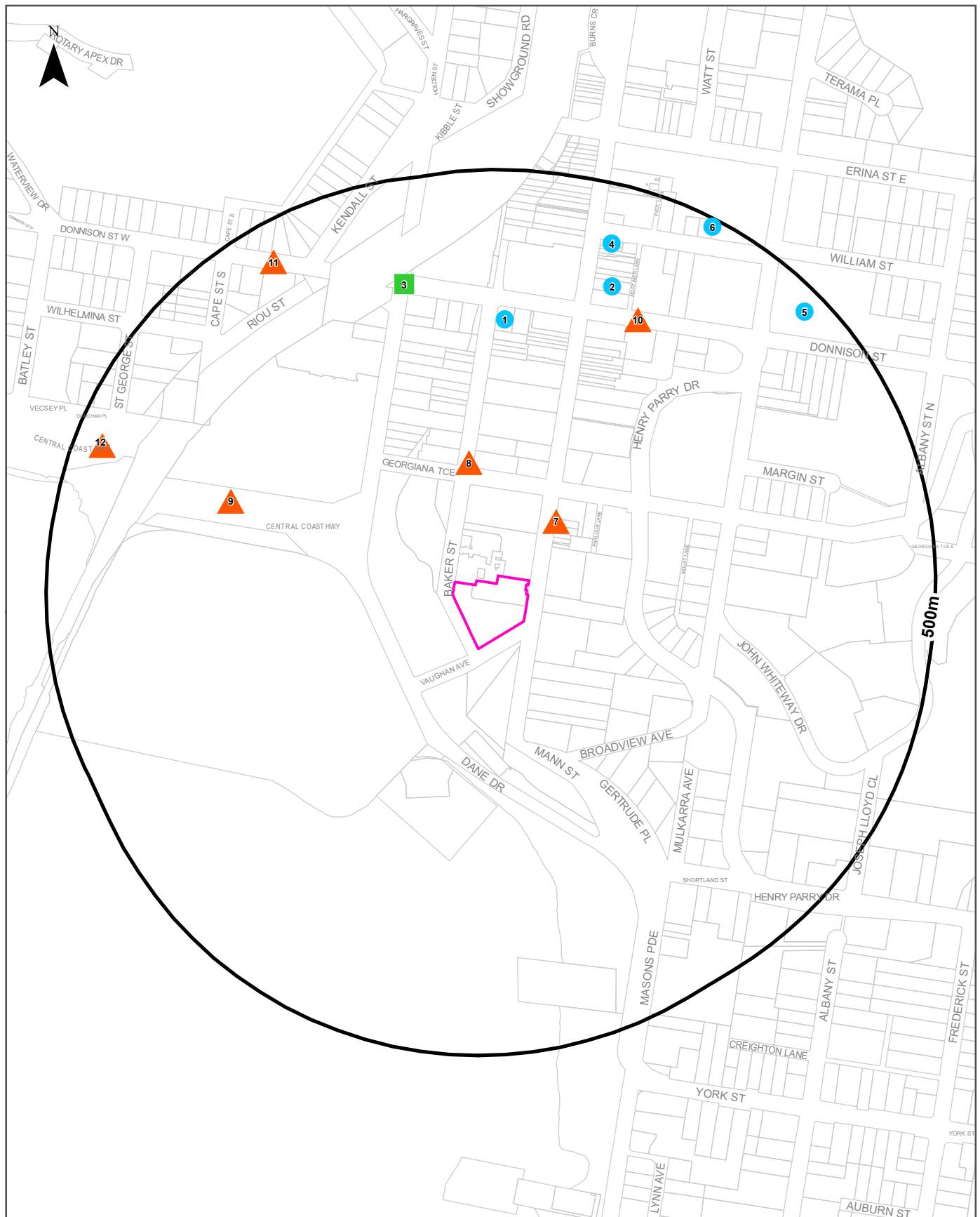
Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
12	WROUGHT IRON WORKERS	Frewin, R. G. and Son, Baker St., Gosford	204453	1961	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, 14 Baker St., Gosford	203552	1961	Road Match	0m
	BAKERS-BREAD	Van Drempt Bros., Baker St., Gosford	203279	1961	Road Match	0m
	AGRICULTURAL MACHINERY MANUFACTURERS	Frewin, R. G., Baker St., Gosford	184137	1950	Road Match	0m
	BLACKSMITHS & FARRIERS	Frewin, R. G., Baker St., Gosford	184173	1950	Road Match	0m
	CARAVAN & TRAILER BUILDERS	Frewin, R. G., Baker St., Gosford	184227	1950	Road Match	0m
	COACH & BODY BUILDERS	Frewin, R. G., Baker St., Gosford	184279	1950	Road Match	0m
	STEEL DISTRIBUTORS	Frewin, R. G., Baker St., Gosford	184670	1950	Road Match	0m
	WELDERS-OXY & ELECTRIC	Frewin, R. G., Baker St., Gosford	185921	1950	Road Match	0m
	MOTOR PAINTERS & PANEL BEATERS	Hextall Eric, Baker St., Gosford	184557	1950	Road Match	0m
	WELDERS-OXY & ELECTRIC	Hextall, Eric., Baker St., Gosford	185922	1950	Road Match	0m
	LAUNDRIES	Sno White Laundry, Baker St., Gosford	184466	1950	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners Baker St., Gosford	184316	1950	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, Baker St., Gosford	184320	1950	Road Match	0m
13	SCHOOLS &/OR COLLEGES PRIVATE & /OR PUBLIC	Gosford Pre-School Kindergarten., Dane Dr., Gosford 2250	125215	1982	Road Match	86m
14	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Public School, Georgiana Ter., Gosford 2250	538868	1970	Road Match	106m
	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Public School. Georgiana Ter., Gosford	204288	1961	Road Match	106m
	CLOTHING-MANUFACTURERS &/OR WHOLESALE	S.G.B. Apparel Pty. Ltd., Georgiana Ter., Gosford	184278	1950	Road Match	106m
15	ELECTRICAL CONTRACTORS-LICENSED	Coopers Moore, Whitton St., North Gosford	538191	1970	Road Match	120m
	QUARRY PROPRIETORS	Gosford Quarries Pty. Ltd., Parry Pde., Gosford	555778	1970	Road Match	120m
	BUILDERS & CONTRACTORS	Gosford Quarries Pty. Ltd., Parry Land, Gosford	203362	1961	Road Match	120m
16	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	BP Orange Grove Service Station, Pacific Hghwy., West Gosford	538681	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Golden Fleece Service Station, Pacific Hghwy., West Gosford	538639	1970	Road Match	129m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Lakeview Service Station, Pacific Hghwy. West Gosford	538688	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Lakeview Service Station, Pacific Hghwy., West Gosford	538645	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Noble, S. H. Pty. Ltd., Pacific Hghwy., West Gosford	538648	1970	Road Match	129m
	BUILDERS &/OR BUILDING CONTRACTORS	Rysdyk Constructions Pty. Ltd., Pacific Hghwy. Gosford 2250	537974	1970	Road Match	129m
	COLD STORES	Waters & McPhan Pty. Ltd., Pacific Hghwy. Gosford 2250	538067	1970	Road Match	129m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Lakeview Service Station, Pacific Highway. West, Gosford	204085	1961	Road Match	129m
	ENGINEERS-FABRICATING	Lansdowne Engineering, Pacific Highway., Gosford	203599	1961	Road Match	129m
	ENGINEERS-STRUCTURAL	Lansdowne Engineering, Pacific Highway., Gosford	203612	1961	Road Match	129m
	MOTOR TOWING SERVICES	Sungold Motors, Pacific Highway, West Gosford	204099	1961	Road Match	129m
	GAS CYLINDER SERVICE	Sungold Motors, Pacific Highway., Gosford	203724	1961	Road Match	129m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Sungold Motors, Pacific Highway., Gosford	203988	1961	Road Match	129m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
16	MOTOR CAR & TRUCK DEALERS-NEW & USED	Sungold Motors, Pacific Highway., Gosford	204017	1961	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Sungold Motors, Pacific Highway., Gosford	204048	1961	Road Match	129m
	ENGINEERS-GENERAL &/OR MANUFACTURING &/OR MECHANICAL	Landsdowne, E., Pacific Highway., Gosford	184331	1950	Road Match	129m
	WELDERS-OXY & ELECTRIC	Landsdowne, E., Pacific Highway., Gosford	185923	1950	Road Match	129m
	PRINTERS-GENERAL	Producers Co-operative Distributing Society Ltd., Pacific Highway., West Gosford	184621	1950	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Snelling Motors Pty. Ltd., Pacific Highway., Gosford	184545	1950	Road Match	129m
	MOTOR CAR & TRUCK DEALERS	Sungold Motors (Agents, General Motors-Holden Vauxhall, Oldsmobile Cars, Bedford Trucks), Pacific Highway., West Gosford	184535	1950	Road Match	129m
	MOTOR OIL & SPIRIT MERCHANTS	Vacuum Oil Co. Pty. Ltd. (Depot), Pacific Highway., West Gosford	184554	1950	Road Match	129m

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# Dry Cleaners, Motor Garages & Service Stations

26-30 Mann Street, Gosford, NSW 2250



## Legend

- Site Boundary
- Buffer 500m
- 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:



Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

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Property Boundaries © NSW Department Finance, Services & Innovation 2025

# Historical Business Directories

26-30 Mann Street, Gosford, NSW 2250

## 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
1	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS	BP Gosford., 99 Donnison St., Gosford 2250	124749	1982	Premise Match	300m	North
	MOTOR GARAGES & ENGINEERS	Stock's Filling Station (Gosford), Cnr. Donnison and Baker Sts. Gosford 2250	538653	1970	Premise Match	300m	North
	MOTOR GARAGES & ENGINEERS	Stock's Filling Station (Gosford) Cnr. Donnison & Baker Streets, Gosford	204050	1961	Premise Match	300m	North
	MOTOR GARAGES & ENGINEERS	Stock's Filling Station (Gosford), Cnr. Donnison and Baker Sts., Gosford	204046	1961	Premise Match	300m	North
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Stock's Filling Station (Gosford), Cnr. Donnison and Baker Sts., Gosford	204094	1961	Premise Match	300m	North
2	MOTOR GARAGES & ENGINEERS	Advanx (Gosford) Motor Service Pty. Ltd., 117 Donnison St., Gosford	204024	1961	Premise Match	367m	North
	MOTOR GARAGES & ENGINEERS	Gosford Motors Pty. Ltd., 113 Mann St., Gosford	204034	1961	Premise Match	367m	North
	MOTOR GARAGES & ENGINEERS	Gosford Motor Service and Engineering Co. Pty. Ltd., 113 Mann St., Gosford	184540	1950	Premise Match	367m	North
3	MOTOR GARAGES & ENGINEERS	Dibben, R., Cnr. Donnison and Holden Sts., Gosford	204029	1961	Road Intersection	372m	North
4	DRY CLEANERS & PRESSERS	Spring Fresh Dry Cleaners., 1 William St., Gosford 2250	123982	1982	Premise Match	422m	North
5	DRY CLEANERS & PRESSERS	Springfresh Dry Cleaners., Shop 131 Marketown., Gosford 2250	123984	1982	Premise Match	426m	North East
6	DRY CLEANERS & PRESSERS	Lawrence Dry Cleaners., 73 Imperial Centre., Gosford 2250	123980	1982	Premise Match	462m	North East
	DRY CLEANERS, PRESSERS & DYERS	Malley, C. O., 165 Mann St., Gosford	184318	1950	Premise Match	462m	North East

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## 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
7	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Golden Fleece Service Station., Pacific Highway., North Gosford 2250	124772	1982	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle, A. E. & Sons Pty. Limited, Pacific Hghwy., North Gosford	538634	1970	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Golden Fleece Service Station, Pacific Hghwy., North Gosford	538685	1970	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Gosford Auto Electrics, Pacific Hghwy., Gosford North	538687	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Hilton, Brian Pty. Ltd., Pacific Hghwy., North Gosford	538643	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle, A. E. and Sons, Pacific Highway., North Gosford	204030	1961	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Golden Fleece Service Station, Pacific Highway., North Gosford	204081	1961	Road Match	0m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	North Gosford Transport Centre, Pacific Highway., North Gosford	204086	1961	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Robert's Fleetline Service Station & Restaurant, Mann St., North Gosford	204042	1961	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Eagle and Corner, Pacific Highway., North Gosford	184539	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Stephenson's Garage, Pacific Highway., North Gosford	184546	1950	Road Match	0m
8	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, Baker St. Gosford 2250	538166	1970	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, 14 Baker St., Gosford	203552	1961	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners Baker St., Gosford	184316	1950	Road Match	0m
	DRY CLEANERS, PRESSERS & DYERS	Topper Dry Cleaners, Baker St., Gosford	184320	1950	Road Match	0m
9	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	BP Orange Grove Service Station, Pacific Hghwy., West Gosford	538681	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Golden Fleece Service Station, Pacific Hghwy., West Gosford	538639	1970	Road Match	129m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Lakeview Service Station, Pacific Hghwy. West Gosford	538688	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Lakeview Service Station, Pacific Hghwy., West Gosford	538645	1970	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Noble, S. H. Pty. Ltd., Pacific Hghwy., West Gosford	538648	1970	Road Match	129m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Lakeview Service Station, Pacific Highway. West, Gosford	204085	1961	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Sungold Motors, Pacific Highway., Gosford	204048	1961	Road Match	129m
	MOTOR GARAGES & ENGINEERS	Snelling Motors Pty. Ltd., Pacific Highway., Gosford	184545	1950	Road Match	129m
10	MOTOR GARAGES & ENGINEERS	Amoco Service Station, Donnison St. Gosford 2250	538628	1970	Road Match	328m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Amoco Service Station, Donnison St. Gosford 2250	538679	1970	Road Match	328m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
10	MOTOR GARAGES & ENGINEERS	Caltex Service Station, Donnison St. Gosford 2250	538632	1970	Road Match	328m
	MOTOR GARAGES & ENGINEERS	Rosenfelder, Emil, 307 Donnison St., Gosford	184544	1950	Road Match	328m
	MOTOR GARAGES & ENGINEERS	Stock's Tyre Service (Gosford), Donnison St., Gosford	184547	1950	Road Match	328m
11	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Amoco Service Station., 90 Donnison St., Gosford 2250	124745	1982	Road Match	416m
12	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	BP West Gosford Service Station Pacific Highway., West Gosford 2250	124750	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Esso Servicentre., Pacific Highway., West Gosford 2250	124770	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Golden Fleece Service Station., Pacific Highway., West Gosford 2250	124771	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Gosford Auto Chef., Pacific Highway., West Gosford 2250	124773	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Grawill Motors Gosford Pty. Ltd., Pacific Highway., West Gosford 2250	124776	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Mackenzie, K., 27 Pacific Highway., West Gosford 2250	124783	1982	Road Match	418m
	MOTOR GARAGES &/OR ENGINEERS &/ OR SERVICE STATIONS	Noble Motors., Pacific Highway., West Gosford 2250	124786	1982	Road Match	418m
	MOTOR GARAGES & ENGINEERS	Advax Motors, Pacific Hghwy., West Gosford	538627	1970	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Atlantic Service Station, 1a Pacific Hghwy., West Gosford	538680	1970	Road Match	418m
	MOTOR GARAGES & ENGINEERS	Esso Servicenter, Pacific Hghwy., West Gosford	538637	1970	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Esso Servicenter, Pacific Hghwy., West Gosford	538682	1970	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Gosford Auto Chef, Pacific Hghwy., West Gosford	538686	1970	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OILS, Etc.	Ryden Bros., 50 Pacific Hghwy., West Gosford	538691	1970	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Golden Fleece Service Station and Café, Pacific Highway., West Gosford	204082	1961	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Gosford Auto Chef, Pacific Highway., West Gosford	204080	1961	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Hollier's Service Centre, 50-52 Pacific Highway., West Gosford	204083	1961	Road Match	418m
	MOTOR SERVICE STATIONS-PETROL, OIL, Etc.	Orange Grove Service Station Pacific Highway West Gosford	204051	1961	Road Match	418m
	MOTOR GARAGES & ENGINEERS	Sungold Motors, Pacific Highway., West Gosford	204047	1961	Road Match	418m
	MOTOR GARAGES & ENGINEERS	Sungold Motors, Pacific Highway., West Gosford	184548	1950	Road Match	418m

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# Aerial Imagery 2024



26-30 Mann Street, Gosford, NSW 2250

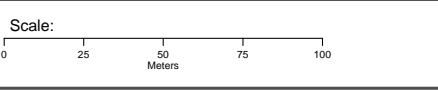


150m

Google Earth  
Image © 2025 Maxar Technologies

**Legend**

-  Site Boundary
-  Buffer 150m



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Coordinate System:  
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Date: 06 August 2025



# Aerial Imagery 2014

26-30 Mann Street, Gosford, NSW 2250

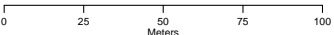


150m

**Legend**

-  Site Boundary
-  Buffer 150m

**Scale:**



0 25 50 75 100  
Meters

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# Aerial Imagery 2003

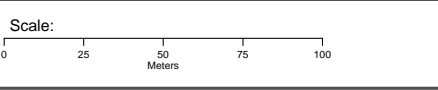
26-30 Mann Street, Gosford, NSW 2250



150m

**Legend**

-  Site Boundary
-  Buffer 150m



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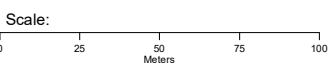
# Aerial Imagery 1994

26-30 Mann Street, Gosford, NSW 2250



### Legend

-  Site Boundary
-  Buffer 150m



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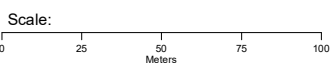
# Aerial Imagery 1984

26-30 Mann Street, Gosford, NSW 2250



### Legend

-  Site Boundary
-  Buffer 150m



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Date: 06 August 2025

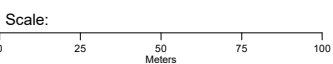
# Aerial Imagery 1975

26-30 Mann Street, Gosford, NSW 2250



### Legend

-  Site Boundary
-  Buffer 150m



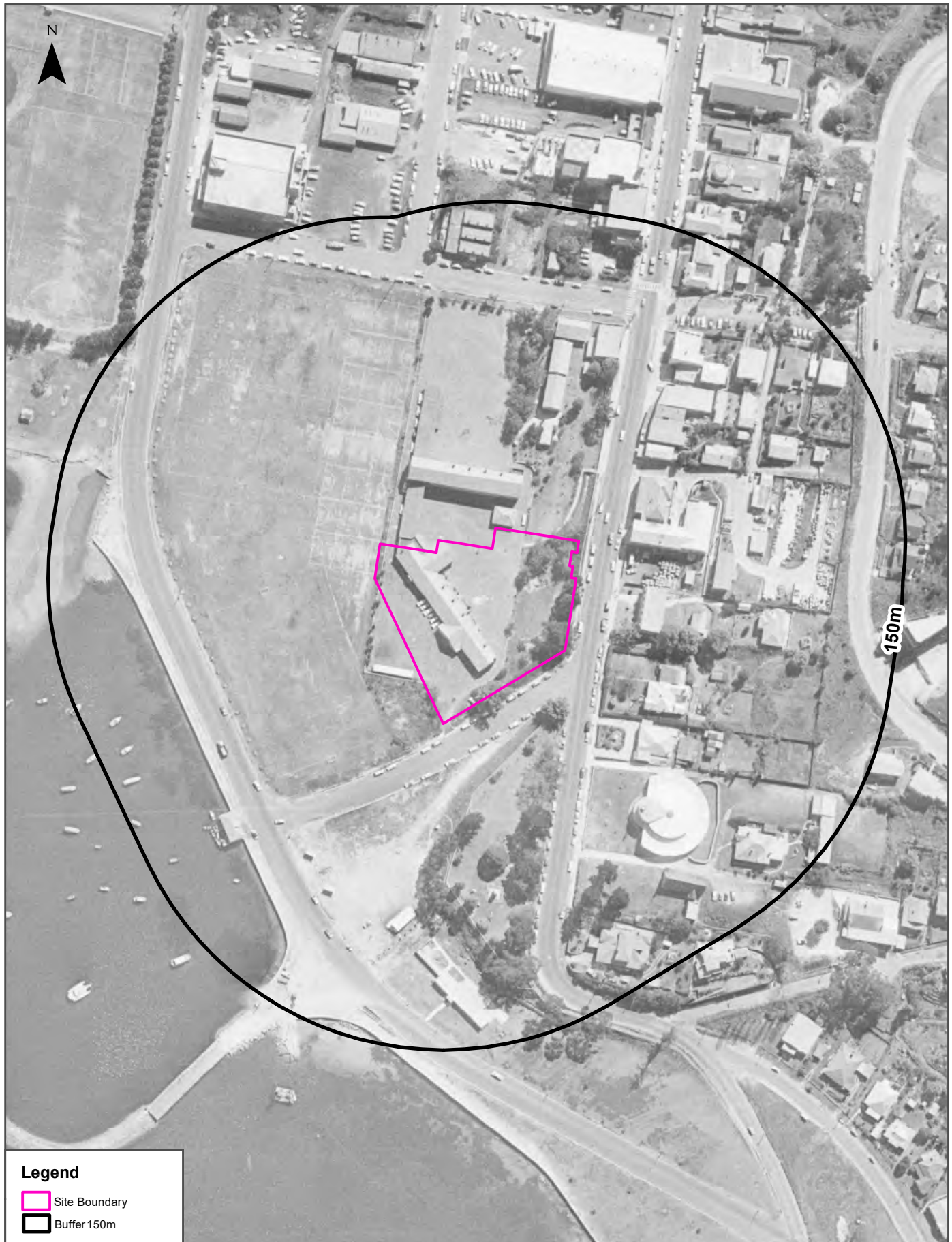
Data Sources: Aerial Imagery:  
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Date: 06 August 2025

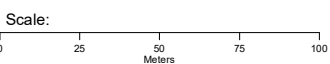
# Aerial Imagery 1965

26-30 Mann Street, Gosford, NSW 2250



### Legend

-  Site Boundary
-  Buffer 150m



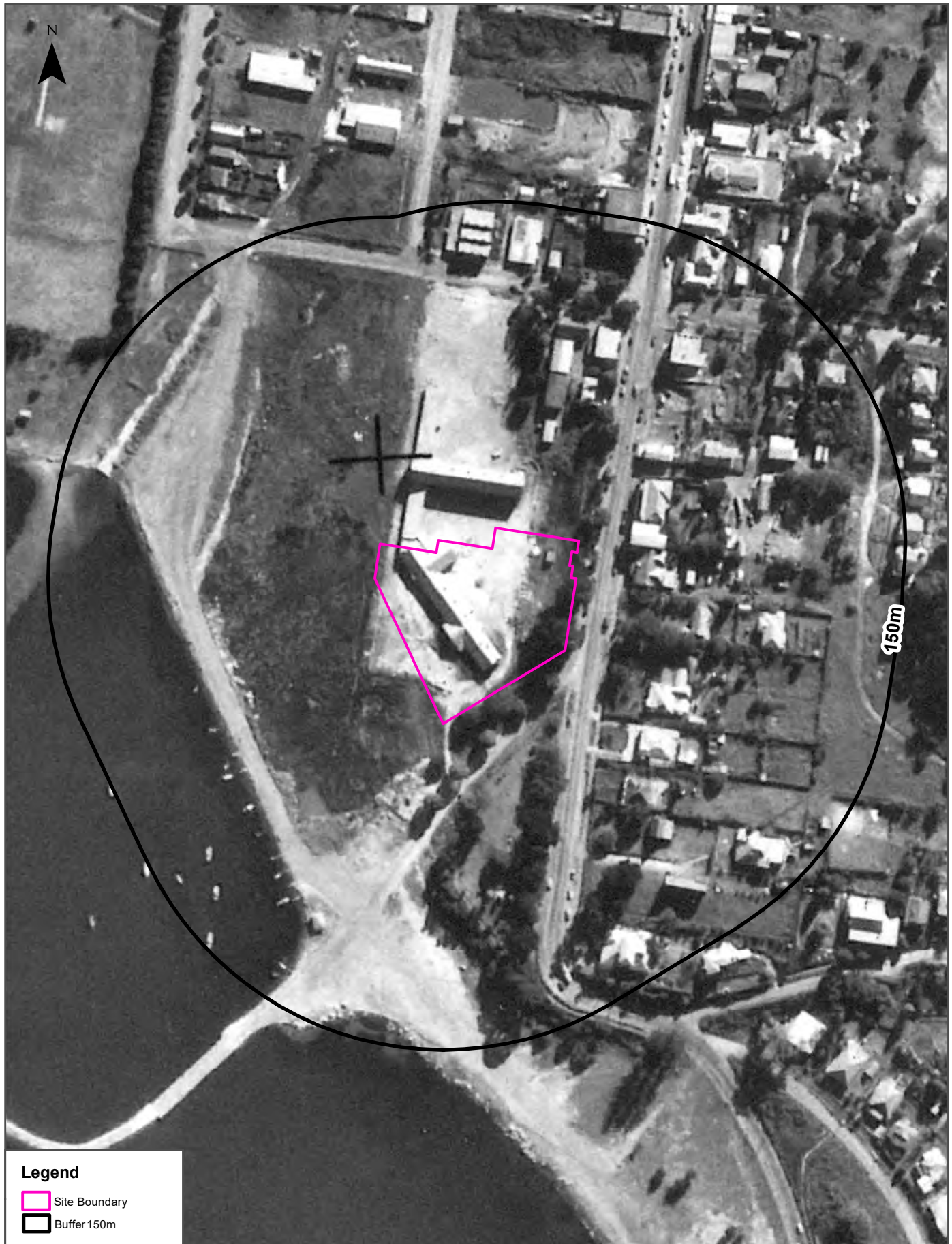
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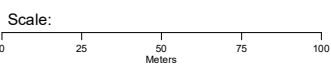
# Aerial Imagery 1954

26-30 Mann Street, Gosford, NSW 2250



### Legend

-  Site Boundary
-  Buffer 150m



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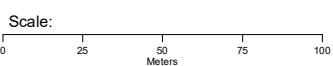
# Aerial Imagery 1941

26-30 Mann Street, Gosford, NSW 2250



## Legend

-  Site Boundary
-  Buffer 150m



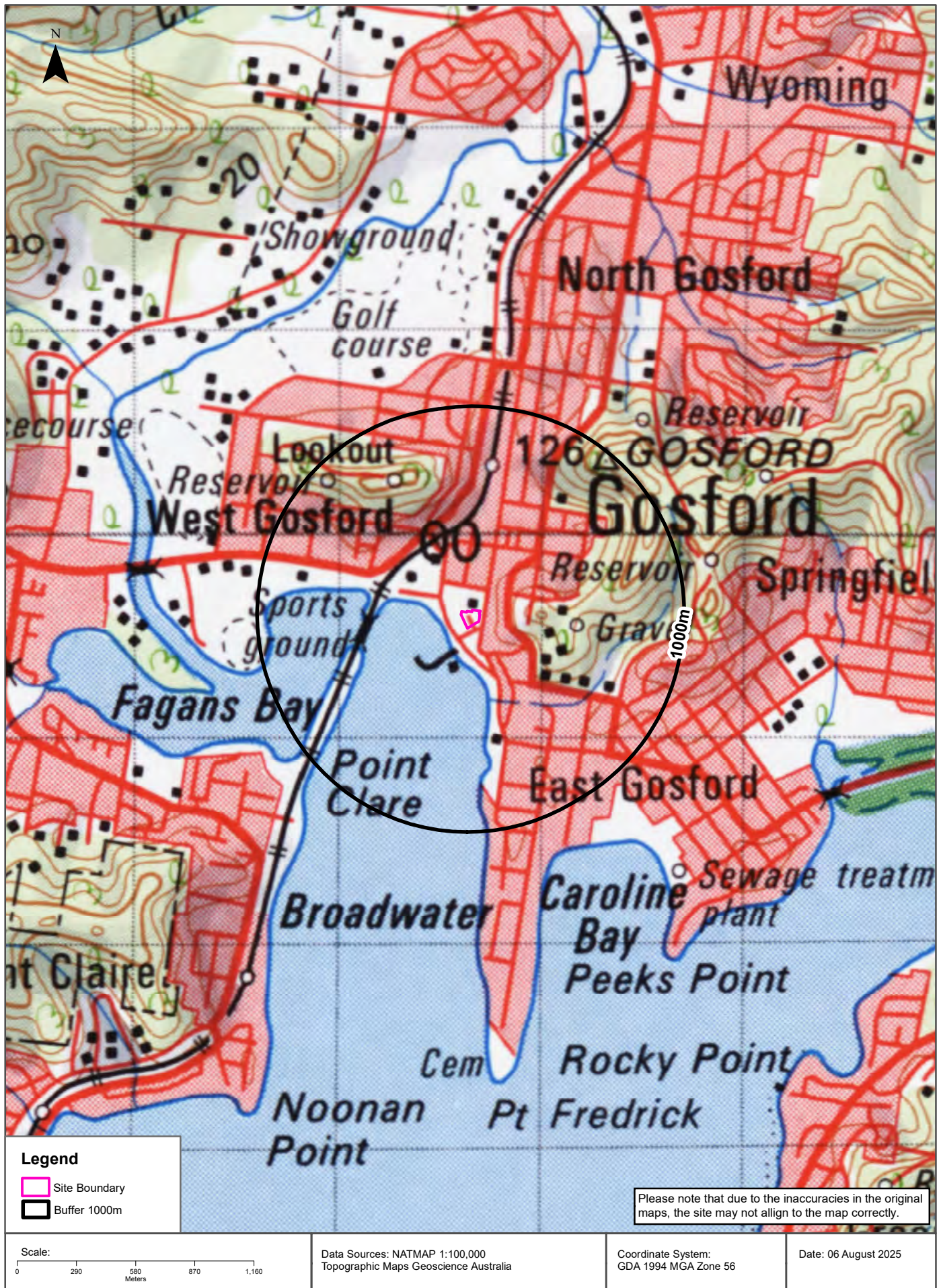
Data Sources Aerial Imagery: National Library of Australia

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

# Historical Map 1975

26-30 Mann Street, Gosford, NSW 2250



# Historical Map c.1942

26-30 Mann Street, Gosford, NSW 2250

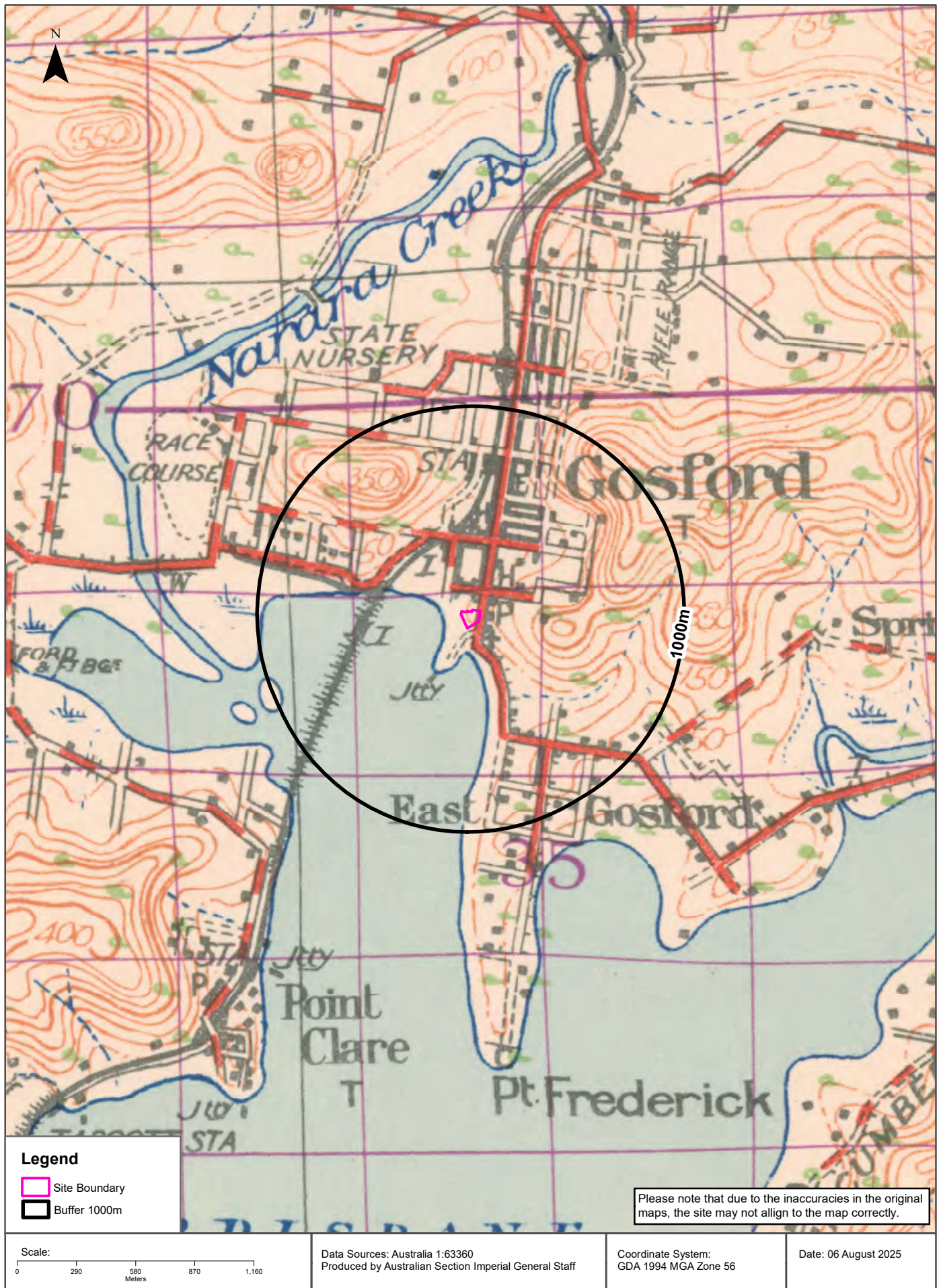


Please note that due to the inaccuracies in the original maps, the site may not align to the map correctly.

<p>Scale:</p>	<p>Data Sources: Australia 1:63360 Produced by Australian Section Imperial General Staff</p>	<p>Coordinate System: GDA 1994 MGA Zone 56</p>	<p>Date: 06 August 2025</p>
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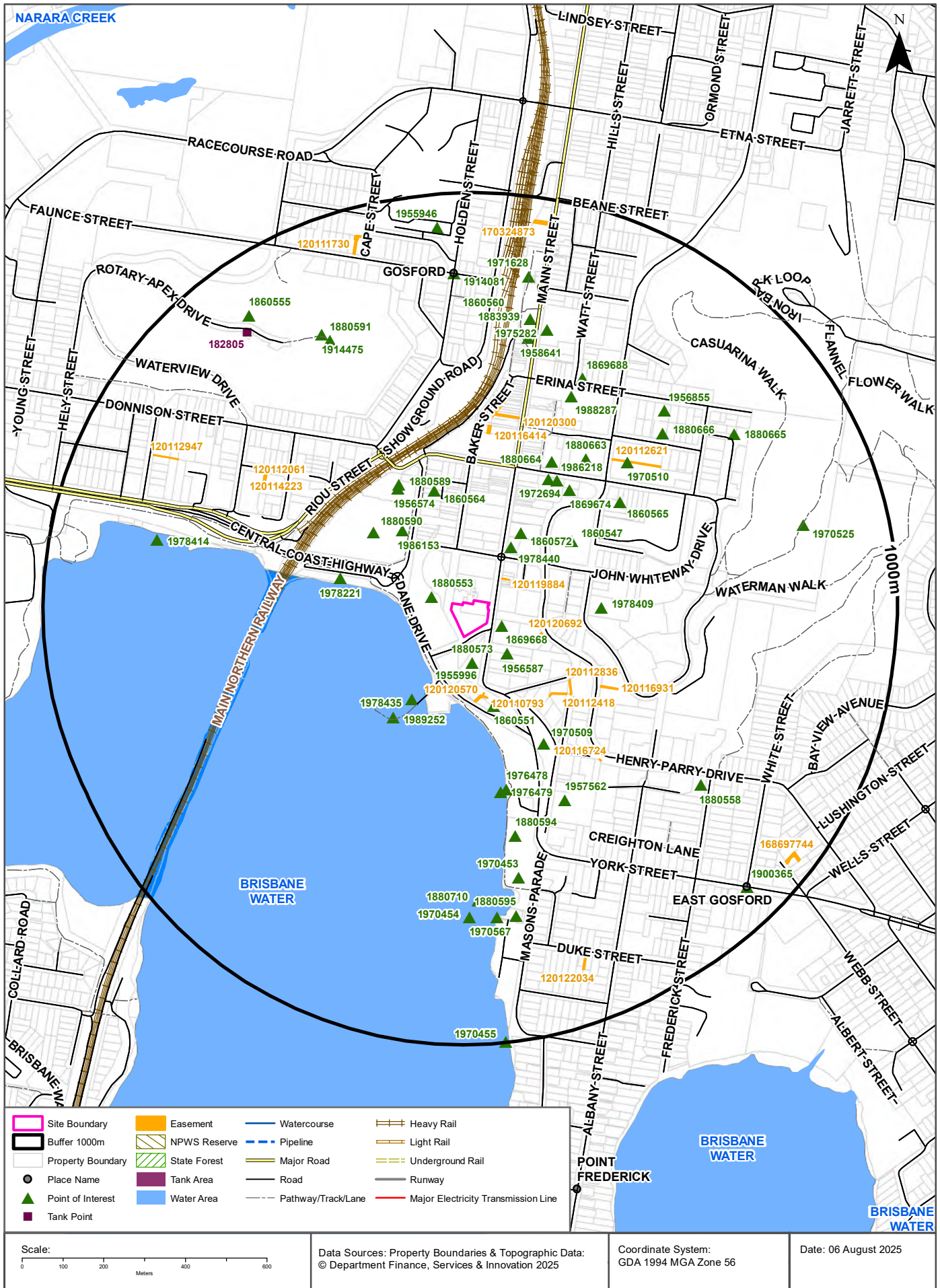
# Historical Map c.1921

26-30 Mann Street, Gosford, NSW 2250



# Topographic Features

26-30 Mann Street, Gosford, NSW 2250



# Topographic Features

26-30 Mann Street, Gosford, NSW 2250

## Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1869668	Police Station	GOSFORD POLICE STATION	38m	East
1880553	Park	GOSFORD CITY PARK	53m	North West
1880573	Park	GOSFORD PARK	66m	South
1956587	Place Of Worship	ANGLICAN CHURCH	90m	South East
1978440	Community Facility	CENTRAL COAST CONSERVATORIUM	146m	North East
1955996	Launching Ramp	Launching Ramp	149m	South West
1860551	Park	MEMORIAL PARK	184m	South
1860572	Local Government Chambers	GOSFORD CITY COUNCIL	188m	North East
1978435	Wharf	Wharf	199m	South West
1986153	Filtration Plant	GRAHAM PARK WATER TREATMENT PLANT	216m	North West
1860547	Technical College	GOSFORD TAFE COLLEGE	252m	North East
1880590	Sports Field	BLUE TONGUE CENTRAL COAST STADIUM	260m	North West
1989252	Wharf	GOSFORD WHARF	263m	South West
1978409	Park	JOHN WHITEWAY DRIVE BUSH RESERVE	275m	East
1860564	Club	CENTRAL COAST LEAGUES CLUB	280m	North
1978221	Park	GRAHAME PARK	281m	West
1956574	Sports Field	BOWLING GREENS	310m	North West
1880589	Community Facility	GOSFORD CITY BOWLING CLUB	319m	North West
1970509	Park	Park	324m	South East
1972694	High School	ET AUSTRALIA SECONDARY COLLEGE	336m	North East
1869674	Place Of Worship	UNITING CHURCH	340m	North East
1986218	Special School	ET AUSTRALIA SECONDARY COLLEGE SENIOR CAMPUS	342m	North East
1880664	Library	GOSFORD LIBRARY	378m	North East
1976478	Boat Ramp	Boat Ramp	387m	South
1976479	Wharf	Wharf	390m	South
1860565	Court House	GOSFORD COURT HOUSE	405m	North East
1880663	Park	KIBBLE PARK	424m	North East
1957562	Retirement Village	LEGACY INDEPENDENT LIVING UNITS POINT FREDERICK	471m	South East
1970510	Shopping Centre	GOSFORD TOWN CENTRE	483m	North East
1880594	Swimming Pool Facility	GOSFORD OLYMPIC POOL	504m	South
1988287	Shopping Centre	IMPERIAL CENTRE GOSFORD	545m	North East
1880666	Place Of Worship	CHRISTIAN SCIENTIST CHURCH	594m	North East

Map Id	Feature Type	Label	Distance	Direction
1869688	Post Office	GOSFORD POST OFFICE	595m	North East
1970453	Park	LIONS PARK	605m	South
1956855	Place Of Worship	Place Of Worship	637m	North East
1880710	Wharf	Wharf	648m	South
1958641	Tourist Information Centre	GOSFORD VISITOR INFORMATION CENTRE	656m	North
1880558	Park	PEACE PARK	657m	South East
1975282	Community Medical Centre	GATEWAY COMMUNITY HEALTH CENTRE	684m	North
1970454	Wharf	Wharf	687m	South
1970567	Wharf	Wharf	691m	South
1880595	Club	GOSFORD SAILING CLUB	695m	South
1883939	Park	BURNS PLACE	702m	North
1860560	Railway Station	GOSFORD RAILWAY STATION	703m	North
1880591	Lookout	PRESIDENTS HILL LOOKOUT	710m	North West
1880665	Community Facility	RED CROSS SOCIETY	728m	North East
1914475	Mountain Like	PRESIDENTS HILL	732m	North West
1978414	Park	CARAWAH RESERVE	740m	West
1970525	Lookout	OURAKA LOOKOUT	792m	East
1914081	Town	GOSFORD	803m	North
1971628	Transport Interchange	GOSFORD BUS INTERCHANGE	804m	North
1860555	Park	WATERVIEW PARK	863m	North West
1900365	Suburb	EAST GOSFORD	908m	South East
1955946	Helipad	Helipad	918m	North
1970455	Wharf	Wharf	997m	South

Topographic Data Source: © Land and Property Information (2015)

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## 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
182805	Water	Operational		21/07/2018	832m	North West

Tanks Data Source: © Land and Property Information (2015)

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## 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
120119884	Primary	Undefined		66m	North East
120120692	Primary	Undefined		129m	East
120110793	Primary	Undefined		145m	South
120120570	Primary	Undefined		151m	South
120112418	Primary	Undefined		233m	South East
120112836	Primary	Undefined		245m	South East
120116931	Primary	Undefined		319m	South East
120116414	Primary	Undefined		410m	North
120116724	Primary	Undefined		433m	South East
120120300	Primary	Undefined		453m	North
120112621	Primary	Undefined		461m	North East
120112061	Primary	Undefined		542m	North West
120114223	Primary	Undefined		550m	North West
120112947	Primary	Undefined		758m	North West
120122034	Primary	Undefined		836m	South
120111730	Primary	Undefined		889m	North
168697744	Primary	Right of way		936m	South East
170324873	Primary	Right of way	7m	937m	North

Easements Data Source: © Land and Property Information (2015)

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## State Forest

What State Forest exist within the dataset buffer?

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

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)

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# Elevation Contours (m AHD)

26-30 Mann Street, Gosford, NSW 2250



# Hydrogeology & Groundwater

26-30 Mann Street, Gosford, NSW 2250

## Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive aquifers of low to moderate productivity	0m	On-site

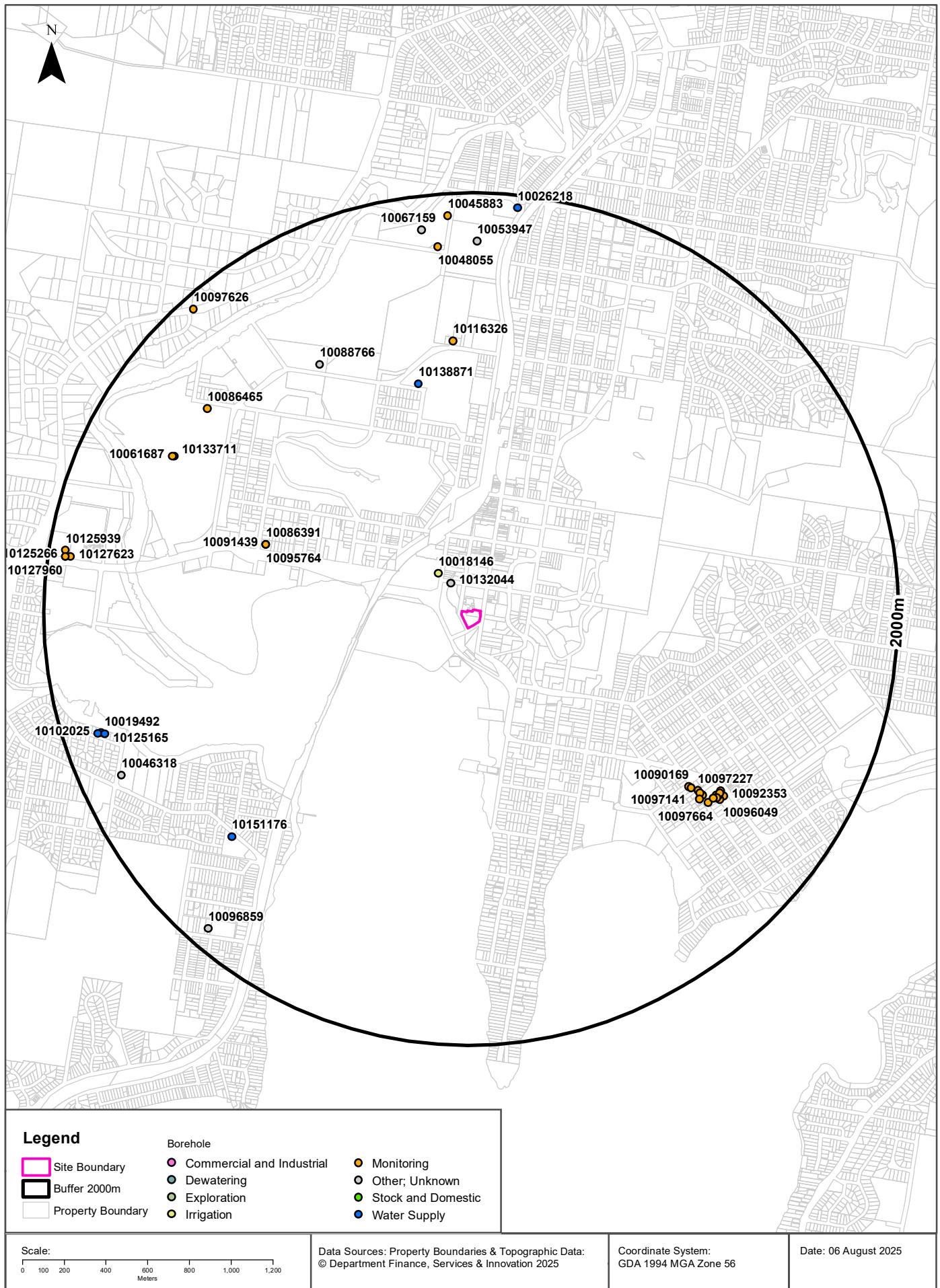
Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)  
Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024

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 2024 Data Source : NSW Department of Primary Industries



# Hydrogeology & Groundwater

26-30 Mann Street, Gosford, NSW 2250

## 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
10132044	GW201893	Other	Functional	08/08/2004	78.00		AHD		1.500		142m	North West
10018146	GW201679	Irrigation	Functioning	20/09/2004	102.00		AHD				212m	North West
10086391	GW200838	Monitoring	Functional	12/05/2010	7.50		AHD			3.00	990m	West
10091439	GW200840	Monitoring	Functional	24/05/2010	8.00		AHD			3.00	990m	West
10095764	GW200839	Monitoring	Functional	12/05/2010	7.50		AHD			3.00	990m	West
10138871	GW053790	Water Supply	Unknown	01/01/1980	42.70		AHD				1108m	North
10090169	GW202604	Monitoring	Functional	17/10/2011	4.00		AHD				1278m	South East
10116326	GW100343	Monitoring	Functioning	15/03/1993	73.00		AHD	2800	9.000	5.50	1291m	North
10097141	GW202603	Monitoring	Functional	17/10/2011	4.00		AHD				1292m	South East
10099196	GW202602	Monitoring	Functional	17/10/2011	4.00		AHD				1326m	South East
10099427	GW202601	Monitoring	Functional	17/10/2011	4.00		AHD				1341m	South East
10103564	GW202600	Monitoring	Functional	17/10/2011	4.00		AHD				1356m	South East
10094446	GW201097	Monitoring	Functional	15/04/2011	6.00		AHD			2.20	1357m	South East
10088766	GW072796	Other	Functioning	21/01/1995	90.00		AHD	Good	0.804	9.00	1362m	North West
10097664	GW201098	Monitoring	Functional	15/04/2011	6.00		AHD			2.30	1399m	South East
10106839	GW201099	Monitoring	Functional	15/04/2011	7.50		AHD			2.20	1406m	South East
10097123	GW201093	Monitoring	Functional	13/04/2011	6.00		AHD			2.40	1409m	South East
10097227	GW201095	Monitoring	Functional	13/04/2011	9.00		AHD			2.70	1414m	South East
10101672	GW202607	Monitoring	Functional	05/07/2012	8.20		AHD			3.50	1416m	South East
10100073	GW202606	Monitoring	Functional	05/07/2012	8.20		AHD			3.50	1419m	South East
10103962	GW202605	Monitoring	Functional	09/07/2012	7.00		AHD			3.50	1419m	South East
10096049	GW201094	Monitoring	Functional	13/04/2011	7.50		AHD			1.80	1433m	South East
10092353	GW201096	Monitoring	Functional	13/04/2011	9.00		AHD			2.75	1441m	South East
10151176	GW051157	Water Supply	Unknown	01/10/1980	61.00		AHD	501-1000 ppm			1509m	South West
10086465	GW104667	Monitoring	Functioning	03/01/2003	42.50		AHD	398	4.000	12.60	1558m	North West
10133711	GW100229	Other	Functioning	24/01/1993	39.00		AHD	1500	4.800		1562m	North West
10061687	GW100174	Monitoring	Proposed	04/11/1992	60.00		AHD	3500	3.100		1571m	North West
10048055	GW201179	Monitoring	Functional	12/03/2007	16.20		AHD			3.05	1748m	North
10053947	GW105399	Other	Unknown	14/08/2003	48.50		AHD	660	2.500	6.60	1767m	North
10046318	GW201053	Other	Functioning	06/11/2004	62.00		AHD		2.000	4.00	1800m	South 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
10125165	GW202156	Water Supply	Functioning	15/11/2007	9.00		AHD	200	0.100	4.80	1801m	West
10019492	GW201421	Water Supply	Functioning	12/04/2011	5.00		AHD		1.000	2.00	1816m	West
10102025	GW202091	Water Supply	Functioning	08/01/2007	6.00		AHD		1.000	3.00	1832m	West
10067159	GW065029	Other	Unknown	22/12/1989	62.00		AHD	Fresh			1837m	North
10127623	GW101285	Monitoring	Functional	17/04/1996	5.00		AHD			0.70	1890m	West
10045883	GW201689	Monitoring	Functional	22/11/2007	62.00		AHD	600	4.000	3.60	1893m	North
10096859	GW201961	Other	Functioning	17/05/2007	54.00		AHD	900	2.100	12.00	1902m	South West
10125266	GW101284	Monitoring	Functional	17/04/1996	5.00		AHD			0.70	1915m	West
10127960	GW101287	Monitoring	Abandoned	17/04/1996	3.80		AHD			0.85	1915m	West
10125939	GW101286	Monitoring	Abandoned	17/04/1996	3.80		AHD			0.37	1921m	West
10097626	GW202234	Monitoring	Functional	07/03/2006	5.10		AHD			1.50	1935m	North West
10026218	GW201677	Water Supply	Functioning	28/06/2006	205.00		AHD		8.000	7.00	1937m	North

Borehole Data Source: Bureau of Meteorology; Water NSW. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## Driller's Logs

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

NGIS Bore ID	Drillers Log	Distance	Direction
10132044	0.00m-3.00m Sandy Clay, with wood & gravel 3.00m-5.00m Clay, marine, grey 5.00m-11.00m Sand, grey, with clay 11.00m-12.00m Sandstone, weathered layer 12.00m-14.00m Sandy Clay 14.00m-16.00m Sandstone, weathered 16.00m-20.00m Clay; pink & red 20.00m-27.00m Shale, grey 27.00m-30.00m Sandstone, white 30.00m-34.00m Shale 34.00m-35.00m Sandstone 35.00m-44.00m Shale, grey red 44.00m-46.00m Sandstone 46.00m-60.00m Shale & Sandstone layers 60.00m-78.00m Shale, solid, grey Sandstone layers	142m	North West
10018146	0.00m-6.00m Sand, medium, golden 6.00m-13.00m Clay, grey 13.00m-16.00m Sand, fine, grey, with clay 16.00m-24.00m Sand, medium-fine, grey, with dirty water & clay 24.00m-25.00m Gravel & Sand, harder 25.00m-30.00m Shale, grey 30.00m-35.00m Sandstone, with some Shale bands, highly fractured 35.00m-57.00m Shale 57.00m-65.00m Sandstone 65.00m-65.00m Shale 65.00m-75.50m Sandstone, grey 75.50m-102.00m Shale	212m	North West
10086391	0.00m-1.50m Fill 1.50m-3.00m Sandstone, light yellow, weathered 3.00m-6.00m Sandstone, fractured, yellow, grey lense 6.00m-7.50m Sandstone, grey, black lense	990m	West
10091439	0.00m-1.50m Fill 1.50m-3.00m Sandstone, light yellow, weathered 3.00m-6.00m Sandstone, fractured, yellow, grey lense 6.00m-8.00m Sandstone, grey, black lense	990m	West
10095764	0.00m-1.50m Fill 1.50m-3.00m Sandstone, light yellow, weathered 3.00m-6.00m Sandstone, fractured, yellow, grey lense 6.00m-7.50m Sandstone, grey, black lense	990m	West
10090169	0.00m-0.15m Silt, Sandy; topsoil, soft, brown, frequent roots, moderate to high organic content 0.15m-0.90m Silt, Sandy; soft, light brown, reduced organic content 0.90m-2.80m Silt, Sandy; fine grained sands, brown-grey 2.80m-4.00m Silt, Sandy; fine grained sands, hard, brown-grey, wet from 3m	1278m	South East

NGIS Bore ID	Drillers Log	Distance	Direction
10116326	0.00m-9.00m TOPSOIL & SAND (WB) 9.00m-18.50m RED CLAY 18.50m-29.00m SAND (WB) 29.00m-30.00m GRAVEL (WB) 30.00m-45.00m GREY SANDSTONE (MEDIUM GRAIN) 45.00m-47.00m GREY SANDSTONE, CLAY (MEDIUM GRAIN) 47.00m-52.00m GREY SANDSTONE (FINE GRAIN) 52.00m-54.00m GREY SANDSTONE (MEDIUM GRAIN) & BED SHALE 54.00m-55.00m CLAY BAND 55.00m-61.00m GREY SANDSTONE (MEDIUM GRAIN) 61.00m-62.00m GREY SANDSTONE (MEDIUM GRAIN) & BED SHALE 62.00m-72.50m GREY SANDSTONE (MEDIUM GRAIN) W.B. 72.50m-73.00m GREY SANDSTONE (MEDIUM GRAIN) & BED SHALE	1291m	North
10097141	0.00m-0.30m Sand, slightly sand, slightly gravelly; gravels subangular-subrounded, fine to medium grain of sandstone, light brown m 0.30m-1.00m Sand, silty; fine grained, light brown, some root structures 1.00m-3.00m Silt, Sandy; fine grained sand, soft, light brown 3.00m-4.00m Silt, Sandy; fine grained sand, soft, grey mottled brown, wet	1292m	South East
10099427	0.00m-0.10m Sand, Clayey; with grass of surface, brown 0.10m-0.30m Sand, Clayey; with subangular to subrounded, fine to coarse gravels of sandstone, brown, wood & metal fragments, rootlet 0.30m-0.90m Sand, Clayey; fine grained, light brown, moist 0.90m-1.40m Sand, Silty; fine grained, grey, wet 1.40m-4.00m Silt, Sandy; soft, fine grained, grey, wet	1341m	South East
10103564	0.00m-0.10m Fill; road base 0.10m-0.30m Sand, silty; soft, fine grained, with some gravels, dark brown 0.30m-0.40m Sand, silty; soft, fine grained, angular gravels, dark brown 0.40m-0.70m Sand, silty; soft, fine grained, light brown 0.70m-4.00m Sand, silty; coarse to fine grained, angular to subangular gravels of sandstone, grey-brown	1356m	South East
10094446	0.00m-0.20m Clay, Gravelly; brown, slightly sandy, frequent rootlets 0.20m-1.10m Clay, Gravelly; brown gravel is angular to subangular, fine to coarse grained of concrete, slightly sandy 1.10m-1.30m Clayey Sand; light grey, very clayey 1.30m-6.00m Sandy Clay; light grey & brown, sand is fine grained, clay is mottled with brown from 4.5m	1357m	South East
10088766	0.00m-5.00m 5.00m-17.00m Clay-sandstone 17.00m-90.00m	1362m	North West
10097664	0.00m-0.10m Fill; Concrete driveway 0.10m-0.29m Gravel, Clayey Sandy; brown & black gravel, sand & clay brown, dense 0.29m-0.85m Clay, Sandy Gravelly; grey, fine to stiff, gravel is angular to subangular, fine to coarse grained of concrete or sandst 0.85m-6.00m Sandy Clay; light brown, with red brown mottling, very sandy, soft	1399m	South East
10106839	0.00m-0.10m Fill; Concrete drive way 0.10m-1.40m Clay, Gravelly; brown, gravel is angular to subangular, fine to coarse grained, slightly sandy 1.40m-2.30m Sandy Clay; brown, soft 2.30m-2.60m Clay; grey brown, fine to stiff, slightly sandy 2.60m-3.10m Sandy Clay; red, dense, very sandy 3.10m-4.20m Clay; grey, with brown mottling, firm to stiff, slightly sandy 4.20m-5.50m Sandy Clay; light grey & white, moist, very sandy 5.50m-7.50m Clayey Sand; dark brown, slightly clayey	1406m	South East
10097123	0.00m-3.00m Clay; light brown to brown 3.00m-4.20m Sand; grey, fine grained, slightly clayey 4.20m-6.00m Sand; grey & brown, fine grained, dense, slightly clayey	1409m	South East
10097227	0.00m-4.80m Clayey Sand; light brown to brown 4.80m-9.00m Silt, Sandy; light grey, medium plasticity, firm to stiff, fine grained Sand	1414m	South East
10101672	0.00m-3.50m Fill; Clayey sand/rippsed sandstone, light brown to brown, moist 3.50m-8.20m Sand/Sandstone; fine grained, grey/red, weathered bedrock, with silt & traces of clay	1416m	South East
10100073	0.00m-3.50m Fill; Clayey sand/rippsed sandstone (imported VENM backfill), red brown/light brown, moist to wet 3.50m-7.40m Sand/Sandstone; fine grained, grey/red, weathered bedrock, with silt & traces of clay	1419m	South East
10103962	0.00m-2.80m Fill; Sand, coarse grained, white/red, moist, odourless, increasing silt content with depth 2.80m-5.00m Sand, Silty; coarse grained, red, moist 5.00m-6.00m Sandstone, Silty; weathered, grey with iron fibres, moist becoming wet 6.00m-7.00m Sandstone; weathered, coarse, grey, becoming rock, wet, odourless	1419m	South East
10096049	0.00m-2.50m Clayey Sand; light brown to brown 2.50m-3.60m Sand; grey, with brown mottling, fine to coarse grained, slightly clayey 3.60m-4.10m Silt, Sandy; grey, laminated, firm to stiff, slightly sandy 4.10m-7.50m Sand; light grey, fine grained, dense, slightly clayey	1433m	South East
10092353	0.00m-3.00m Gravel, Sandy; light brown, gravel fine to medium grained, well graded, angular to subangular, moist, sand is medium gra 3.00m-4.00m Sandy Gravel; light brown, contains cobbles of sandstone 4.00m-9.00m Sandstone; friable, weathered layer	1441m	South East
10151176	0.00m-1.00m Soil 1.00m-13.00m Clay 13.00m-27.00m Sandstone 27.00m-35.00m Shale 35.00m-61.00m Sandstone Water Supply	1509m	South West

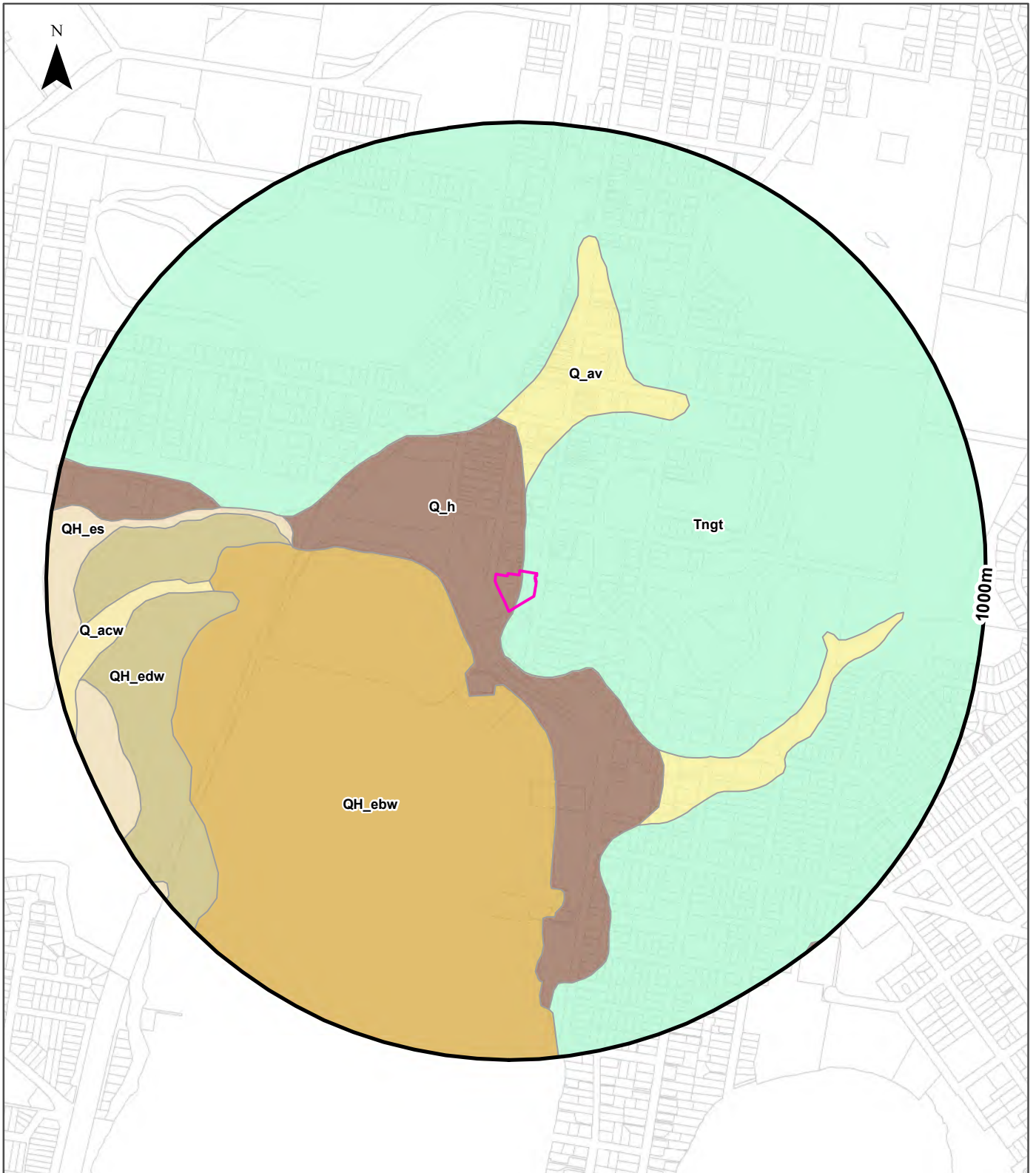
NGIS Bore ID	Drillers Log	Distance	Direction
10086465	0.00m-0.20m BITUMEN 0.20m-8.00m SANDSTONE L/BROWN 8.00m-17.30m SANDSTONE/CLAYSTONE 17.30m-18.50m SANDSTONE FRACTURED 18.50m-20.00m SANDSTONE/IRONSTONE FRACTURED 20.00m-20.50m IRONSTONE 20.50m-22.00m SANDSTONE L/BROWN 22.00m-23.50m CLAYSTONE 23.50m-27.50m SANDSTONE/IRONSTONE 27.50m-29.70m CLAYSTONE 29.70m-32.50m SANDSTONE L/BROWN 32.50m-33.00m SANDSTONE/QUARTZ 33.00m-34.50m CLAYSTONE/SHALE 34.50m-36.00m SILTSTONE SOFT 36.00m-37.30m CLAY L/BLUE/STIFF 37.30m-38.50m SILTSTONE L/GREY 38.50m-42.20m SHALE RED 42.20m-42.50m SILTSTONE	1558m	North West
10133711	0.00m-8.00m WHITE SANDSTONE 8.00m-20.00m GREY SANDSTONE 20.00m-29.00m BROWN WEATHERED SANDSTONE 29.00m-33.00m GREY SANDSTONE 33.00m-39.00m GREY SILTSTONE	1562m	North West
10061687	0.00m-1.00m SANDY BLACK LOAM 1.00m-3.00m GREY CLAY 3.00m-4.00m SILTY GREY SAND 4.00m-8.00m SANDY GREY CLAY 8.00m-9.00m WHITE SILTY SAND 9.00m-12.00m SANDY GREY CLAY 12.00m-18.00m GREY CLAY 18.00m-21.00m BROWN WEATHERED SANDSTONE 21.00m-22.00m FRACTURED GREY SANDSTONE 22.00m-35.00m GREY SANDSTONE 35.00m-36.00m FRACTURED SANDSTONE 36.00m-56.00m GREY SILTSTONE 56.00m-57.00m SOFT GREY SHALE 57.00m-60.00m GREY SANDSTONE	1571m	North West
10048055	0.00m-2.50m FILL,SOIL,CLAY,GRAVEL 2.50m-3.50m SANDY CLAY 3.50m-13.50m SAND SILTY WET,GREY 13.50m-16.20m SAND,YELLOW BROWN	1748m	North
10053947	0.00m-4.00m CLAY 4.00m-15.00m SAND/SILT/CLAY/SANDSTONE BANDS/ROCKS 15.00m-25.00m SANDSTONE GREY SOFT 25.00m-27.00m CLAYSTONE FRACTURED 27.00m-29.00m SANDSTONE GREY SOFT 29.00m-35.50m SILTSTONE SOFT 35.50m-37.00m SANDSTONE GREY 37.00m-37.30m CLAY 37.30m-40.00m SANDSTONE GREY 40.00m-40.20m CLAY 40.20m-44.10m SILTSTONE SOFT 44.10m-44.20m DOLERITE 44.20m-44.40m DOLERITE FRACTURED 44.40m-45.00m DOLERITE V/FINE GRAIN/HARD/CREAM 45.00m-48.50m SANDSTONE GREY	1767m	North
10046318	0.00m-16.00m Clay 16.00m-72.00m Sandy Shale, grey	1800m	South West
10125165	0.00m-1.00m Sand, grey black 1.00m-3.00m Clay, orange cream 3.00m-6.00m Clay, orange, with white sand mix 6.00m-8.00m Sand, light grey 8.00m-9.00m Clay, white	1801m	West
10019492	0.00m-1.00m Fill (Clay) 1.00m-5.00m Sand & grey Clay	1816m	West
10102025	0.00m-1.00m Topsoil/Sand 1.00m-2.50m Mud, sandy 2.50m-5.00m Sand, shell, mud 5.00m-6.00m Sand	1832m	West
10127623	0.00m-0.50m sandy clay (fill) 0.50m-2.00m Sandy clay 2.00m-5.00m silty to clayey sand	1890m	West

NGIS Bore ID	Drillers Log	Distance	Direction
10045883	0.00m-1.00m Fill 1.00m-15.00m Sand, grey, fine to medium 15.00m-16.00m Sand, yellow, medium 16.00m-17.00m Clay, white-cream 17.00m-20.00m Sandstone, strongly weathered, grey 20.00m-23.00m Claystone, white to light grey 23.00m-26.00m Sandstone, cream to yellow 26.00m-33.00m Shale & Siltstone, in part iron rich 33.00m-36.00m Shale, light grey 36.00m-41.00m Shale, grey 41.00m-62.00m Shale, grey, & Sandstone interbedded	1893m	North
10096859	0.00m-1.00m Sand, black 1.00m-3.00m Clay, mixed 3.00m-7.50m Sandstone, orange/cream 7.50m-10.00m Sandstone, grey 10.00m-24.00m Silty Sand, grey 24.00m-25.00m Sandstone, pink 25.00m-33.00m Shale, grey 33.00m-41.50m Sandstone, grey 41.50m-48.00m Sandstone, light grey & dark Shale, fractured 48.00m-54.00m Sandstone, grey	1902m	South West
10125266	0.00m-1.10m Silty, black sand 1.10m-2.50m silty, grey sand 2.50m-5.00m grey, clayey, sand	1915m	West
10127960	0.00m-1.00m Fill - sand with clay 1.00m-1.90m silty sand 1.90m-3.80m clayey sand 3.80m-4.20m clay	1915m	West
10125939	0.00m-0.50m Fill - roadbase & sand 0.50m-1.50m sandy clay 1.50m-3.80m clayey sand 3.80m-4.00m clay	1921m	West
10097626	0.00m-0.80m Fill; Gravelly Sand, road-base material, medium grained, red/brown, angular gravels up to 100mm diameter, loose, moist 0.80m-1.50m Fill; Gravelly Sandy Clay; moderate plasticity, grey, angular gravels, medium grained sand, moist 1.50m-2.80m Clayey Sand; fine to medium grained, grey, low plasticity clay, moist, well graded, moist 2.80m-3.50m Peat; Clay; low to moderate plasticity, black/grey, moist/wet 3.50m-5.10m Clay; low plasticity, dark grey, loose, wet	1935m	North West
10026218	0.00m-5.00m Clay, red 5.00m-12.00m Sandy Clay 12.00m-24.00m Clay, wet 24.00m-57.00m Shale, grey 57.00m-67.00m Sandstone, shale bands 67.00m-118.00m Shale 118.00m-140.00m Sandstone/Shale/Siltstone 140.00m-150.00m Sandstone, fine 150.00m-205.00m Sandstone, minor fractures	1937m	North

Drill Log Data Source: Bureau of Meteorology; Water NSW. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

# Geology

26-30 Mann Street, Gosford, NSW 2250



<b>Legend</b>		<b>Linear Geological Structures and Boundaries</b>	
Site Boundary	Trendline	Marker Bed	Miscellaneous Boundary
Report Buffer	Fold Axis	Faulted Boundary	Water/Coastline Boundary
Property Boundary	Geological Boundary	Shear Zone or Schist Zone Boundary	State/Territory Border
<b>Scale:</b> 		Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025	
		Coordinate System: GDA 1994 MGA Zone 56	
		Date: 06 August 2025	

# Geology

26-30 Mann Street, Gosford, NSW 2250

## Geological Units

Geological units within the dataset buffer:

Code	Unit Name	Description	Stratigraphy	Age Range	Dominant Lithology	Dist	Dir
Q_h	Anthropogenic deposits	Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix.	/Anthropogenic deposits///	Quaternary (base) to Now (top)	Anthropogenic material	0m	On-site
Tngt	Terrigal Formation	Interbedded laminite, shale and fine- to coarse-grained quartz- to quartz-lithic sandstone; minor red claystone.	/Narrabeen Group/Gosford Subgroup/Terrigal Formation//	Early Triassic (base) to Middle Triassic (top)	Siliciclastic sedimentary rock	0m	On-site
QH_ewb	Estuarine basin and bay (subaqueous)	Clay, silt, shell, very fine- to fine-grained lithic-quartz (± carbonate) sand (fluvially- and/or marine-deposited).	/Estuarine deposits//Estuarine basin and bay//Estuarine basin and bay (subaqueous)/	Holocene (base) to Now (top)	Clastic sediment	108m	South West
Q_av	Alluvial valley deposits	Silt, clay, (fluvially deposited) lithic to quartz-lithic sand, gravel.	/Alluvium//Alluvial valley deposits//	Quaternary (base) to Now (top)	Clastic sediment	172m	North
QH_es	Estuarine swamp	Organic-rich mud, peat, clay, silt, very fine- to fine-grained sand (marine-deposited), fine- to medium-grained sand (fluvially deposited).	/Estuarine deposits//Estuarine swamp//	Holocene (base) to Now (top)	Organic rich sediment	457m	West
QH_edw	Estuarine fluvial delta front (subaqueous)	Very fine- to fine-grained (sporadically medium-grained) lithic-quartz sand (fluvially-deposited), silt, clay, shell material.	/Estuarine deposits//Estuarine fluvial delta front//Estuarine fluvial delta front (subaqueous)/	Holocene (base) to Now (top)	Clastic sediment	461m	West
Q_acw	Alluvial channel deposits - subaqueous	Fluvially deposited sand, gravel, silt, clay.	/Alluvium//Alluvial channel deposits//Alluvial channel deposits - subaqueous/	Quaternary (base) to Now (top)	Clastic sediment	626m	West

## Linear Geological Structures

Fault and shear or schist zone boundaries within the dataset buffer:

Map ID	Boundary Type	Feature Description	Fault Dip Angle	Fault Dip Direction	Dist	Dir
NA	No records in buffer					

Trendlines within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Fold axes within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Marker beds within the dataset buffer:

Map ID	Feature Description	Rock Unit Description	Dist	Dir
NA	No records in buffer			

Geological Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development  
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# Naturally Occurring Asbestos Potential

26-30 Mann Street, Gosford, NSW 2250

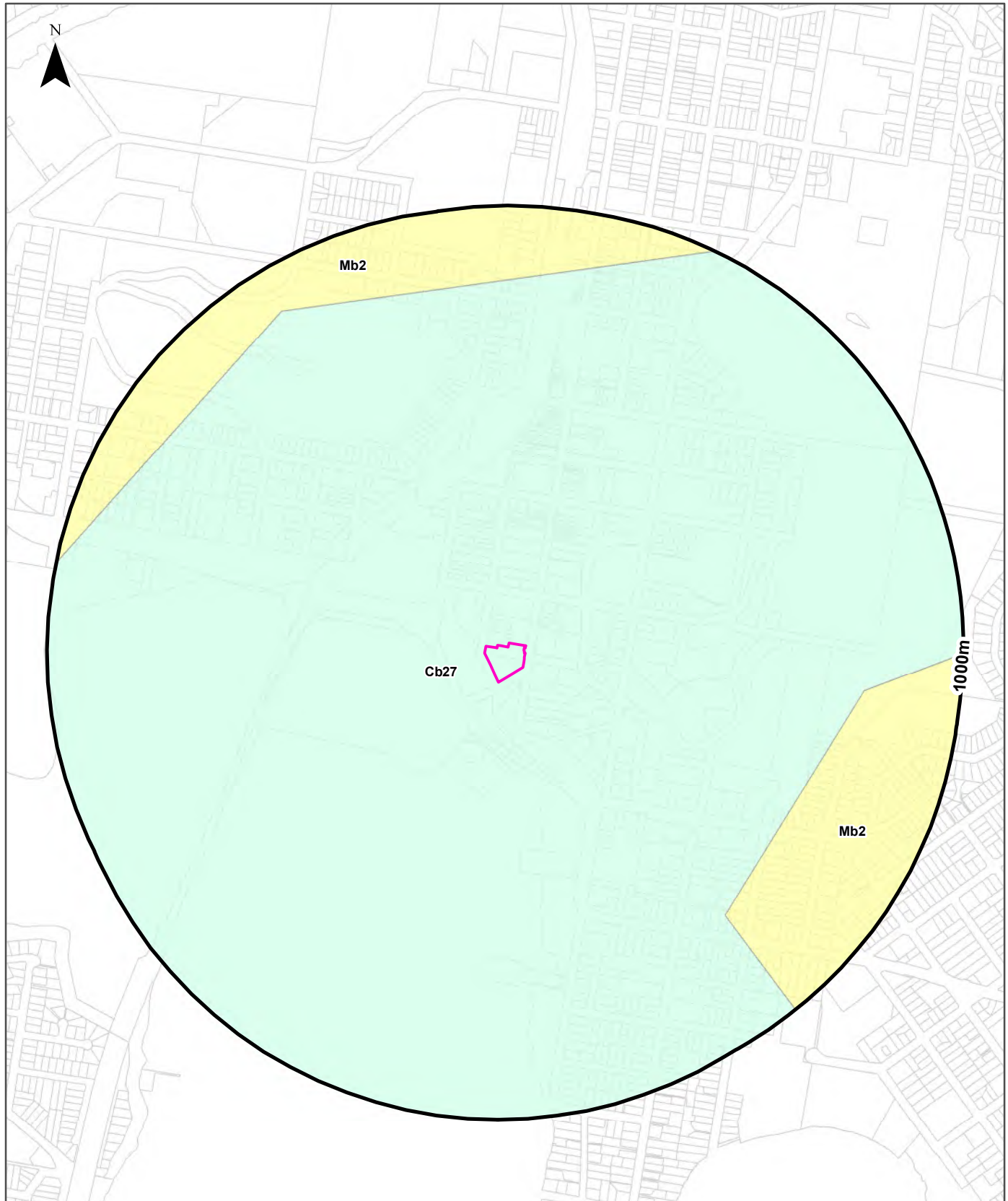
## Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

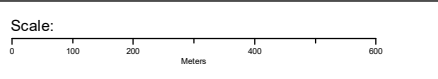
Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

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<b>Legend</b>		<b>Australian Soil Classification Orders</b>				
Site Boundary	Anthroposol	Dermosol	Kandosol	Podosol	Tenosol	No Data
Buffer 1000m	Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol	
Property Boundary	Chromosol	Hydrosol	Organosol	Sodosol	Lake	



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2025

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

# Soils

26-30 Mann Street, Gosford, NSW 2250

## Atlas of Australian Soils

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

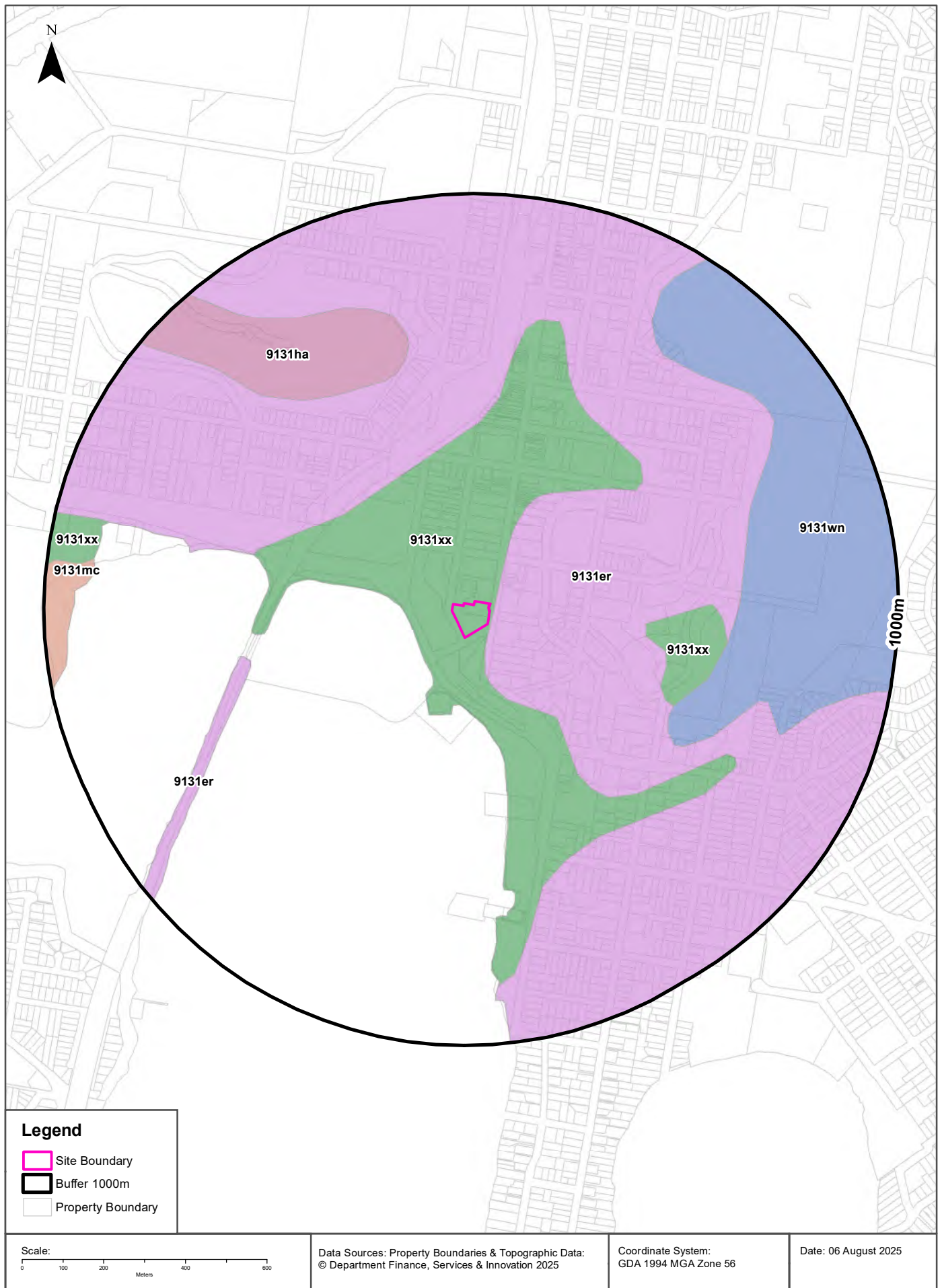
Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Cb27	Podosol	Coastal sand plains and dunes, lagoons, and swampy areas: chief soils are leached sands (Uc2.3 and Uc2.2). Associated are dunes of siliceous sands (Uc1.2) and/or calcareous sands (Uc1.1) fringing the coastline; and swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Unit Cb27 has similarities with units Cb28 and Ca6.	0m	On-site
Mb2	Kandosol	Dissected sandstone plateau of moderate to strong relief with sandstone pillars, ledges, and slabs-- level to undulating ridges, irregularly benched slopes, steep ridges, cliffs, canyons, narrow sandy valleys: chief soils are (i) on areas of gentle to moderate relief, acid yellow leached earths (Gn2.74) and (Gn2.34) and acid leached yellow earths (Gn2.24)- sometimes these soils contain ironstone gravel; and (ii) on, or adjacent to, areas of strong relief, siliceous sands (Uc1.2), leached sands (Uc2.12) and (Uc2.2), and shallow forms of the above (Gn2) soils. Associated are: (i) on flat to gently undulating remnants of the original plateau surface, leached sands (Uc2.3), siliceous sands (Uc1.2), sandy earths (Uc5.22), and (Gn2) soils as for (i) above (these areas are in part comparable with unit Cb29); (ii) on flat ironstone gravelly remnants of the original plateau surface, (Gn2) soils as for unit Mb5(i); (iii) on gently undulating ridges where interbedded shales are exposed, shallow, often stony (Dy3.41), (Dr2.21), and related soils similar to unit Tb35; (iv) narrow valleys of (Uc2.3) soils flanked by moderate slopes of (Dy3.41) soils; (v) escarpments of steep hills with shallow (Dy) and (Dr) soils between sandstone pillars; and (vi) shallow (Um) soils, such as (Um6.21) on steep hills of basic rocks. As mapped, minor areas of units Mg20, Mm1, and Mw8 are included. Data are limited.	689m	East

Atlas of Australian Soils Data Source: CSIRO

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# Soil Landscapes of Central and Eastern NSW

26-30 Mann Street, Gosford, NSW 2250



## Soil Landscapes of Central and Eastern NSW

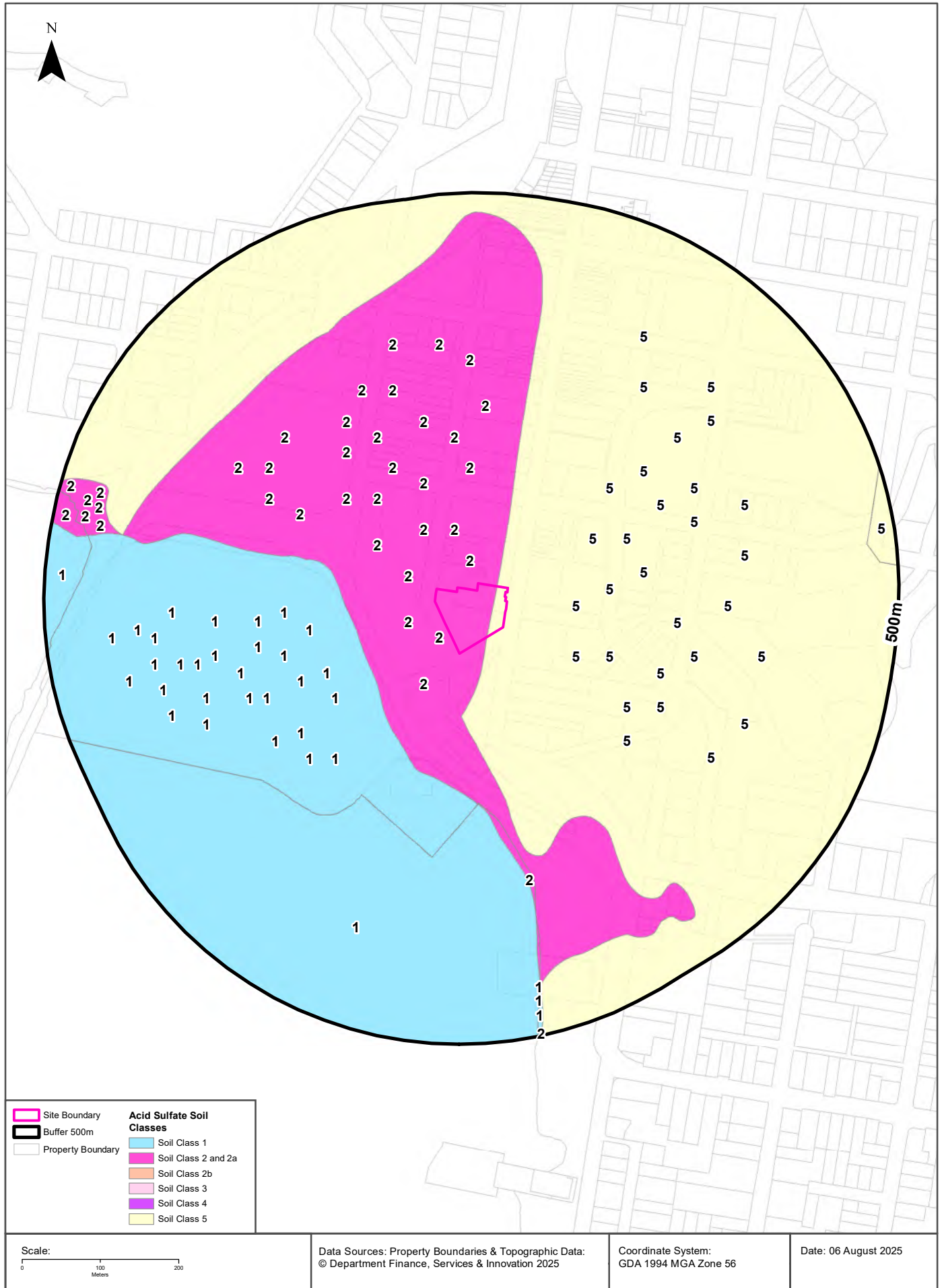
Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
<a href="#">9131xx</a>	Disturbed Terrain	0m	On-site
<a href="#">9131er</a>	Erina	5m	North East
<a href="#">9131wn</a>	Watagan	497m	East
<a href="#">9131ha</a>	Hawkesbury	574m	North West
<a href="#">9131mc</a>	Mangrove Creek	880m	West

Soil Landscapes of Central and Eastern NSW: NSW Department of Planning, Industry and Environment  
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# Acid Sulfate Soils

26-30 Mann Street, Gosford, NSW 2250



# Acid Sulfate Soils

26-30 Mann Street, Gosford, NSW 2250

## 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	State Environmental Planning Policy (Precincts—Regional) 2021
2	Works below natural ground surface present an environmental risk; Works by which the watertable is likely to be lowered present an environmental risk	State Environmental Planning Policy (Gosford City Centre) 2018
2	Works below natural ground surface present an environmental risk; Works by which the watertable is likely to be lowered present an environmental risk	State Environmental Planning Policy (Precincts?Regional) 2021

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

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# Atlas of Australian Acid Sulfate Soils

26-30 Mann Street, Gosford, NSW 2250



<b>Legend</b>		<b>Probability of occurrence of Acid Sulfate Soils</b>	
Site Boundary	A. High (>70%)	C. Extremely Low (1-5%)	
Buffer 1000m	B. Low (6-70%)	D. No Chance (0%)	
Property Boundary			
Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025	Coordinate System: GDA 1994 MGA Zone 56	Date: 06August 2025

## Acid Sulfate Soils

26-30 Mann Street, Gosford, NSW 2250

### 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
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	0m	On-site

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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# Dryland Salinity

26-30 Mann Street, Gosford, NSW 2250

## 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

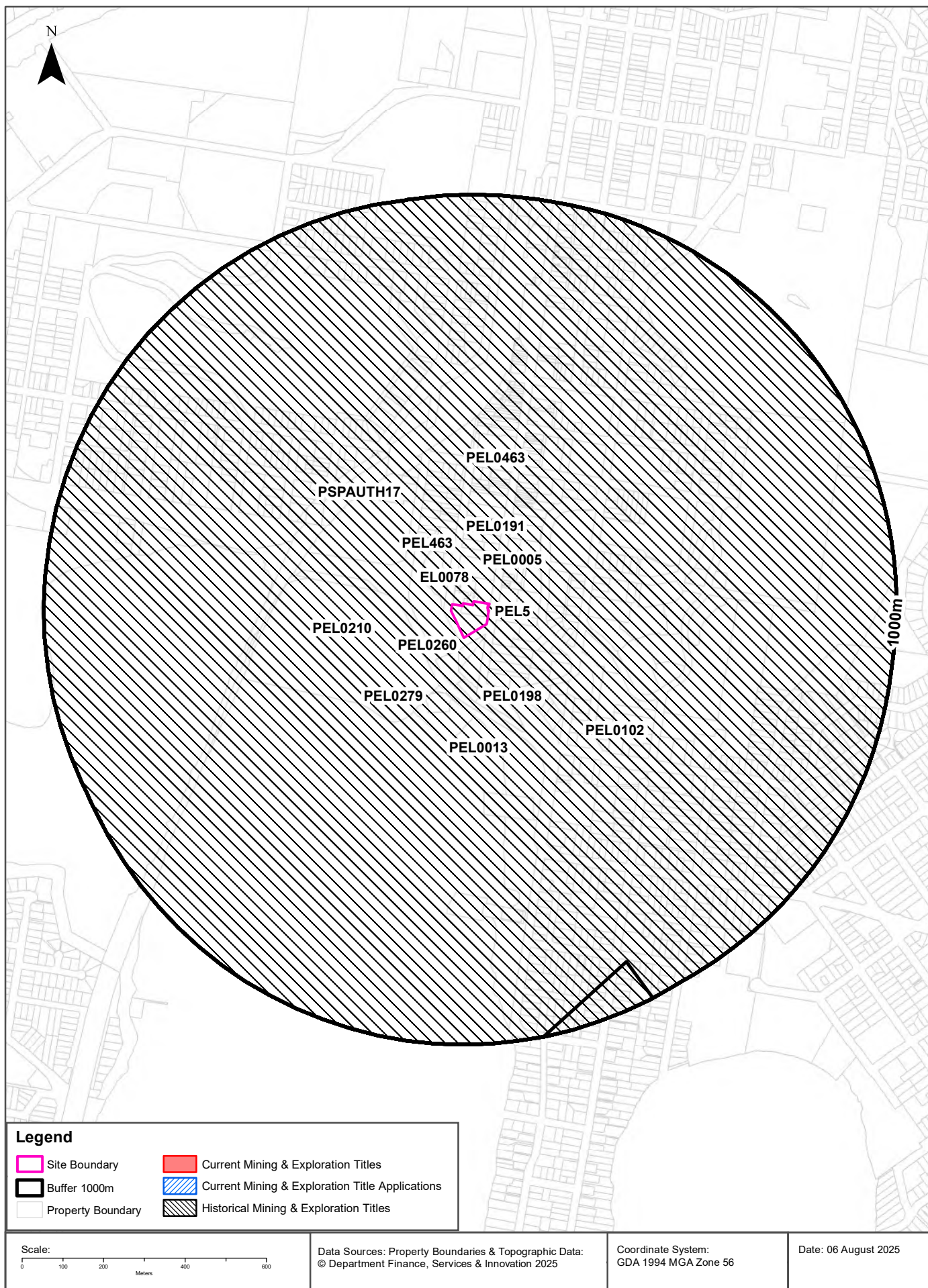
26-30 Mann Street, Gosford, NSW 2250

## Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)  
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# Mining

26-30 Mann Street, Gosford, NSW 2250

## 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: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

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## 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: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

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## Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

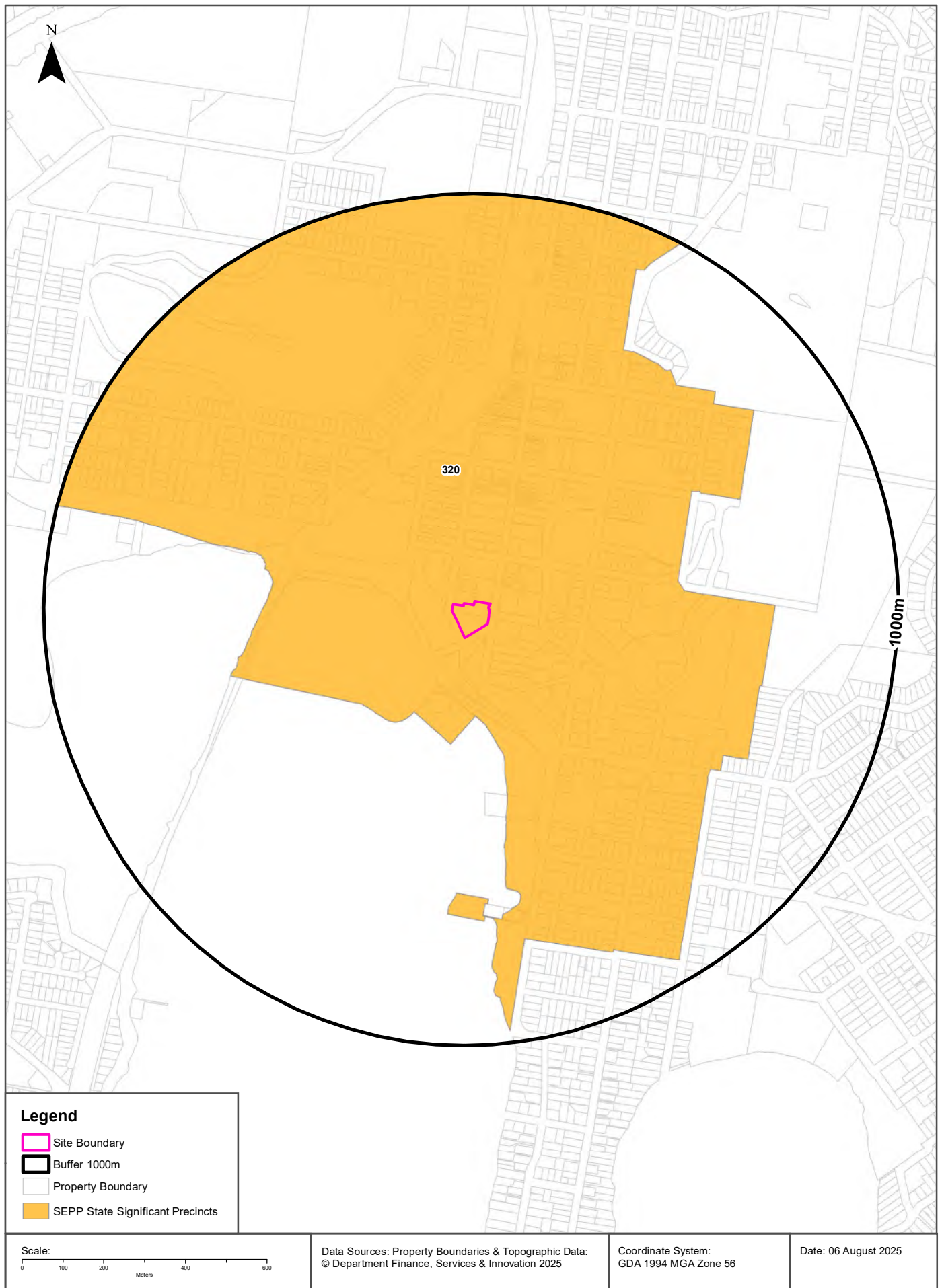
Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0463	DART ENERGY (APOLLO) PTY LTD	20091010	20150603	PETROLEUM	Petroleum	0m	On-site
PEL0279	THE ELECTRICITY COMMISSION OF NSW (TRADING AS PACIFIC POWER)	19910504	19931111	PETROLEUM	Petroleum	0m	On-site
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
PEL0005	AGL UPSTREAM INVESTMENTS PTY LIMITED	19931111	20150403	PETROLEUM	Petroleum	0m	On-site
EL0078	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	19670201	19680201	MINERALS		0m	On-site
PEL0013	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	19810909	19930803	PETROLEUM	Petroleum	0m	On-site
PEL463	DART ENERGY (APOLLO) PTY LTD	20081022	20130227	MINERALS		0m	On-site
PEL5	AGL UPSTREAM INVESTMENTS PTY LIMITED	19931111	20011210	MINERALS		0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	20070803	20080703	PETROLEUM	Petroleum	0m	On-site
PEL0191	NORTHWEST OIL AND MINERALS CO NL			PETROLEUM	Petroleum	0m	On-site
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site

Historical Mining & Exploration Titles Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

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# SEPP State Significant Precincts

26-30 Mann Street, Gosford, NSW 2250



# State Environmental Planning Policy

26-30 Mann Street, Gosford, NSW 2250

## State Significant Precincts

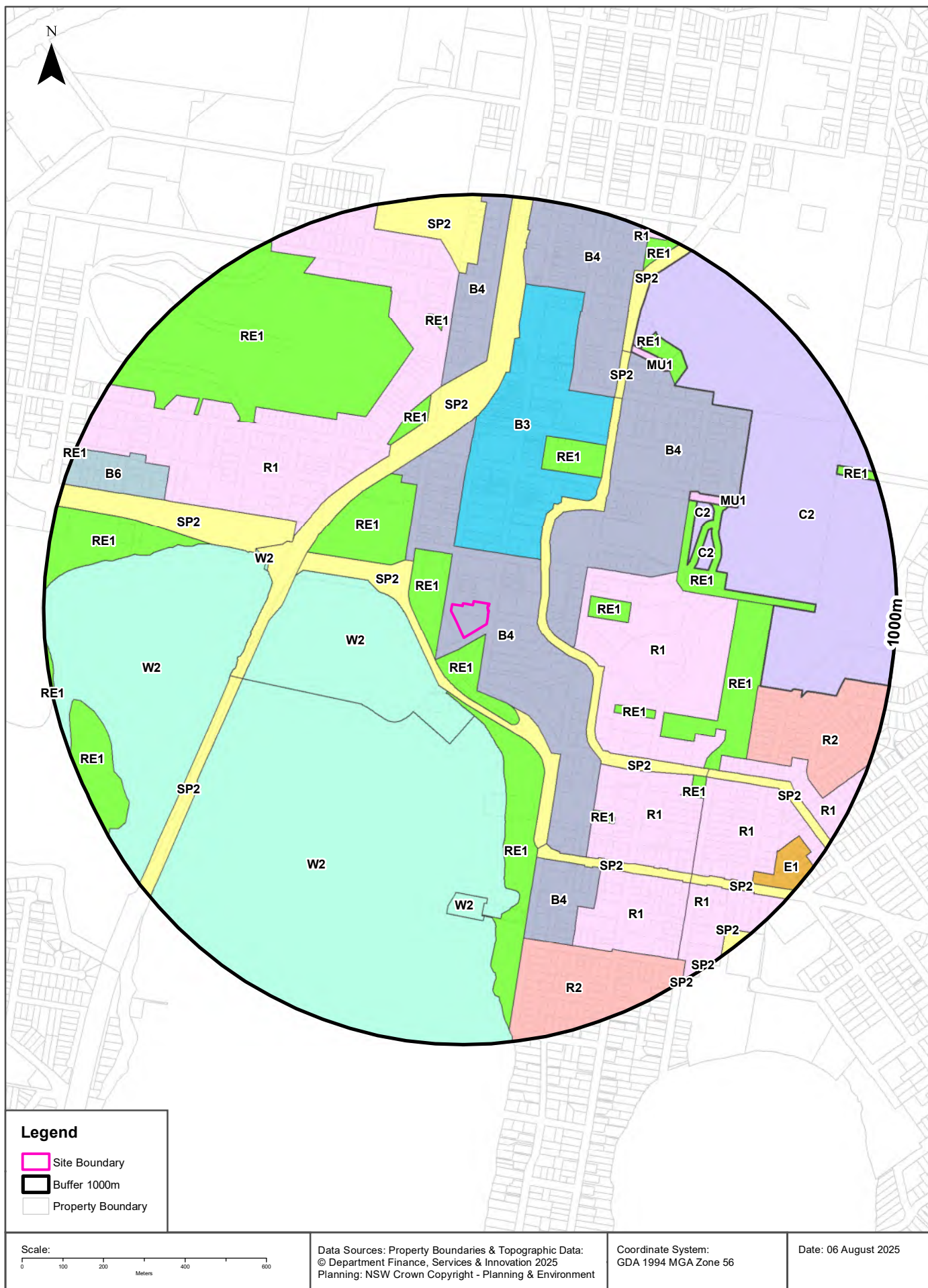
What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
320		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		0m	On-site

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment  
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# EPI Planning Zones

26-30 Mann Street, Gosford, NSW 2250



# Environmental Planning Instrument

26-30 Mann Street, Gosford, NSW 2250

## 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
B4	Mixed Use		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		0m	On-site
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		18m	South
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		20m	North West
SP2	Infrastructure	Road	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		86m	South West
W2	Recreational Waterways		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		105m	West
SP2	Infrastructure	Road	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		120m	East
B3	Commercial Core		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		127m	North
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		138m	South
B4	Mixed Use		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		141m	North East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		160m	North West
W2	Recreational Waterways		Central Coast Local Environmental Plan 2022	09/05/2025	09/05/2025	18/07/2025	Amendment No 8	192m	South West
R1	General Residential		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		217m	East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		242m	East
SP2	Infrastructure	Rail Infrastructure Facility	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		353m	North
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		356m	North East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		372m	South East

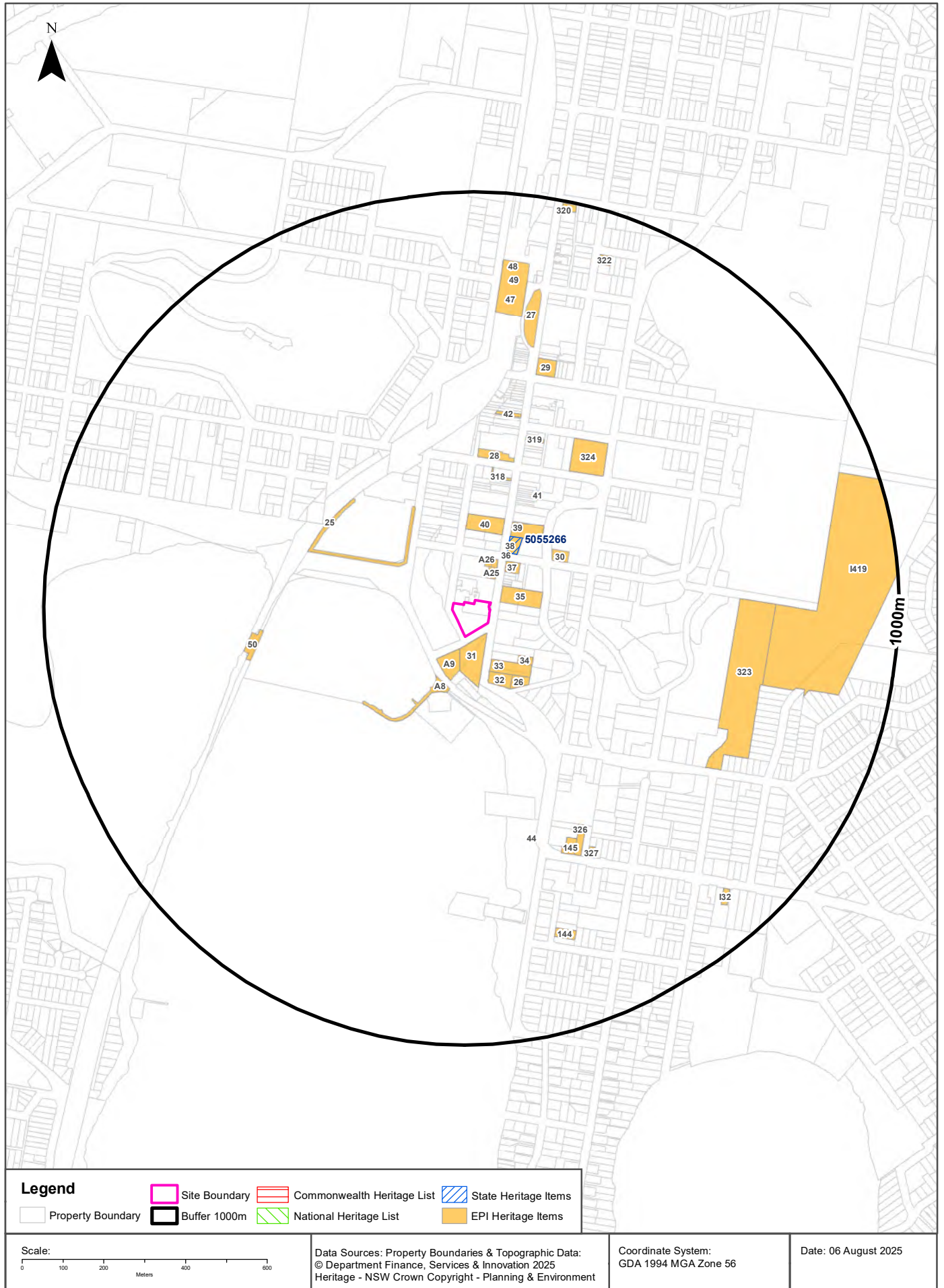
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R1	General Residential		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		393m	North West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		420m	North
SP2	Infrastructure	Road	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		422m	West
R1	General Residential		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		442m	South East
W2	Recreational Waterways		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	445m	West
RE1	Public Recreation		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	461m	East
W2	Recreational Waterways		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		462m	West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		485m	East
C2	Environmental Conservation		Central Coast Local Environmental Plan 2022	09/05/2025	09/05/2025	18/07/2025	Amendment No 8	494m	East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		509m	North West
C2	Environmental Conservation		Central Coast Local Environmental Plan 2022	09/05/2025	09/05/2025	18/07/2025	Amendment No 8	510m	East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		526m	South East
B4	Mixed Use		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		535m	North
SP2	Infrastructure	Rail Infrastructure Facility	Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	539m	South West
SP2	Infrastructure	Road	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		544m	South East
MU1	Mixed Use		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	552m	North East
B4	Mixed Use		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		560m	North
C2	Environmental Conservation		Central Coast Local Environmental Plan 2022	09/05/2025	09/05/2025	18/07/2025	Amendment No 8	561m	North East
B4	Mixed Use		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		567m	South
SP2	Infrastructure	Road	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		593m	North East
RE1	Public Recreation		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	610m	West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
W2	Recreational Waterways		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		625m	South
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		628m	South East
SP2	Infrastructure	Road	Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	651m	South East
R1	General Residential		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	655m	South East
R1	General Residential		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		657m	South East
R1	General Residential		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	659m	South East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		669m	North
R2	Low Density Residential		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	682m	East
SP2	Infrastructure	Road	Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	702m	North East
RE1	Public Recreation		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	705m	North East
MU1	Mixed Use		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	707m	North East
R2	Low Density Residential		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	751m	South
B6	Enterprise Corridor		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		753m	West
SP2	Infrastructure	Health Services Facilities	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		806m	North
R1	General Residential		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	808m	South East
E1	Local Centre		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	893m	South East
RE1	Public Recreation		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	895m	West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		900m	North East
RE1	Public Recreation		Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	910m	East
SP2	Infrastructure	Educational Establishment	Central Coast Local Environmental Plan 2022	21/04/2023	26/04/2023	18/07/2025	Map Amendment No 8	949m	South East
R1	General Residential		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		976m	North East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022		988m	North West

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# Heritage Items

26-30 Mann Street, Gosford, NSW 2250



## Heritage

26-30 Mann Street, Gosford, NSW 2250

### 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							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch  
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### 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							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch  
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### 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
5055266	Gosford Courthouse and Police Station (former)	45 Mann Street, Gosford	Central Coast	21/02/2025	02103	3337	129m	North East

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage  
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### 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
31	Gosford City Council Memorial Park, including avenue and feature trees	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	18m	South
35	Part of Gosford South Post Office	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	22m	East
A9	Rotary Club, fountain, garden and original site of Gosford Wharf	Item - Archaeological	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	31m	South West
A25	Footings of former sergeant's residence/police station	Item - Archaeological	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	60m	North East
33	Old Christ Church Anglican Church	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	79m	South East
37	Creighton's Funeral Parlour	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	84m	North East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
36	Former School of Arts	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	86m	North East
A26	Footings of former police stables	Item - Archaeological	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	86m	North
32	Stone street and driveway wall	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	102m	South East
34	Anglican rectory	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	108m	South East
A8	Site of original Gosford Wharf	Item - Archaeological	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	118m	South West
38	Conservatorium of Music (former courthouse and police station)	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	129m	North East
26	Stone street wall	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	139m	South East
25	Avenue and feature trees'Grahame Park	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	151m	North West
40	Former Brisbane Water County Council building	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	168m	North
39	Gosford City Council administration building	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	169m	North East
30	Former Gosford Public School and residence, now TAFE Building E	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	182m	North East
41	Feature tree'fig	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	280m	North East
318	Orion Cafe	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	302m	North
28	Union Hotel	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	349m	North
324	William Street Well	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	375m	North East
319	Shopfront	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	406m	North
42	Building facade, First National Real Estate	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	461m	North
50	Railway bridge and pylons	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	466m	West
44	War memorial site, Gosford Olympic Swimming Pool	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	512m	South

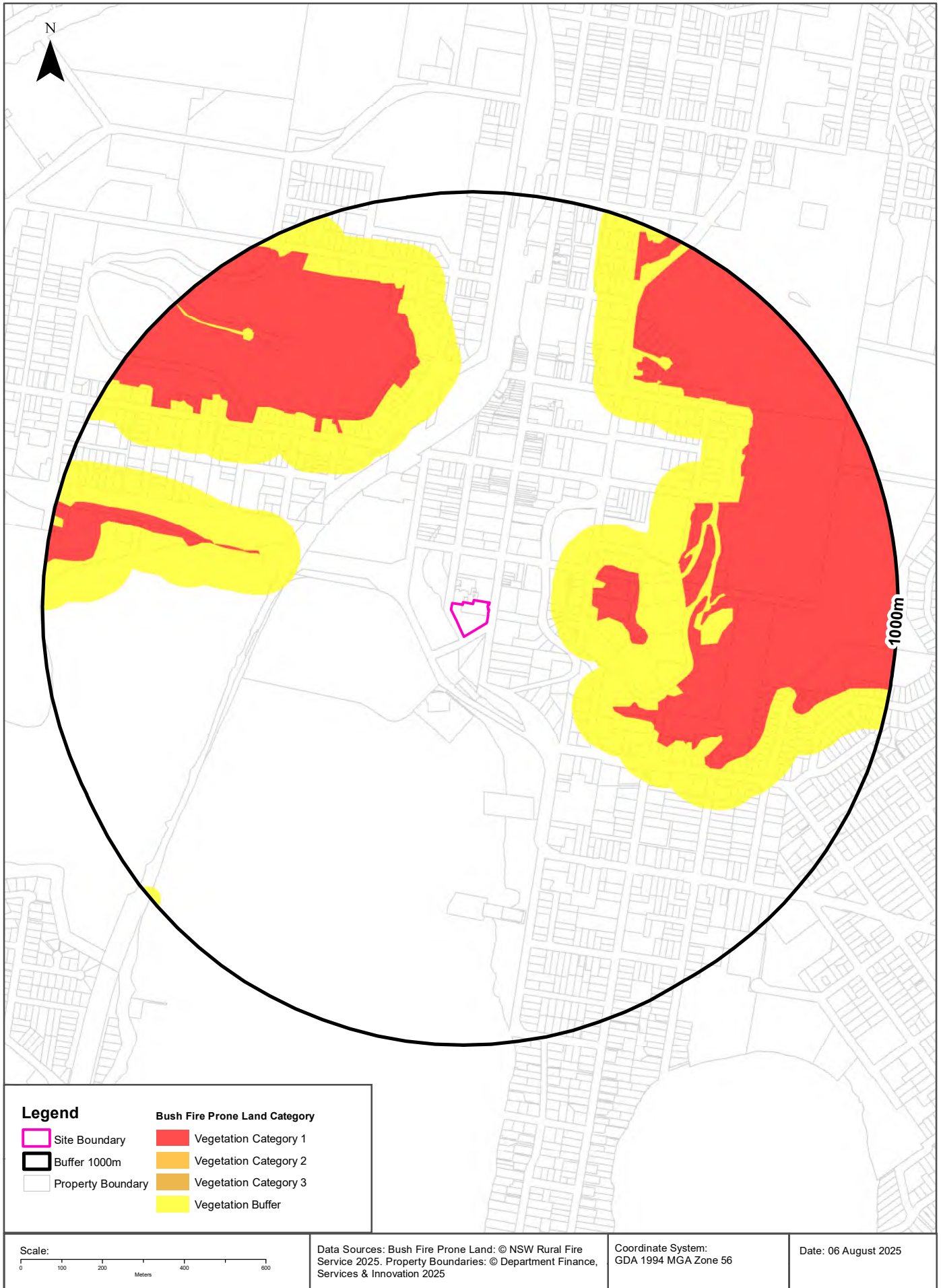
Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
326	Block of units	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	536m	South East
145	House, 'Nettville'	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	549m	South East
29	Gosford Hotel	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	570m	North
327	House Fence	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	596m	South East
323	Rumbalara Reserve Quarry	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	597m	East
27	Burns Place Park, feature eucalypt and stands of mature trees	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	634m	North
1419	Quarry	Item - General	Local	Central Coast Local Environmental Plan 2022	24/06/2022	01/08/2022	09/05/2025	687m	East
49	Large-faced clock with wooden frame	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	703m	North
48	Signal box, water column and tank	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	703m	North
47	Railway turntable	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	703m	North
144	House, 'Corra-Lynn'	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	745m	South
132	House, "Neringla"	Item - General	Local	Central Coast Local Environmental Plan 2022	24/06/2022	01/08/2022	09/05/2025	867m	South East
322	House	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	871m	North
320	Steps of former private hospital	Item - General	Local	State Environmental Planning Policy (Precincts—Regional) 2021	02/12/2021	01/03/2022	01/03/2022	975m	North

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# Natural Hazards - Bush Fire Prone Land

26-30 Mann Street, Gosford, NSW 2250



## Natural Hazards

26-30 Mann Street, Gosford, NSW 2250

### 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 Buffer	149m	East
Vegetation Category 1	249m	East

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

# Ecological Constraints - Vegetation & Ramsar Wetlands

26-30 Mann Street, Gosford, NSW 2250



Site Boundary	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Semi-arid Woodlands (Grassy sub-formation)
Report Buffer	Dry Sclerophyll Forests (Shrubby sub-formation)	Semi-arid Woodlands (Shrubby sub-formation)
Property Boundary	Forested Wetlands	Wet Sclerophyll Forests (Grassy sub-formation)
Ramsar Wetland	Freshwater Wetlands	Wet Sclerophyll Forests (Shrubby sub-formation)
<b>Native Vegetation</b>		
Alpine Complex	Grasslands	Non vegetated
Arid Shrublands (Acacia sub-formation)	Grassy Woodlands	Unattributed
Arid Shrublands (Chenopod sub-formation)	Heathlands	Not classified
	Rainforests	Other
	Saline Wetlands	

<p>Scale:</p>	<p>Data Sources: Property Boundaries &amp; Topographic Data. © Department Finance, Services &amp; Innovation 2025</p>	<p>Coordinate System: GDA 1994 MGA Zone 56</p>	<p>Date: 06 August 2025</p>
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# Ecological Constraints

26-30 Mann Street, Gosford, NSW 2250

## Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
7212422	Forested Wetlands	(Forested Wetlands) Coastal Creekflat Layered Grass-Sedge Swamp Forest	Coastal Floodplain Wetlands	0m	On-site
7212542	Not classified	(Not classified) Not classified	Not classified	0m	On-site
7214587	Not classified	(Not classified) Not classified	Not classified	182m	North
7212248	Wet Sclerophyll Forests (Grassy sub-formation)	(Wet Sclerophyll Forests (Grassy sub-formation)) Central Coast Escarpment Moist Forest	Northern Hinterland Wet Sclerophyll Forests	226m	North East
7212252	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Sydney Coastal Sandstone Bloodwood Shrub Forest	Sydney Coastal Dry Sclerophyll Forests	312m	North East
7212249	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	369m	North East
7212587	Not classified	(Not classified) Not classified	Not classified	370m	East
7212250	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	373m	North
7212253	Forested Wetlands	(Forested Wetlands) Coastal Creekflat Layered Grass-Sedge Swamp Forest	Coastal Floodplain Wetlands	412m	North East
7212356	Saline Wetlands	(Saline Wetlands) Grey Mangrove-River Mangrove Forest	Mangrove Swamps	432m	South
7212562	Not classified	(Not classified) Not classified	Not classified	502m	East
7212589	Not classified	(Not classified) Not classified	Not classified	530m	East
7212590	Not classified	(Not classified) Not classified	Not classified	544m	East
7214611	Not classified	(Not classified) Not classified	Not classified	545m	North West
7212588	Not classified	(Not classified) Not classified	Not classified	549m	East
7212349	Forested Wetlands	(Forested Wetlands) Coastal Creekflat Layered Grass-Sedge Swamp Forest	Coastal Floodplain Wetlands	554m	South
7212350	Forested Wetlands	(Forested Wetlands) Estuarine Swamp Oak Twig-rush Forest	Coastal Floodplain Wetlands	563m	South
7213121	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Sydney Coastal Sandstone Bloodwood Shrub Forest	Sydney Coastal Dry Sclerophyll Forests	599m	North West
7212354	Wet Sclerophyll Forests (Shrubby sub-formation)	(Wet Sclerophyll Forests (Shrubby sub-formation)) Hunter Coast Ranges Turpentine Wet Forest	North Coast Wet Sclerophyll Forests	629m	East
7212334	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	638m	South East
7212352	Rainforests	(Rainforests) Lower North Wet Gully Palm Rainforest	Northern Warm Temperate Rainforests	645m	East
7212251	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	697m	North East
7212351	Rainforests	(Rainforests) Lower North Wet Gully Palm Rainforest	Northern Warm Temperate Rainforests	743m	East
7213126	Not classified	(Not classified) Not classified	Not classified	755m	North West
7213120	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	833m	North West
7212429	Saline Wetlands	(Saline Wetlands) Grey Mangrove-River Mangrove Forest	Mangrove Swamps	847m	West

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
7213106	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Sydney Coastal Sandstone Bloodwood Shrub Forest	Sydney Coastal Dry Sclerophyll Forests	869m	North
7212355	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	877m	East
7212353	Rainforests	(Rainforests) Lower North Wet Gully Palm Rainforest	Northern Warm Temperate Rainforests	908m	East
7212593	Not classified	(Not classified) Not classified	Not classified	930m	West
7212336	Forested Wetlands	(Forested Wetlands) Coastal Creekflat Layered Grass-Sedge Swamp Forest	Coastal Floodplain Wetlands	935m	South East
7212348	Dry Sclerophyll Forests (Shrub/grass sub-formation)	(Dry Sclerophyll Forests (Shrub/grass sub-formation)) Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	939m	East
7212360	Forested Wetlands	(Forested Wetlands) Estuarine Swamp Oak-Mangrove Forest	Coastal Floodplain Wetlands	969m	West
7212595	Not classified	(Not classified) Not classified	Not classified	971m	West
7212247	Wet Sclerophyll Forests (Shrubby sub-formation)	(Wet Sclerophyll Forests (Shrubby sub-formation)) Hunter Coast Ranges Turpentine Wet Forest	North Coast Wet Sclerophyll Forests	991m	East

Native Vegetation Type Map : NSW Department of Planning and Environment 2022

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## 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					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment

## Ecological Constraints

26-30 Mann Street, Gosford, NSW 2250

### Collaborative Australian Protected Areas Database - Terrestrial

Protected areas in terrestrial environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

### Collaborative Australian Protected Areas Database - Marine

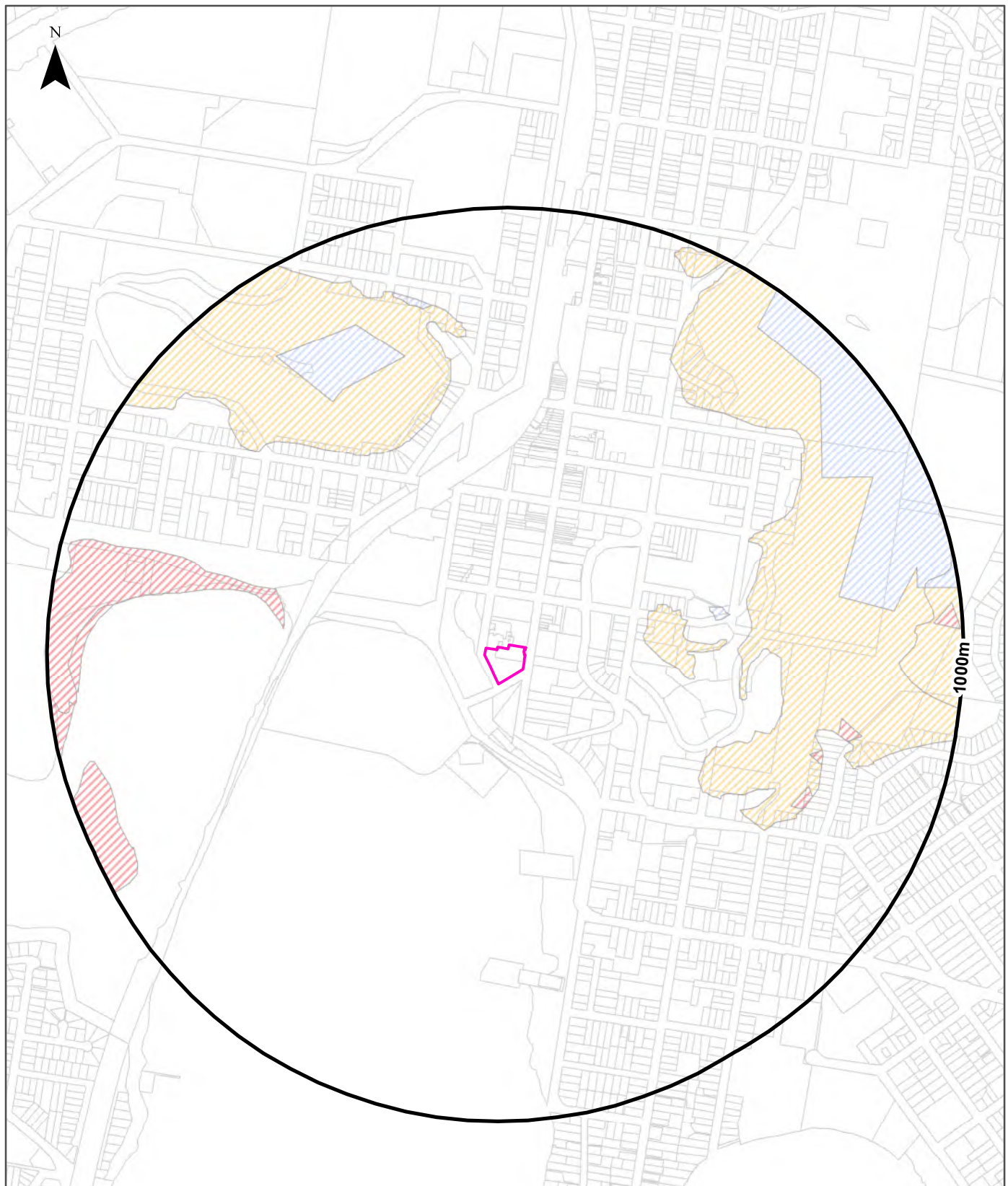
Protected areas in marine environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

Source: Collaborative Australian Protected Areas Database (CAPAD) 2022  
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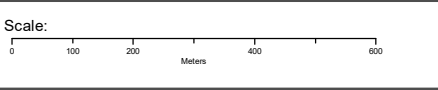
# Ecological Constraints - Groundwater Dependent Ecosystems Atlas

26-30 Mann Street, Gosford, NSW 2250



## Legend

- |                     |   |   |
|---------------------|---|---|
| Site Boundary       | High potential GDE - from national assessment     | Low potential GDE - from national assessment          |
| Buffer 1000m        | High potential GDE - from regional studies        | Low potential GDE - from regional studies             |
| Property Boundaries | Moderate potential GDE - from national assessment | Known GDE - from regional studies                     |
|                     | Moderate potential GDE - from regional studies    | Unclassified potential GDE - from national assessment |
|                     |   | Unclassified potential GDE - from regional studies    |



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2025

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 06 August 2025

## Ecological Constraints

26-30 Mann Street, Gosford, NSW 2250

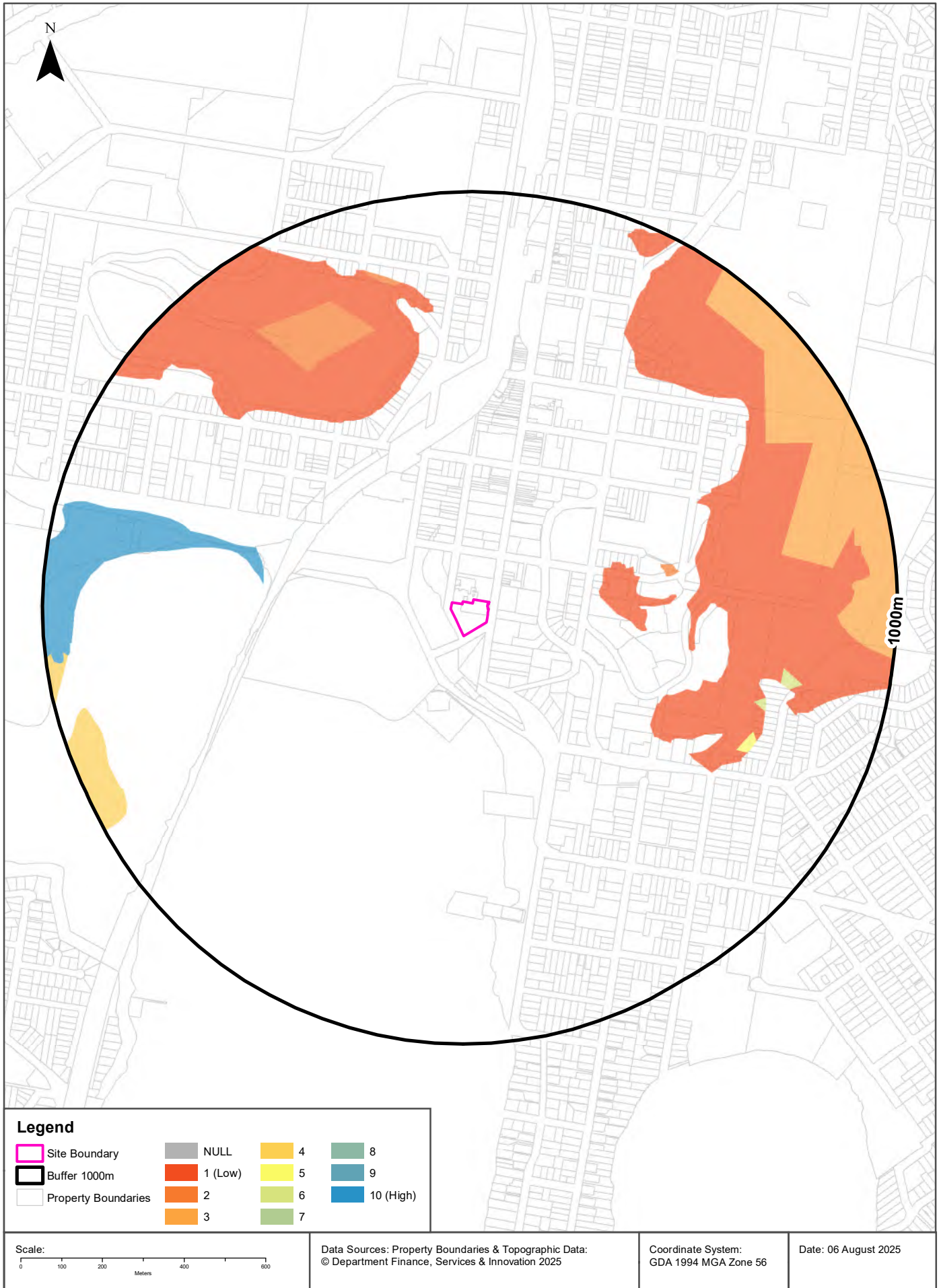
### Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	Moderate potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		269m	East
Terrestrial	Low potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		427m	East
Terrestrial	High potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		464m	West

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology  
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# Ecological Constraints - Inflow Dependent Ecosystems Likelihood

26-30 Mann Street, Gosford, NSW 2250



# Ecological Constraints

26-30 Mann Street, Gosford, NSW 2250

## Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	1	Deeply dissected sandstone plateaus.	Vegetation		269m	East
Terrestrial	2	Deeply dissected sandstone plateaus.	Vegetation		427m	East
Terrestrial	10	Deeply dissected sandstone plateaus.	Vegetation		464m	West
Terrestrial	6	Deeply dissected sandstone plateaus.	Vegetation		682m	East
Terrestrial	5	Deeply dissected sandstone plateaus.	Vegetation		686m	South East
Terrestrial	3	Deeply dissected sandstone plateaus.	Vegetation		723m	North East
Terrestrial	4	Deeply dissected sandstone plateaus.	Vegetation		907m	South West

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology  
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# Ecological Constraints

26-30 Mann Street, Gosford, NSW 2250

## NSW BioNet Species Sightings

Species sightings from the NSW BioNet Repository that have either a state or federal conservation status, or a sensitivity status, and are within 10 km of the site:

*Note: This data does not include NSW Category 1 sensitive species.*

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Heleioporus australiacus	Giant Burrowing Frog	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Not Sensitive	Endangered	Vulnerable	
Animalia	Amphibia	Litoria brevipalmata	Green-thighed Frog	Not Sensitive	Vulnerable	Not Listed	
Animalia	Amphibia	Mixophyes balbus	Stuttering Frog	Category 2	Endangered	Vulnerable	
Animalia	Amphibia	Mixophyes iteratus	Giant Barred Frog	Category 2	Vulnerable	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Category 2	Critically Endangered	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna carneipes	Flesh-footed Shearwater	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Sensitive	Vulnerable	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Not Sensitive	Critically Endangered	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Category 3	Endangered	Endangered	
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Category 2	Vulnerable	Not Listed	
Animalia	Aves	Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Category 2	Vulnerable	Vulnerable	
Animalia	Aves	Charadrius leschenaultii	Greater Sand-plover	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Charadrius mongolus	Lesser Sand-plover	Not Sensitive	Vulnerable	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Circus assimilis	Spotted Harrier	Not Sensitive	Vulnerable	Not Listed	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Coracina lineata</i>	Barred Cuckoo-shrike	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Cuculus optatus</i>	Oriental Cuckoo	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Cyclopsitta diophthalma coxeni</i>	Coxen's Fig-Parrot	Category 2	Critically Endangered	Critically Endangered	
Animalia	Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Diomedea exulans</i>	Wandering Albatross	Not Sensitive	Endangered	Vulnerable	
Animalia	Aves	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	<i>Epthianura albifrons</i>	White-fronted Chat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Esacus magnirostris</i>	Beach Stone-curlew	Not Sensitive	Critically Endangered	Not Listed	
Animalia	Aves	<i>Falco subniger</i>	Black Falcon	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Gallinago hardwickii</i>	Latham's Snipe	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;JAMBA
Animalia	Aves	<i>Grantiella picta</i>	Painted Honeyeater	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Gygis alba</i>	White Tern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Haematopus longirostris</i>	Pied Oystercatcher	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Hieraaetus morphnoides</i>	Little Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Hydroprogne caspia</i>	Caspian Tern	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	<i>Irediparra gallinacea</i>	Comb-crested Jacana	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Ixobrychus flavicollis</i>	Black Bittern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Lathamus discolor</i>	Swift Parrot	Not Sensitive	Endangered	Critically Endangered	
Animalia	Aves	<i>Limosa lapponica</i>	Bar-tailed Godwit	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Limosa limosa</i>	Black-tailed Godwit	Not Sensitive	Endangered	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Lophochroa leadbeateri</i>	Pink Cockatoo	Category 2	Vulnerable	Endangered	
Animalia	Aves	<i>Lophoictinia isura</i>	Square-tailed Kite	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Macronectes giganteus</i>	Southern Giant Petrel	Not Sensitive	Endangered	Endangered	
Animalia	Aves	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Menura alberti</i>	Albert's Lyrebird	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Neophema pulchella</i>	Turquoise Parrot	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Ninox connivens</i>	Barking Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Ninox strenua</i>	Powerful Owl	Category 3	Vulnerable	Not Listed	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Sensitive	Critically Endangered	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius minutus	Little Curlew	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Onychoprion fuscatus	Sooty Tern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Parvipsitta pusilla	Little Lorikeet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Phaethon rubricauda	Red-tailed Tropicbird	Not Sensitive	Vulnerable	Not Listed	CAMBA;JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pterodroma nigripennis	Black-winged Petrel	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Ptilinopus magnificus	Wompoo Fruit-Dove	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pyrrholaemus sagittatus	Speckled Warbler	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Sterna hirundo	Common Tern	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Not Sensitive	Endangered	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Thalassarche cauta	Shy Albatross	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Thalassarche chrysostoma	Grey-headed Albatross	Not Sensitive	Not Listed	Endangered	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	Not Sensitive	Critically Endangered	Vulnerable	
Animalia	Aves	Todiramphus chloris	Collared Kingfisher	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Tringa brevipes	Grey-tailed Tattler	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Sensitive	Endangered	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Turnix maculosus	Red-backed Button-quail	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Xenus cinereus	Terek Sandpiper	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Insecta	<i>Petalura gigantea</i>	Giant Dragonfly	Not Sensitive	Endangered	Not Listed	
Animalia	Mammalia	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Burrmys parvus</i>	Mountain Pygmy-possum	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Not Sensitive	Vulnerable	Endangered	
Animalia	Mammalia	<i>Dasyurus viverrinus</i>	Eastern Quoll	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Dugong dugon</i>	Dugong	Not Sensitive	Endangered	Not Listed	
Animalia	Mammalia	<i>Eubalaena australis</i>	Southern Right Whale	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Miniopterus australis</i>	Little Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Myotis macropus</i>	Southern Myotis	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Notamacropus parma</i>	Parma Wallaby	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Petauroides volans</i>	Southern Greater Glider	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Petaurus australis</i>	Yellow-bellied Glider	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Phascolarctos cinereus</i>	Koala	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Phoniscus papuensis</i>	Golden-tipped Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Potorous tridactylus tridactylus</i>	Northern long-nosed potoroo	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	<i>Pseudomys gracilicaudatus</i>	Eastern Chestnut Mouse	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Vespadelus troungtoni</i>	Eastern Cave Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	<i>Antaresia childreni</i>	Children's Python	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	<i>Caretta caretta</i>	Loggerhead Turtle	Not Sensitive	Endangered	Endangered	
Animalia	Reptilia	<i>Chelonia mydas</i>	Green Turtle	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Reptilia	<i>Dermochelys coriacea</i>	Leatherback Turtle	Not Sensitive	Endangered	Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	Eretmochelys imbricata	Hawksbill Turtle	Not Sensitive	Not Listed	Vulnerable	
Animalia	Reptilia	Hoplocephalus bitorquatus	Pale-headed Snake	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Hoplocephalus stephensii	Stephens' Banded Snake	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Suta flagellum	Little Whip Snake	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Uvidicolus sphyrurus	Border Thick-tailed Gecko	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Reptilia	Varanus rosenbergi	Rosenberg's Goanna	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Acacia pubescens	Downy Wattle	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Baloskion longipes	Dense Cord-rush	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Category 3	Vulnerable	Not Listed	
Plantae	Flora	Cryptostylis hunteriana	Leafless Tongue Orchid	Category 2	Vulnerable	Vulnerable	
Plantae	Flora	Darwinia glaucophylla		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Dendrobium tetragonum var. melaleucaphilum	Spider Orchid	Category 2	Endangered	Not Listed	
Plantae	Flora	Diuris bracteata		Category 2	Endangered	Extinct	
Plantae	Flora	Epacris purpurascens var. purpurascens		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Eucalyptus camfieldii	Camfield's Stringybark	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Eucalyptus glaucina	Slaty Red Gum	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Euphorbia psammogeton	Sand spurge	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Grammitis stenophylla	Narrow-leaf Finger Fern	Category 3	Endangered	Not Listed	
Plantae	Flora	Grevillea shiressii		Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Hibbertia procumbens	Spreading Guinea Flower	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Hibbertia puberula		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Lindsaea fraseri	Fraser's Screw Fern	Category 3	Endangered	Not Listed	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Melaleuca biconvexa	Biconvex Paperbark	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Category 3	Endangered	Endangered	
Plantae	Flora	Prostanthera askania	Tranquility Mintbush	Not Sensitive	Endangered	Endangered	
Plantae	Flora	Prostanthera junonis	Somersby Mintbush	Not Sensitive	Endangered	Endangered	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Not Sensitive	Critically Endangered	Critically Endangered	
Plantae	Flora	Rhodomyrtus psidioides	Native Guava	Not Sensitive	Critically Endangered	Critically Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	<i>Tetralochea glandulosa</i>		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	<i>Tetralochea juncea</i>	Black-eyed Susan	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	<i>Tylophora woollsii</i>	Cryptic Forest Twiner	Not Sensitive	Endangered	Endangered	

Source: NSW BioNet Species Sightings

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Adjacent Match	Land adjacent to a georeferenced feature
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## **Appendix C: Laboratory Results Summary Tables**

**ABBREVIATIONS AND EXPLANATIONS FOR SALINITY TABLES**
**Abbreviations used in the Tables:**

Ca	Calcium
CEC	Cation Exchange Capacity
DO	Dissolved Oxygen
EC	Electrical Conductivity
ECe	Extract Electrical Conductivity
Eh	Redox Potential
ESP	Exchangeable Sodium Percentage (Each Na/CEC)
K	Potassium
Mg	Magnesium
Na	Sodium
SWL	Standing Water Level

**Units used in the Tables**

°C	Degrees Celsius
dS/m	deciSiemens per metre
m	meters
meq/100g	milliequivalents per 100 grams
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
mV	millivolts
ohm.cm	ohm centimetre
µS/cm	microSiemens per centimetre

**Notes on Specific Tables**
***SUMMARY OF SOIL LABORATORY RESULTS - EC and ECe***

- The salinity Class has been adopted from 'Site Investigations for Urban Salinity' DLWC 2002.
- The chart function assumes an ECe value of 1.9 for values that are less than the practical quatitation limit.

***SUMMARY OF RESISTIVITY CALCULATION ON SOIL EC RESULTS***

- The resistivity values have been calculated on the laboratory EC values.
- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C])
- Table 6.5.2 [A] of Australian Standard 2159-2009 recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water

***SUMMARY OF SOIL LABORATORY RESULTS - pH***

- The pH Classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Tables 6.4.2 [C] & 6.5.2 [C])
- Table 6.5.2 [A] of Australian Standard 2159-2009 recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water

***SUMMARY OF SOIL LABORATORY RESULTS - SULFATE & CHLORIDES***

- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C])
- The chart function assumes an concentration of 0.5mg/kg for values that are less than the practical quatitation li

***SUMMARY OF SOIL LABORATORY RESULTS - CEC & ESP***

- The Sodicity rating has been adopted from the publication 'Site Investigations for Urban Salinity' DLWC 2002.

***SUMMARY OF GROUNDWATER LABORATORY RESULTS***

- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C]) .
- Table 6.4.2 [A] recommends using a Mild Exposure Classification for Concrete Piles in Fresh Water - Treat as in Soil Condition 'A'.
- Table 6.5.2 [A] recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water.

**TABLE A**  
**SUMMARY OF SOIL LABORATORY RESULTS - EC and ECe**

Borehole Number	Sample Depth (m)	Sample Description	EC ( $\mu\text{S}/\text{cm}$ )	ECe (dS/m)	Salinity Class
BH1	0-0.2	F: Silty Sand	30	<2	NON SALINE
BH1	2.3-2.5	Sand	67	<2	NON SALINE
BH1	3.1-3.2	Sandy Clay	40	<2	NON SALINE
BH1	6-6.2	Sandy Clay	72	<2	NON SALINE
BH1	7.5-7.7	Silty Clay	52	<2	NON SALINE
BH1	9-9.2	Silty Clay	33	<2	NON SALINE
BH2	0.1-0.2	F: Clayey Silty Sand	230	2.1	SLIGHTLY SALINE
BH2	1.8-2	Sandy Silt	74	<2	NON SALINE
BH2	2.2-2.5	Clayey Sand	62	<2	NON SALINE
BH2	2.8-3	Sandy Clay	48	<2	NON SALINE
BH3	0.6-0.7	F: Clayey Silty Sand	43	<2	NON SALINE
BH3	2.5-2.7	Silty Clay	62	<2	NON SALINE
BH3	4-4.1	Silty Clay	68	<2	NON SALINE
BH4	0.6-0.7	F: Silty Sand	86	<2	NON SALINE
BH4	1.7-1.9	Sandy Clay	55	<2	NON SALINE
BH4	4-4.2	Silty Clay	65	<2	NON SALINE
<b>Total Number of Samples</b>			16	16	-
<b>Minimum Value</b>			30	<PQL	-
<b>Maximum Value</b>			230	2.1	-

**ECe Values (dS/m)**

**Salinity Class**

<2

NON SALINE

2 to 4

SLIGHTLY SALINE

4 to 8

MODERATELY SALINE

8 to 16

VERY SALINE

>16

HIGHLY SALINE

**TABLE B**  
**SUMMARY OF RESISTIVITY CALCULATION ON SOIL EC RESULTS**

Borehole Number	Sample Depth (m)	Sample Description	EC ( $\mu\text{S}/\text{cm}$ )	Resistivity (ohm.cm)	Classification Condition A
BH1	0-0.2	F: Silty Sand	30	33,333	Non Aggressive
BH1 [LAB_DUP]	0-0.2	Laboratory Duplicate	30	33,333	Non Aggressive
BH1	2.3-2.5	Sand	67	14,925	Non Aggressive
BH1	3.1-3.2	Sandy Clay	40	25,000	Non Aggressive
BH1	6-6.02	Sandy Clay	72	13,889	Non Aggressive
BH1	7.5-7.7	Silty Clay	52	19,231	Non Aggressive
BH1	9-9.2	Silty Clay	33	30,303	Non Aggressive
BH2	0.1-0.2	F: Clayey Silty Sand	230	4,348	Mildly Aggressive
BH2	1.8-2	Sandy Silt	74	13,514	Non Aggressive
BH2	2.2-2.5	Clayey Sand	62	16,129	Non Aggressive
BH2	2.8-3	Sandy Clay	48	20,833	Non Aggressive
BH3	0.6-0.7	F: Clayey Silty Sand	43	23,256	Non Aggressive
BH3	2.5-2.7	Silty Clay	62	16,129	Non Aggressive
BH3 [LAB_DUP]	2.5-2.7	Laboratory Duplicate	62	16,129	Non Aggressive
BH3	4-4.1	Silty Clay	68	14,706	Non Aggressive
BH4	0.6-0.7	F: Silty Sand	86	11,628	Non Aggressive
BH4	1.7-1.9	Sandy Clay	55	18,182	Non Aggressive
BH4	4-4.2	Silty Clay	65	15,385	Non Aggressive
<b>Total Number of Samples</b>			18	18	-
<b>Minimum Value</b>			30	4,348	-
<b>Maximum Value</b>			230	33,333	-

Classification is based on Soil condition 'A' - high permeability soils (e.g. sands & gravel) that are in groundwater.

**Resistivity Values (ohm.cm)**      **Classification for Steel Piles**

>5,000	Non-Aggressive
2,000 - 5,000	Mildly Aggressive
1,000 - 2,000	Moderately Aggressive
<1,000	Severely Aggressive

**TABLE C**  
**SUMMARY OF SOIL LABORATORY RESULTS - pH**

Borehole Number	Sample Depth (m)	Sample Description	pH	Classification for Concrete Piles Condition A	Classification for Steel Piles Condition A
BH1	0-0.2	F: Silty Sand	6.2	Mildly Aggressive	Non-Aggressive
BH1 [LAB_DUP]	0-0.2	Laboratory Duplicate	6.2	Mildly Aggressive	Non-Aggressive
BH1	2.3-2.5	Sand	6.2	Mildly Aggressive	Non-Aggressive
BH1	3.1-3.2	Sandy Clay	6.5	Mildly Aggressive	Non-Aggressive
BH1	6-6.02	Sandy Clay	8	Mildly Aggressive	Non-Aggressive
BH1	7.5-7.7	Silty Clay	7.8	Mildly Aggressive	Non-Aggressive
BH1	9-9.2	Silty Clay	7.1	Mildly Aggressive	Non-Aggressive
BH2	0.1-0.2	F: Clayey Silty Sand	7.1	Mildly Aggressive	Non-Aggressive
BH2	1.8-2	Sandy Silt	6.3	Mildly Aggressive	Non-Aggressive
BH2	2.2-2.5	Clayey Sand	6.3	Mildly Aggressive	Non-Aggressive
BH2	2.8-3	Sandy Clay	5.9	Mildly Aggressive	Non-Aggressive
BH3	0.6-0.7	F: Clayey Silty Sand	6.3	Mildly Aggressive	Non-Aggressive
BH3	2.5-2.7	Silty Clay	5.3	Moderately Aggressive	Non-Aggressive
BH3 [LAB_DUP]	2.5-2.7	Laboratory Duplicate	5.3	Moderately Aggressive	Non-Aggressive
BH3	4-4.1	Silty Clay	6.4	Mildly Aggressive	Non-Aggressive
BH4	0.6-0.7	F: Silty Sand	8.1	Mildly Aggressive	Non-Aggressive
BH4	1.7-1.9	Sandy Clay	6	Mildly Aggressive	Non-Aggressive
BH4	4-4.2	Silty Clay	7.1	Mildly Aggressive	Non-Aggressive
<b>Total Number of Samples</b>			18	-	-
<b>Minimum Value</b>			5.3	-	-
<b>Maximum Value</b>			8.1	-	-

Classification is based on Soil condition 'A' - high permeability soils (e.g. sands & gravel) that are in groundwater.

Classification for Concrete Piles	pH Value	Classification for Steel Piles
>5.5 Mildly Aggressive	>5	Non-Aggressive
4.5 - 5.5 Moderately Aggressive	4.0 - 5.0	Mildly Aggressive
4 - 4.5 Severely Aggressive	3.0 - 4.0	Moderately Aggressive
<4 Very Severely Aggressive	<3	Severely Aggressive

**TABLE D**  
**SUMMARY OF SOIL LABORATORY RESULTS - SULPHATE & CHLORIDES**

Borehole Number	Sample Depth (m)	Sample Description	Chloride (mg/kg)	Sulphate (mg/kg)	Classification for Concrete Piles	Classification for Steel Piles
					Sulfate - Condition A	Chloride - Condition A
BH1	0-0.2	F: Silty Sand	10	<10	Mildly Aggressive	Non-Aggressive
BH1 [LAB_DUP]	0-0.2	Laboratory Duplicate	10	<10	Mildly Aggressive	Non-Aggressive
BH1	2.3-2.5	Sand	31	10	Mildly Aggressive	Non-Aggressive
BH1	3.1-3.2	Sandy Clay	20	20	Mildly Aggressive	Non-Aggressive
BH1	6-6.02	Sandy Clay	10	<10	Mildly Aggressive	Non-Aggressive
BH1	7.5-7.7	Silty Clay	20	<10	Mildly Aggressive	Non-Aggressive
BH1	9-9.2	Silty Clay	10	<10	Mildly Aggressive	Non-Aggressive
BH2	0.1-0.2	F: Clayey Silty Sand	53	75	Mildly Aggressive	Non-Aggressive
BH2	1.8-2	Sandy Silt	20	10	Mildly Aggressive	Non-Aggressive
BH2	2.2-2.5	Clayey Sand	20	28	Mildly Aggressive	Non-Aggressive
BH2	2.8-3	Sandy Clay	31	20	Mildly Aggressive	Non-Aggressive
BH3	0.6-0.7	F: Clayey Silty Sand	<10	<10	Mildly Aggressive	Non-Aggressive
BH3	2.5-2.7	Silty Clay	10	57	Mildly Aggressive	Non-Aggressive
BH3 [LAB_DUP]	2.5-2.7	Laboratory Duplicate	10	60	Mildly Aggressive	Non-Aggressive
BH3	4-4.1	Silty Clay	10	58	Mildly Aggressive	Non-Aggressive
BH4	0.6-0.7	F: Silty Sand	10	29	Mildly Aggressive	Non-Aggressive
BH4	1.7-1.9	Sandy Clay	20	50	Mildly Aggressive	Non-Aggressive
BH4	4-4.2	Silty Clay	10	32	Mildly Aggressive	Non-Aggressive
<b>Total Number of Samples</b>			18	18	-	-
<b>Minimum Value</b>			<PQL	<PQL	-	-
<b>Maximum Value</b>			53	75	-	-

Classification is based on Soil condition 'A' - high permeability soils (e.g. sands & gravel) that are in groundwater.

Sulfate Values	Classification for Concrete Piles	Chloride Values	Classification for Steel Piles
<5,000	Mildly Aggressive	<5,000	Non-Aggressive
5,000 - 10,000	Moderately Aggressive	5,000 - 20,000	Mildly Aggressive
10,000 - 20,000	Severely Aggressive	20,000 - 50,000	Moderately Aggressive
>20,000	Very Severely Aggressive	>50,000	Severely Aggressive

**TABLE E**  
**SUMMARY OF SOIL LABORATORY RESULTS - CEC & ESP**

Borehole Number	Sample Depth (m)	Sample Description	Exchangeable Ca	Exchangeable K	Exchangeable Mg	Exchangeable Na	CEC	ESP %	Ca:Mg
			(meq/100g)						
BH1	0-0.2	F: Silty Sand	0.8	<0.1	0.4	<0.1	1.3	7.7%	2.0:1
BH2	0.1-0.2	F: Clayey Silty Sand	7.6	0.3	1.9	0.4	10	4.0%	4.0:1
BH3	0.6-0.7	F: Clayey Silty Sand	3	0.2	1.6	0.1	5	2.0%	1.88:1
BH4	0.6-0.7	F: Silty Sand	4	<0.1	0.4	<0.1	4.5	2.2%	10.0:1
<b>Total Number of Samples</b>			4	4	4	4	4	4	4
<b>Minimum Value</b>			0.80	<PQL	0.40	<PQL	1.3	2.0%	1.88 :1
<b>Maximum Value</b>			7.60	0.30	1.90	0.40	10.0	7.7%	10.0 :1

**ESP Value**

< 5%  
 5% to 15%  
 > 15%

**Sodicity Rating**

Non-Sodic
Sodic
Highly Sodic

**TABLE F**  
**SUMMARY OF GROUNDWATER LABORATORY RESULTS**

Sample Reference	Field Measurements						Laboratory Results				Classification for Concrete Piles Soil Condition A	Classification for Steel Piles Soil Condition A
	SWL (m)	pH	EC (µS/cm)	Temp (°C)	Eh (mV)	DO (mg/L)	pH	EC (µS/cm)	Sulfate (mg/L)	Chloride (mg/L)		
MW1A	1.53	5.6	601	14.9	-52	0.2	6.3	690	24	66	Mildly Aggressive	Non-Aggressive
MW3	0.7	5.2	741	18.3	-22.4	0.3	6.4	1,000	35	160	Mildly Aggressive	Non-Aggressive
MW4	1.2	5.8	777	18.3	-9.6	3.4	6.2	770	23	130	Mildly Aggressive	Non-Aggressive
MW5	1.48	5.9	915	19.1	10.6	0.2	6.2	960	28	170	Mildly Aggressive	Non-Aggressive
<b>Total Number of Samples</b>	4	4	4	4	4	4	4	4	4	4	-	-
<b>Minimum Value</b>	0.7	5.2	601	14.9	-52	0.2	6.2	690	23	66	-	-
<b>Maximum Value</b>	1.53	5.9	915	19.1	10.6	3.4	6.4	1,000	35	170	-	-

**Exposure Classification for Concrete Piles**

Classification is based on Soil condition 'A' - high permeability soils (e.g. sands & gravel) that are in groundwater.

pH	Sulfate (mg/L)	Chloride (mg/L)
> 5.5	<1,000	<6,000
4.5 - 5.5	1,000 - 3,000	6,000 - 12,000
4.0 - 4.5	3,000 - 10,000	12,000 - 30,000
< 4	>10,000	>30,000

**Classification A**

Mildly Aggressive
Moderately Aggressive
Severely Aggressive
Very Severely Aggressive

**Exposure Classification for Steel Piles**

Classification is also based on Soil condition 'A' - high permeability soils (e.g. sands & gravel) that are in groundwater.

pH	Chloride (mg/L)
> 5	<1,000
4.0 - 5.0	1,000 - 10,000
3.0 - 4.0	10,000 - 20,000
<3	>20,000

**Classification A**

Non-Aggressive
Mildly Aggressive
Moderately Aggressive
Severely Aggressive

ABBREVIATIONS AND EXPLANATIONS FOR ACID SULFATE SOIL TABLE

**Abbreviations used in the Tables:**

<b>ANC<sub>BT</sub></b>	Acid Neutralising Capacity - Back Titration
<b>ANCE</b>	Excess Acid Neutralising Capacity
<b>CaCO<sub>3</sub></b>	Calcium Carbonate
<b>kg</b>	kilogram
<b>mol H<sup>+</sup>/t</b>	moles hydrogen per tonne
<b>pHF</b>	Field pH
<b>pHFOX</b>	Field peroxide pH
<b>pH<sub>KCl</sub></b>	Pottasium chloride pH
<b>S</b>	Sulfur
<b>SCr</b>	The symbol given to the result from the Chromium Reducible Sulfur method
<b>S<sub>NAS</sub></b>	Net Acid Soluble Sulfur
<b>% w/w</b>	Percentage by mass

Results have been assessed against the criteria specified in Table 1.1 of National Acid sulfate Soil Guidance - National acid sulfate soil identification and laboratory method manual. Water Quality Australia. June 2018

TABLE A  
SUMMARY OF LABORATORY RESULTS - ACID SULFATE SOIL ANALYSIS

Soil Texture:	Coarse	Analysis	pH <sub>F</sub> and pH <sub>FOX</sub>				pH <sub>KCL</sub>	Actual Acidity (Titratable Actual Acidity - TAA) (mol H <sup>+</sup> /t)	Potential Sulfidic Acidity		Retained Acidity (%S <sub>NAS</sub> )	Acid Neutralising Capacity (ANC <sub>BT</sub> ) (% CaCO <sub>3</sub> )	a-Net Acidity without ANCE (mol H <sup>+</sup> /t)	s-Net Acidity without ANCE (%w/w S)	Liming Rate - without ANCE (kg CaCO <sub>3</sub> /tonne)
			pH <sub>F</sub>	pH <sub>FOX</sub>	Reaction	pH <sub>F</sub> - pH <sub>FOX</sub>			(% S <sub>Cr</sub> )	(mol H <sup>+</sup> /t)					
National Acid Sulfate Soils Guidance (2018)			-	-	-	-	-	-	-	-	-	-	18	0.03	-
Sample Reference	Sample Depth (m)	Sample Description													
BH1	0-0.1	F: Silty Sand	8.6	6.5	Low reaction	2.1	-	-	-	-	-	-	-	-	-
BH1	0.1-0.2	F: Silty Sand	6.2	3.7	Medium reaction	2.5	-	-	-	-	-	-	-	-	-
BH1	0.5-0.7	F: Silty Sand	4.8	4.2	High reaction	0.6	-	-	-	-	-	-	-	-	-
BH1	1-1.1	F: Silty Sand	4.9	4	High reaction	0.9	-	-	-	-	-	-	-	-	-
BH1	1.3-1.5	F: Silty Clay	4.7	3.4	Medium reaction	1.3	-	-	-	-	-	-	-	-	-
BH1	1.8-1.9	F: Silty Clay	6.4	4.6	Volcanic reaction	1.8	4.9	30	0.02	10	[NT]	[NT]	40.0	0.06	3
BH1	2.3-2.5	Sand	6.1	3.6	Low reaction	2.5	-	-	-	-	-	-	-	-	-
BH1	3.1-3.2	Sandy Clay	6	3.6	Low reaction	2.4	-	-	-	-	-	-	-	-	-
BH1	4.5-4.6	Silty Clay	6.8	4.2	Low reaction	2.6	-	-	-	-	-	-	-	-	-
BH1	6-6.2	Sandy Clay	7.6	6.1	Low reaction	1.5	-	-	-	-	-	-	-	-	-
BH1	7.5-7.7	Silty Clay	7.4	6	High reaction	1.4	6.2	<5	0.01	8	[NT]	[NT]	7.8	0.01	<0.75
BH1	9-9.2	Silty Clay	7.2	6	Low reaction	1.2	6.1	<5	0.02	12	[NT]	[NT]	14.0	0.02	1.1
BH2	0.1-0.2	F: Clayey Silty Sand	6.2	3.5	Medium reaction	2.7	-	-	-	-	-	-	-	-	-
BH2	0.7-1	F: Sandy Clay	6	4.2	High reaction	1.8	-	-	-	-	-	-	-	-	-
BH2	1.3-1.5	F: Sandy Clay	5.6	3.3	Medium reaction	2.3	-	-	-	-	-	-	-	-	-
BH2	1.65-1.7	Sandy Silt	6.6	4.2	Volcanic reaction	2.4	5.6	12	0.008	5	[NT]	[NT]	17.0	0.03	1.3
BH2	2.2-2.5	Clayey Sand	6.4	3.2	Low reaction	3.2	-	-	-	-	-	-	-	-	-
BH2	2.8-3	Sandy Clay	5.4	3.9	Low reaction	1.5	-	-	-	-	-	-	-	-	-
BH2	3.3-3.45	Sandy Clay	5.7	4.3	Low reaction	1.4	3.8	36	0.008	5	<0.005	[NT]	41.0	0.07	3.1
BH2	4.65-4.95	Silty Clay	6.5	5.6	Low reaction	0.9	-	-	-	-	-	-	-	-	-
BH3	0.2-0.3	F: Clayey Gravel	6.1	3.5	Low reaction	2.6	-	-	-	-	-	-	-	-	-
BH3	0.6-0.7	F: Clayey Silty Sand	5.2	2.6	Medium reaction	2.6	-	-	-	-	-	-	-	-	-
BH3	1.2-1.3	F: Sandy Silt	6.4	4.1	Volcanic reaction	2.3	5.8	5	0.01	8	[NT]	[NT]	13.0	0.02	0.96
BH3	2-2.1	Sandy Clay	5.2	2.7	Low reaction	2.5	-	-	-	-	-	-	-	-	-
BH3	2.5-2.7	Silty Clay	5.6	2.8	Low reaction	2.8	4.1	26	0.02	10	<0.005	[NT]	36.0	0.06	2.7
BH3	3.1-3.3	Silty Clay	5.8	3.8	Low reaction	2	-	-	-	-	-	-	-	-	-
BH3	4-4.1	Silty Clay	6.1	4.6	Low reaction	1.5	-	-	-	-	-	-	-	-	-
BH3	4.4-4.5	Silty Clay	6.3	4.9	Low reaction	1.4	-	-	-	-	-	-	-	-	-
BH3	5-5.1	Silty Clay	6.4	4.4	Low reaction	2	5.3	5	0.01	8	[NT]	[NT]	13.0	0.02	0.96
BH3	5.5-5.7	XW Sandstone	6.3	4.7	Low reaction	1.6	-	-	-	-	-	-	-	-	-
BH3	6-6.2	XW Sandstone	6.3	4.4	Low reaction	1.9	5.2	<5	0.008	5	[NT]	[NT]	9.8	0.02	<0.75
BH4	0.1-0.2	F: Sandy Gravel	7.9	5.9	Low reaction	2	-	-	-	-	-	-	-	-	-
BH4	0.6-0.7	F: Silty Sand	8.3	6	Low reaction	2.3	-	-	-	-	-	-	-	-	-
BH4	1.1-1.2	F: Sandy Silt	6.8	2.9	Medium reaction	3.9	-	-	-	-	-	-	-	-	-
BH4	1.5-1.7	F: Sandy Silt	7.1	3.2	Medium reaction	3.9	6.2	<5	0.02	12	[NT]	[NT]	13.0	0.02	0.98
BH4	1.7-1.9	Sandy Clay	6.8	2.9	Low reaction	3.9	-	-	-	-	-	-	-	-	-
BH4	2-2.2	Sandy Clay	6.7	4.3	Low reaction	2.4	-	-	-	-	-	-	-	-	-
BH4	2.6-2.7	Silty Clay	6.8	3.6	Low reaction	3.2	5.2	<5	0.02	10	[NT]	[NT]	14.0	0.02	1.1
BH4	2.9-3	Silty Clay	6.6	3.9	Low reaction	2.7	-	-	-	-	-	-	-	-	-
BH4	3.7-3.9	Silty Clay	6.7	5.1	Low reaction	1.6	-	-	-	-	-	-	-	-	-
BH4	4-4.2	Silty Clay	6.8	5	Low reaction	1.8	-	-	-	-	-	-	-	-	-
BH4	4.5-4.7	Silty Clay	7.5	4.9	Low reaction	2.6	-	-	-	-	-	-	-	-	-
BH4	5.1-5.3	Sandstone	7.4	4.4	Low reaction	3	6	<5	0.01	8	<0.005	<0.05	8.2	0.01	<0.75
<b>Total Number of Samples</b>			43	43	43	43	12	12	12	12	12	12	12	12	12
<b>Minimum Value</b>			4.7	2.6	-	0.6	3.8	<5	0.008	5	(NT)	(NT)	7.8	0.01	<0.75
<b>Maximum Value</b>			8.6	6.5	-	3.9	6.2	30	0.02	12	<0.005	<0.05	41.0	0.07	3.1

Values Exceeding Action Criteria





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## **Appendix D: Background on Salinity**



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## Background on Salinity

### A. General Information on Salinity

Salinity is the accumulation and concentration of salt at or near the ground surface or within surface water bodies. Salt is naturally present in the landscape through deposition of salt from the ocean in coastal areas and through weathering of bedrock that contains salt, accumulated during deposition of original sediments in a prehistoric marine environment. The salts are commonly soluble chlorides, sulphates or carbonates of sodium and magnesium.

In Sydney, salinity issues are typically associated with the Wianamatta Group shales and their derived soil landscapes. The natural vegetation of western Sydney is dominated by large isolated trees with deep root systems that remove subsurface moisture. Slow rates of percolation through the relatively impermeable clay soil and uptake of a large proportion of rainfall by the trees results in limited recharge of the groundwater system by rainfall. The depth to groundwater has developed a natural equilibrium and there is little tendency for salt contained in the groundwater or subsoils to rise to the surface.

### B. Salinity and Urban Development

Salinity becomes a problem in urban areas when changes in the land use result in changes to the way water moves through the environment. This can result in vegetation die-back, decrease in water quality and damage to urban infrastructure.

Removal of deep rooted tree species during development and replacement with urban infrastructure, houses and industrial developments reduces the mechanism for the removal of subsurface moisture.

The development of urban salinity is commonly associated with changes in the hydrological cycle through the environment (rainfall, surface run-off, water infiltration and groundwater system). An increase in the quantity of water reaching the groundwater table as a result of vegetation clearance, irrigation of parklands, leaking water infrastructure and changes in drainage patterns, can cause a relatively rapid rise in the groundwater table. Earthworks that include excavation of natural soil profiles and exposure of more saline subsurface soils or shale bedrock may also result in an increase in salt concentrations at the ground surface.

Construction of roads, pipelines and buildings commonly results in removal of topsoil leading to exposure of the subsoils and interception of surficial and shallow subsurface drainage. In addition, over-irrigation of urban gardens, leaking water infrastructure and concentrated drainage patterns can result in increased water movement through the subsoil to the groundwater system leading to a relatively rapid rise in the groundwater table.

A rise in groundwater levels and impediments to subsurface drainage patterns can transport salt formerly stored in the bedrock to the surficial soil profile. This may result in salt encrustation of exposed soils, building foundations, roads, drainage infrastructure and corrosion of metal, concrete and other building materials. Increasing salt concentrations in surficial soils (and consequently in surface waters) may also result in die-off



of the existing vegetation, further reducing the hydrological load on the groundwater system and resulting in further groundwater table rises.

### **C. Potential Salinity Impacts on Urban Development**

Some of the adverse impacts that can arise from saline conditions include:

- Salt scalds caused by a rise in the subsoil moisture content that mobilises salt to the ground surface;
- Salt scalds caused by modification of former drainage patterns which leads to the day lighting of subsurface seepage (either perched water or groundwater) in areas lower in the catchment, either at breaks in the slope or within drainage lines;
- A rise in groundwater table or accumulation of salt rich seepage leading to corrosion of subsurface facilities including concrete structures, metal pipework, cables, foundations, underground services, etc;
- Rising damp, where salt rich moisture is drawn into building and pavement materials by capillary action leading to deterioration of brick, mortar and concrete;
- Structural cracking, damage or building collapse which may occur as a result of shifting and or sinking foundations;
- Plant die-back associated with a rise in groundwater table level that mobilises excess salt to the plant root zone; and
- Subsurface water discharge and subsequent pollution of streams and drainage channels.

### **D. Soils and Groundwater Planning Strategy in Western Sydney**

The aim of the DLWC 2002 document is to provide a framework for the sustainable development and management of new developments in the western region of Sydney. In relation to salinity management, the development should be designed and constructed such that there is no significant increase in the water table level and no adverse salinity impacts.

The proposed development controls that relate to soils and groundwater issues are summarised below:

1. A water management strategy should be prepared to address the following:
  - Reduction of potable water usage onsite;
  - Development of best practice measures for stormwater reuse for open space irrigation;
  - Reduction of potable water demand;
  - Reduction of adverse impacts on local groundwater regimes;
  - Reduction of change in local flow regimes; and
  - Preparation of water maintenance and a monitoring management system.
2. A salinity management plan should be prepared that includes a groundwater management strategy related to:
  - Adoption of small landscaped areas to reduce irrigation requirements;
  - Use of native and other low water requirement plants;
  - Use of mulch cover (not in drainage lines);
  - Use of low flow watering facilities for landscaped areas;
  - Implementation of a tree planting program, especially in high recharge areas, of native, deep rooted, large growing species to assist retention of the groundwater at existing levels;



- 
- Retention of existing native tree cover where possible; and
  - Not permitting infiltration pits or tanks to disperse surface water.
3. An assessment of soil and rock conditions at the site, including erosion, expansive and dispersive soil conditions, and plant growth potential should be undertaken.
  4. Use of the Blue Book (2004) as a guide to prepare soil and water management plans. The approved plan and subsequent works are to be supervised by appropriately qualified experienced personnel.



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## **Appendix E: Information on Acid Sulfate Soils**

## A. Background

Acid Sulfate Soil (ASS) is formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes. ASS materials are distinguished from other soil or sediment materials (referred to as 'soil materials' throughout the National Acid Sulfate Soils Guidance) by having properties and behaviour that have either:

- 1) Been affected considerably by the oxidation of Reduced Inorganic Sulfur (RIS), or
- 2) The capacity to be affected considerably by the oxidation of their RIS constituents.

Acid sulfate soil materials include potential acid sulfate soils (PASS or sulfidic soil materials) and actual acid sulfate soils (AASS or sulfuric soil materials). These are often found in the same profile, with AASS overlying PASS. PASS and AASS are defined further below:

- PASS are soil materials which contain RIS such as pyrite. The field pH of these soils in their undisturbed state is usually more than pH 4 and is commonly neutral to alkaline (pH 7–9). These soil materials are invariably saturated with water in their natural state. Their texture may be peat, clay, loam, silt or sand and is often dark grey in colour and soft in consistence, but these materials may also exhibit colours that are dark brown, or medium to pale grey to white; and
- AASS are soil materials which contained RIS such as pyrite that have undergone oxidation. This oxidation results in low pH (that is pH less than 4) and often a yellow (jarosite) and/or orange to red mottling (ferric iron oxides) in the soil profile. Actual ASS contains Actual Acidity, and commonly also contains RIS (the source of Potential Sulfuric Acidity) as well as Retained Acidity.

## B. The ASS Planning Maps

The ASS planning maps provide an indication of the relative potential for disturbance of ASS to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of ASS at a site or the likely severity of the conditions.

The maps are divided into five classes dependent upon the type of activities/works that if undertaken, may represent an environmental risk through the development of acidic conditions associated with ASS:

Table 1: Risk Classes

Risk Class	Description
Class 1	All works.
Class 2	All works below existing ground level and works by which the water table is likely to be lowered.
Class 3	Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.
Class 4	Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level.
Class 5	Works within 500m of adjacent Class 1, 2, 3, 4 land which are likely to lower the water table below 1m AHD on the adjacent land.

### C. The ASS Risk Maps

The ASS risk maps provide an indication of the probability of occurrence of ASS materials at a particular location based on interpretation from geological and soil landscape maps. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific assessment necessary) and the likely depth at which ASS materials are likely to be encountered.

### D. Interpretation of ASS Field Tests

Tables A1 and A2 below provide some guidance on the interpretation of  $pH_F$  and  $pH_{FOX}$  test results, as detailed in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018):

Table A1: Interpretation of some  $pH_F$  test ranges

pH value	Result	Comments
$pH_F \leq 4$ , jarosite not observed in the soil layer/horizon	May indicate an AASS indicating previous oxidation of RIS or may indicate naturally occurring, non ASS soils.	Generally not conclusive as naturally occurring, non ASS soils, such as many organic soils (for example peats) and heavily leached soils, often also return $pH_F \leq 4$ .
$pH_F \leq 4$ , jarosite observed in the soil layer/horizon	The soil material is an AASS.	Jarosite and other iron precipitate minerals in ASS such as schwertmannite require a $pH < 4$ to form and indicate prior oxidation of RIS.
$pH_F > 7$	Expected in waterlogged, unoxidised, or poorly drained soils.	Marine muds commonly have a $pH > 7$ which reflects a seawater ( $pH 8.2$ ) influence. Oxidation of samples with $H_2O_2$ can help indicate if the soil materials contain RIS.

Source: Adapted from DER (2015a).

Table A2: Interpretation of  $pH_{FOX}$  test results

pH value and reaction	Result	Comments
Strong reaction of soil with $H_2O_2$ (that is X or V)	Useful indicator of the presence of RIS but cannot be used alone	Organic rich substrates such as peat and coffee rock, and soil constituents like manganese oxides, can also cause a reaction. Care must be exercised in interpreting these results. Laboratory analyses are required to confirm if appreciable RIS is present.
$pH_{FOX}$ value at least one unit below field $pH_F$ and strong reaction with $H_2O_2$ (that is X or V)	May indicate PASS	The difference between $pH_F$ and $pH_{FOX}$ is termed the $\Delta pH$ . Generally the larger the $\Delta pH$ the more indicative of PASS. The lower the final $pH_{FOX}$ the better the likelihood of an appreciable RIS content. For example, a change from $pH_F$ of 8 to $pH_{FOX}$ of 7 (that is a $\Delta pH$ of 1) would not indicate PASS, however, a unit change from $pH_F$ of 3.5 to $pH_{FOX}$ of 2.5 would be indicative of PASS. Laboratory analyses are required to confirm if appreciable RIS is present.
$pH_{FOX} < 3$ , large $\Delta pH$ and a strong reaction with $H_2O_2$ (that is X or V)	Strongly indicates PASS	The lower the $pH_{FOX}$ below 3, the greater the likelihood that appreciable RIS is present. A combination of all three parameters – $pH_{FOX}$ , $\Delta pH$ and reaction strength – gives the



pH value and reaction	Result	Comments
		best indication of PASS. Laboratory analyses are required to confirm that appreciable RIS is present.
A pH <sub>FOX</sub> 3–4 and Low, Medium or Strong reaction with H <sub>2</sub> O <sub>2</sub>	Inconclusive	RIS may be present; however, organic matter may also be responsible for the decrease in pH. Laboratory analyses are required to confirm the presence of RIS.
pH <sub>FOX</sub> 4–5	Inconclusive	RIS may be present in small quantities, or poorly reactive under rapid oxidation, or the sample may contain shell/ carbonate which neutralises some or all acid produced on oxidation. Equally, the pH <sub>FOX</sub> value may be due to the production of organic acids with no RIS present. Laboratory analyses are required to confirm if appreciable RIS is present.
pH <sub>FOX</sub> > 5, small or no ΔpH, but Low, Medium or Strong reaction with H <sub>2</sub> O <sub>2</sub>	Inconclusive	For neutral to alkaline pHF with shell or white concretions, the fizz test with 1 M HCl can be used to identify the presence of carbonates. Laboratory analyses are required to confirm if appreciable RIS is present and further testing is required to confirm that effective self-neutralising materials are present.

Source: Adapted from DER (2015a).



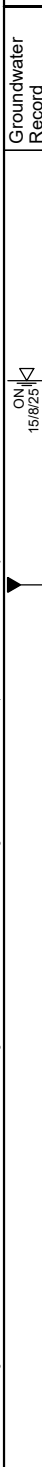
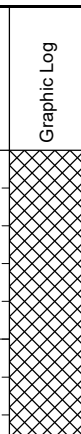
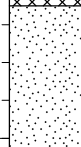
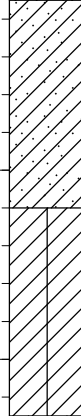
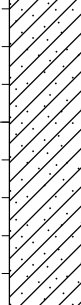
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## Appendix F: Borehole Logs

## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER / CASING ADVANCER      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Datum:** AHD  
**Plant Type:** JK500      **Logged/Checked By:** C.A.R./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N = 6 6,3,3	2			FILL: Silty sand, fine to medium grained, brown, trace of fine to medium grained igneous gravel, clay fines and root fibres.	M			GRAVEL COVER APPEARS POORLY COMPACTED	
					N = 3 1,2,1	1			FILL: Silty clay, low plasticity, dark grey, trace of fine to medium grained sandstone gravel, and root fibres.	w>PL			POSSIBLY ALLUVIAL	
					N = 10 4,4,6	3		SP	SAND: fine to medium grained, grey, trace of clay fines and silt.	W	(L)		ALLUVIAL	
					N = 15 4,7,8	5		CL	Sandy CLAY: low plasticity, grey, fine to medium grained sand, with silt, trace of root fibres.	w>PL	VSt	260 300 210		
						4		CI-CH	Silty CLAY: medium to high plasticity, grey, trace of fine grained sand.		VSt - Hd	360 400 410		
					N = 18 3,7,11	6		CL-CI	Sandy CLAY: low to medium plasticity, light grey and orange brown, fine to medium grained sand, trace of fine to medium grained ironstone gravel, and root fibres.			510 400 310		

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## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER / CASING ADVANCER      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Datum:** AHD  
**Plant Type:** JK500      **Logged/Checked By:** C.A.R./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N = 25 6, 12, 13	-5		CL-CI	Sandy CLAY: low to medium plasticity, light grey and orange brown, fine to medium grained sand, trace of fine to medium grained ironstone gravel, and root fibres.	w>PL	VSt - Hd		ALLUVIAL	
						8		CI	Silty CLAY: medium plasticity, light grey, with fine grained sand, trace of fine to medium grained ironstone gravel.		Hd	500 500 600		
					N > 20 14, 20/ 150mm REFUSAL	-6			as above, but orange brown, light grey and red brown, with fine to medium grained ironstone gravel.			>600 >600 550		
						-7			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 16.3m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 10.3m TO 16.3m. CASING 0.1m TO 10.3m. 2mm SAND FILTER PACK 10.1m TO 16.3m. BENTONITE SEAL 8.0m TO 10.1m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.	
						-8							SECONDARY GROUNDWATER MONITORING WELL INSTALLED TO 3.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 0m TO 3.0m. 2mm SAND FILTER PACK 0.5m TO 3.0m. BENTONITE SEAL 0.5m TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.	
						-9								
						-10								
						-11								

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## CORED BOREHOLE LOG

<b>Client:</b>	URBAN PROPERTY GROUP
<b>Project:</b>	PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT
<b>Location:</b>	26-30 MANN STREET, GOSFORD, NSW

<b>Job No.:</b> 37790P	<b>Core Size:</b> NMLC	<b>R.L. Surface:</b> ~2.7 m
<b>Date:</b> 30/7/25	<b>Inclination:</b> VERTICAL	<b>Datum:</b> AHD
<b>Plant Type:</b> JK500	<b>Bearing:</b> N/A	<b>Logged/Checked By:</b> C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 9.30m							
					NO CORE 0.46m							
			-7									
			10		SANDSTONE: fine to medium grained, orange brown and red brown, with iron indurated bands.	HW	L - M	+0.80			(9.80m) J, 90°, Ir, R, Fe Ct (9.90m) Jh, 80°, St	
			-8		SANDSTONE: fine to medium grained, light brown, grey and red brown, bedded at 0-10°.	MW		+0.20			(10.10m) J, 90°, Ir, R, Cn (10.19m) Be, 0°, P, R, Fe Ct (10.30m) XWS, 0°, 30 mm.t	
			11					+0.40			(10.49m) Be, 5°, P, R, Fe Vn (10.58m) Be, 5°, P, R, Fe Ct (10.60m) Be, 0°, P, R, Fe Ct (10.68m) J, 40°, P, R, Cn (10.77m) J, 90°, C, R, Cn (10.85m) J, 30°, Ir, R, Cn	
			-9					+0.20			(11.18m) XWS, 0°, 15 mm.t (11.26m) Be, 15°, P, R, Clay Ct (11.34m) Be, 0°, P, R, Fe Sn	
			12				H	+0.90			(11.48m) Be, 0°, P, R, Clay Ct (11.54m) Be, 0°, P, R, Clay Ct	
			-10			HW		+0.50			(12.02m) Be, 5°, P, R, Clay Ct (12.10m) Be, 10°, P, R, Clay Ct	
			13					+1.3			(12.24m) Be, 10°, P, R, Clay Ct (12.32m) Be, 10°, P, R, Clay Ct (12.36m) Be, 10°, P, R, Clay Ct	
			-11		NO CORE 0.65m			+3.8			(12.39-13.15m) J x 2, 90°, P/Ir, R, Fe Ct	
			14					+0.30			(13.95m) Jh, 80°, P (14.07m) Be, 0°, P, R	
			-12		SANDSTONE: fine to medium grained, light brown, red brown and grey, bedded at 5-15°.	SW	M	+0.40			(14.53m) J, 30°, P, R, Cn	
			15					+0.30			(15.33m) J, 35°, C, R, Fe Ct (15.42m) J, 70°, C, R, Fe Ct	
			-13					+0.60				

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## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK500      **Bearing:** N/A      **Logged/Checked By:** C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					SANDSTONE: fine to medium grained, light grey, bedded at 0-10°.	FR	M	0.20				
		-14			SILTSTONE: dark grey, with fine grained sandstone bands, bedded at 0-10°.			0.30			(16.50m) CS, 0°, 70 mm.t (16.62m) J, 60°, P, S, Cn	
			17					0.040			(16.95m) J, 90°, P, R, Fe Ct	
					SANDSTONE: fine grained, light grey, with siltstone bands and lenses, bedded at 0-10°.		M - H	3.0			(17.74m) J, 90°, C, R, Fe Sn	
		-15						0.80				
			18				H	1.5			(18.59m) Be, 0°, P, S, Clay Ct (18.63m) Ji, 60°, St	
		-16						2.4				
			19					1.0			(19.26m) Be, 0°, P, S, Clay Ct	
		-17						2.5				
			20					3.3				
		-18						2.2				
			21					5.2				
		-19			SANDSTONE: fine grained, light grey, with grey siltstone and carbonaceous laminae.		VH	3.5				
			22					3.7				

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## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK500      **Bearing:** N/A      **Logged/Checked By:** C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					SANDSTONE: fine grained, light grey, with grey siltstone and carbonaceous laminae. <i>(continued)</i>	FR	VH	3.5			(23.75m) Ji, 80°, Ir	Terrigal Formation
							H	2.1				
		-21						1.0				
		24						5.0				
							H - VH				(24.75m) J/Ji, 70°, Ir, R, Cn	
		-22						5.1				
		25			END OF BOREHOLE AT 25.12 m			1.6				
		-23										
		26										
		-24										
		27										
		-25										
		28										
		-26										
		29										
		-27										

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## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER / CASING ADVANCER      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Datum:** AHD  
**Plant Type:** JK400      **Logged/Checked By:** J.L.O./P.W.

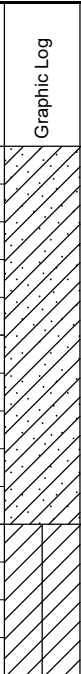
Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N = 11 4,5,6	2				FILL: Clayey silty sand, fine to medium grained, brown, trace of fine to coarse grained igneous gravel, and slag.	M			GRAVEL COVER
						1				FILL: Sandy clay, low plasticity, brown and grey brown, fine to medium grained sand, trace of fine to medium grained ironstone and sandstone gravel, and root fibres.	w<PL		400 380 320	APPEARS WELL COMPACTED
					N = 2 2,1,1	1			ML	FILL: Silty sandy clay, low plasticity, dark grey and brown, fine to medium grained sand, trace of root fibres.	w>PL	S	110 90 70	POSSIBLY ALLUVIAL
						2			SC	Sandy SILT: low plasticity, dark grey, with clay fines. Clayey SAND: fine to medium grained, grey, trace of silt fines.	W	(L)		TOO FRIABLE FOR HP TESTING
					N = 12 3,4,8	3			CL	Sandy CLAY: low plasticity, grey, fine to medium grained sand, trace of silt fines.	w>PL	VSt		
						4							340 320 390	COMMENCE WASHBORING AT 3.0m AFTER SPT
					N = 18 4,6,12	2			CI-CH	Silty CLAY: medium to high plasticity, light grey and brown. Silty CLAY: medium to high plasticity, light grey.		Hd	390 400 370 470 480 520	
					N = 16 18,10,6	6			CL	Sandy CLAY: low plasticity, light grey and red brown, fine to medium grained sand, trace of fine to coarse grained ironstone gravel.		VSt - Hd	430 370 360	
						4								

JK 9.02.4.LB.GLB Log JK AUGERHOLE - MASTER 37790P GOSFORD.GPJ <<DrawingFiles>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab and In Situ Tool - DGD | Lib JK 9.02.4.2019.05.05.31 Proj JK 9.01.0.2018.03.20

## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER / CASING ADVANCER      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Datum:** AHD  
**Plant Type:** JK400      **Logged/Checked By:** J.L.O./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N=SPT 10/ 10mm REFUSAL	-5		CL	Sandy CLAY: low plasticity, light grey and red brown, fine to medium grained sand, trace of fine to coarse grained ironstone gravel. <i>(continued)</i>  Sandy CLAY: low plasticity, light brown, fine to medium grained sand, trace of fine to medium grained ironstone gravel.	w>PL	VSt - Hd		TOO FRIABLE FOR HP TESTING	
				N=SPT 10/ 100mm REFUSAL	-9	CL-CI		Silty CLAY: low to medium plasticity, grey and light brown, with extremely weathered fabric.	w~PL	Hd	>600 >600			
						-10			REFER TO CORED BOREHOLE LOG					
						-11								

JK 9.02.4.LB.GLB\_Log\_JK\_AUGERHOLE\_MASTER\_37790P\_GOSFORD.GPJ <<DrawingFiles>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab and In Situ Tool - DGD | Lib JK 9.02.4.2019.05.31 Proj JK 9.01.0.2018.03.20

## CORED BOREHOLE LOG

<b>Client:</b>	URBAN PROPERTY GROUP
<b>Project:</b>	PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT
<b>Location:</b>	26-30 MANN STREET, GOSFORD, NSW

<b>Job No.:</b> 37790P	<b>Core Size:</b> NMLC	<b>R.L. Surface:</b> ~2.7 m
<b>Date:</b> 30/7/25	<b>Inclination:</b> VERTICAL	<b>Datum:</b> AHD
<b>Plant Type:</b> JK400	<b>Bearing:</b> N/A	<b>Logged/Checked By:</b> J.L.O./P.W.

Water Loss/Level Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
									Specific	General	
		-7		START CORING AT 9.80m							
0% RETURN		10		SANDSTONE: fine to medium grained, grey, with siltstone laminae, bedded at 0-5°.	MW	H	*1.1			(9.88m) Be, 0°, P, R, Clay Ct (9.95m) Be, 0°, P, R, Clay Ct (9.98m) Be, 0°, P, R, Clay Ct	
				NO CORE 0.11m	MW	H	*1.2			(10.20m) Be, 0°, P, R, Clay Ct (10.23m) J, 68°, P, R, Cn (10.25m) Be, 0°, P, R, Clay Vn	
		-8		SANDSTONE: fine to medium grained, light grey, bedded at 0-5°.						(10.50m) Be, 63 - 90°, C, R, Fe Ct, and Clay, Ct (10.52m) J, 75°, P, R, Fe Vn, and Clay, Ct (10.57m) J, 50°, P, R, Fe Sh (10.65m) J, 90°, P, R, Clay Ct (10.71m) Be, 5°, P, R, Clay Ct (10.86m) Be, 0°, P, R, Clay Ct	
		11		SANDSTONE: fine to coarse grained, light grey, with occasional siltstone lenses, bands and laminae, bedded at 0-5°.			*2.1				
				SANDSTONE: fine to coarse grained, light brown, bedded at 0-5°.			*2.6			(11.29m) CS, 5°, 7 mm.t (11.36m) Be, 0°, P, R, Clay, 3 mm.t (11.49m) CS, 0°, 21 mm.t	
		-9		SANDSTONE: fine to coarse grained, light brown, bedded at 0-5°.			*1.3			(11.64m) J, 20°, P, R, Fe Vn (11.67m) Be, 0°, P, R, Fe Vn (11.68m) Be, 0°, P, R, Cn (11.77m) J, 30°, P, R, Cn (11.83m) Be, 0°, P, R, Cn (11.86m) J, 35°, P, R, Cn (11.87m) J, 40°, P, R, Fe Vn (11.89m) Be, 0°, P, R, Fe Vn (11.90m) J, 40°, P, R, Fe Vn (11.94m) J x 2, 58°, P, R, Fe Ct (12.00m) J, 72°, P, R, Fe Ct	
		12		SANDSTONE: fine to medium grained, light grey, with occasional carbonaceous laminae, bedded at 0-5°.	FR		*1.0				
		-10					*0.90				
100% RETURN		13		SANDSTONE: fine to medium grained, light grey, bedded at 0-5°.			*1.2				
		-11					*1.4			(13.80m) J, 30°, P, R, Cn (13.82m) J, 40°, P, R, Cn (13.85m) J, 40°, P, R, Clay Vn (13.87m) Be, 5°, P, R, Clay Vn	
		14					*1.4				
		-12					*1.6				
		15					*1.4				
		-13					*1.3			(15.47m) Be, 0°, P, R, Clay Ct	

JK 9.024.LB.GLB Log JK CORED BOREHOLE - MASTER - 37790P GOSFORD.GPJ <-DrawingFile>> 22/08/2025 15:37 10.01.00.01 DwgGetLabAreaIn Situ Tool - DGD | Lib: JK 9.024.2019.05-31 Proj: JK 9.01.0.2018.03-20

## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.7 m  
**Date:** 30/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK400      **Bearing:** N/A      **Logged/Checked By:** J.L.O./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$		DEFECT DETAILS		Formation
								SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	Specific	General	
100% RETURN					SANDSTONE: fine to medium grained, light grey, with occasional carbonaceous laminae, bedded at 0-5°.	FR	H	VL-0.1 L M T VH-10 EH	600 200 60 20			
					END OF BOREHOLE AT 16.42 m							
			-14									
			17									
			-15									
			18									
			-16									
			19									
			-17									
			20									
			-18									
			21									
			-19									
			22									
			-20									

JK 9.02.4.LB.GLB Log JK CORED BOREHOLE - MASTER - 37790P GOSFORD.GPJ <-DrawingFile>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab and In Situ Tool - DGD | Lib: JK 9.02.4.2019-05-31 Proj: JK 9.01.0.2018-03-20

## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER      **R.L. Surface:** ~2.5 m  
**Date:** 31/7/25      **Datum:** AHD  
**Plant Type:** JK500      **Logged/Checked By:** C.A.R./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
ON 15/8/25							2.5	A	-	CONCRETE: 200mm.t				8mm DIA. REINFORCEMENT, 70mm TOP COVER
					N = 10 4,6,4		2.0	B	-	FILL: Clayey gravel, fine to medium grained, sub-angular igneous gravel, grey, trace of fine to medium grained sand.	M			APPEARS POORLY COMPACTED
							1.0	C	-	FILL: Clayey silty sand, fine to medium grained, grey brown and brown, trace of fine to medium grained sandstone gravel, roots and root fibres.				
					N = 2 1,1,1		1.0	D	-	FILL: Sandy silt, low plasticity, dark grey, trace of root fibres.	w>PL			POSSIBLY ALLUVIAL
							2.0	E	CL	Sandy CLAY: low plasticity, grey and yellow brown.	w>PL	S - F	30 40 50	NO SPT SAMPLE RETURN
							0.0	F	CL-CI	Silty CLAY: low to medium plasticity, light grey mottled red brown and light brown, with fine to medium grained sand.		VSt		ALLUVIAL
					N = 10 3,4,6		3.0	G					310 330 330	HP TESTING ON REMOULDED SAMPLE
							-1.0	H						
					N = 18 5,8,10		2.0	I	CI	Silty CLAY: medium plasticity, red brown mottled grey and light brown, with fine to medium grained ironstone gravel, trace of fine to medium grained sand.		Hd	400 410 420	
							5.0	J	-	Extremely Weathered sandstone: silty CLAY, medium plasticity, light grey and light brown, trace of fine to medium grained sand, and ironstone bands.	XW	Hd		TERRIGAL FORMATION
				N > 22 11,22/ 150mm REFUSAL		6.0	K					>600 >600 >600		

JK 9.02.4.LB.GLB Log JK AUGERHOLE - MASTER 37790P GOSFORD.GPJ <<DrawingFiles>> 22/08/2025 15:37 10.01.00.01 D:\git\JK\9.02.4.LB.GLB\JK 9.01.0.2018.03.20

## BOREHOLE LOG

<b>Client:</b> URBAN PROPERTY GROUP		
<b>Project:</b> PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT		
<b>Location:</b> 26-30 MANN STREET, GOSFORD, NSW		
<b>Job No.:</b> 37790P	<b>Method:</b> SPIRAL AUGER	<b>R.L. Surface:</b> ~2.5 m
<b>Date:</b> 31/7/25	<b>Datum:</b> AHD	
<b>Plant Type:</b> JK500	<b>Logged/Checked By:</b> C.A.R./P.W.	

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
										Extremely Weathered sandstone: silty CLAY, medium plasticity, light grey and light brown, trace of fine to medium grained sand, and ironstone bands. REFER TO CORED BOREHOLE LOG	XW	Hd		GROUNDWATER MONITORING WELL INSTALLED TO 16.23m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 9.23m TO 16.23m. CASING 0.10m TO 9.23m. 2mm SAND FILTER PACK 8.70m TO 16.23m. BENTONITE SEAL 7.30m TO 8.70m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						-5								
							8							
						-6								
							9							
						-7								
							10							
						-8								
							11							
						-9								
							12							
						-10								
							13							
						-11								

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## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.5 m  
**Date:** 31/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK500      **Bearing:** N/A      **Logged/Checked By:** C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										Specific	General	
					START CORING AT 7.07m							
			-5		SANDSTONE: fine to medium grained, light brown, bedded at 0-10°.	MW	L	0.080			(7.14m) J, 90°, Ir, R, Clay Ct (7.27m) J, 80°, C, R, Fe Ct	
			8				M - H	1.5 1.6			(7.48m) Be, 5°, P, S, Clay FILLED, 4 mm.t (7.52m) Ji, 90°, St	
			-6		SANDSTONE: fine to medium grained, grey, with siltstone bands and lenses, and occasional quartz gravel, bedded at 0-15°.	FR		1.2			(7.94m) J, 70°, P, R, Fe Sn (8.21m) Be, 10°, P, R, Fe Sn	
			9					0.90			(8.55m) Be, 10°, P, R, Clay Ct	
			-7					2.0				
			10					1.8			(9.80m) J, 70°, Ir, R, Fe Ct	
			-8					2.0				
			11					1.5			(10.82m) J, 25°, P, R, Cn (11.11m) J/Ji, 90°, Ir, S, Cn	
			-9					0.90				
			12		SANDSTONE: fine to coarse grained, light grey, occasional quartz gravel, bedded at 0-5°.			0.90			(11.85m) CS, 0°, 25 mm.t	
			-10					1.4				
			13					1.2			(12.58m) J, 30°, P, R, Cn	
			-11		SANDSTONE: fine to medium grained, light grey and grey, bedded at 0-10°.			0.90			(13.23m) Be, 0°, P, R, Cn	

JK 9.024.LB.GLB.Log JK CORED BOREHOLE - MASTER - 37790P.GOSFORD.GPJ <-DrawingFile> 22/08/2025 15:37 10.01.00.01 D:\geot\Lab and In Situ Tool - DGD | Lib: JK 9.024 2019-05-31 Proj: JK 9.01.0 2018-03-20

## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.5 m  
**Date:** 31/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK500      **Bearing:** N/A      **Logged/Checked By:** C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS			Formation		
									SPACING (mm)		DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness			
								600	200	60	20	Specific	General	
	90% RETURN	-12			SANDSTONE: fine to medium grained, light grey and grey, with occasional dark grey laminae, bedded at 0-10°.	FR	H	1.3 1.1 0.90 1.0 0.90						Terrigal Formation
		-14			END OF BOREHOLE AT 16.23 m				600	200	60	20		
		-15												
		-16												
		-17												
		-18												

JK 9.02.4.LB.GLB\_Log\_JK\_CORED\_BOREHOLE\_MASTER\_37790P\_GOSFORD.GPJ <-DrawingFile>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab\_and\In\_Situ\_Tools\_DGD\Lab\JK\_9.02.4\_2019\_05-31\_P11\_JK\_9.01.0\_2018\_03-20

## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER      **R.L. Surface:** ~2.7 m  
**Date:** 31/7/25      **Datum:** AHD  
**Plant Type:** JK500      **Logged/Checked By:** C.A.R./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
ON 15/8/25					N = 14 5,7,7	2	[Cross-hatched pattern]	-	CONCRETE: 100mm.t  FILL: Sandy gravel, fine to medium grained, sub-angular igneous gravel, grey, fine to medium grained sand.  FILL: Silty sand, fine to medium grained, brown grey, trace of fine to medium grained igneous gravel.	M			NO REINFORCEMENT OBSERVED  APPEARS MODERATELY COMPACTED	
						1			FILL: Sandy silt, low plasticity, dark grey, fine to medium grained sand, trace of root fibres.	w>PL			POSSIBLY ALLUVIAL	
					N = 5 2,3,2	1	[Diagonal lines pattern]	CL	Sandy CLAY: low plasticity, grey, fine to medium grained sand.	w>PL	St	160 160 180	ALLUVIAL  GROUNDWATER MONITORING WELL INSTALLED TO 16.05m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 10.05m TO 16.05m. CASING 0.10m TO 10.05m. 2mm SAND FILTER PACK 9.40m TO 16.05m. BENTONITE SEAL 7.40m TO 9.40m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.	
						2			CI	Silty CLAY: medium plasticity, grey and yellow brown, trace of fine to medium grained ironstone gravel, fine grained sand, and root fibres.		St - VSt		
					N = 9 4,3,6	3	[Diagonal lines pattern]						180 210 190	SECONDARY GROUNDWATER MONITORING WELL INSTALLED TO 4.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.5m TO 4.5m. CASING 0.1m-1.5m. 2mm SAND FILTER PACK 4.5m TO 0.8m. BENTONITE SEAL 0.8m TO 0.1m. COMPLETED WITH A CONCRETED GATIC COVER.
					4						Hd			
				N = 30 7,13,17	2	[Diagonal lines pattern]						500 >600 520		
					5									TERRIGAL FORMATION
						6	[Dotted pattern]	-	SANDSTONE: fine to medium grained, grey, with extremely weathered bands and ironstone gravel.	DW	VL			
									REFER TO CORED BOREHOLE LOG					
						4								

JK 9.02.4.LB.GLB Log JK AUGERHOLE - MASTER 37790P GOSFORD.GPJ <<DrawingFiles>> 22/08/2025 15:37 10.01.00.01 Dargit Lab and In Situ Tool - DGD | Lib: JK 9.02.4.2019.05.31 Proj: JK 9.01.0.2018.03.20

## CORED BOREHOLE LOG

<b>Client:</b>	URBAN PROPERTY GROUP
<b>Project:</b>	PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT
<b>Location:</b>	26-30 MANN STREET, GOSFORD, NSW

<b>Job No.:</b> 37790P	<b>Core Size:</b> NMLC	<b>R.L. Surface:</b> ~2.7 m
<b>Date:</b> 31/7/25	<b>Inclination:</b> VERTICAL	<b>Datum:</b> AHD
<b>Plant Type:</b> JK500	<b>Bearing:</b> N/A	<b>Logged/Checked By:</b> C.A.R./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components START CORING AT 6.10m	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation	
										Specific	General		
					NO CORE 0.17m								
			4		SANDSTONE: fine to medium grained, light brown, orange brown and light grey, bedded at 0-10°.	HW	VL - L	+0.10					
			7	L - M			+0.30					(7.22m) CS, 0°, 90 mm.t	
			8	M - H			+0.60					(7.76m) CS, 0°, 110 mm.t	
			9		SANDSTONE: fine grained, grey, with siltstone lenses and occasional quartz gravel, bedded at 0-10°.	SW	L - M	+1.7					
			10				+0.040					(8.10-8.46m) Jh/Ji, 80°, Ir	
			11				+0.10					(8.61m) Be, 0°, P, S, Clay Ct	
			12				+0.040					(8.78m) J, 90°, P, R, Fe Sn	
			13				+0.10					(8.90m) Be, 0°, P, R, Clay FILLED, 3 mm.t	
			14				+0.040					(8.98m) J, 90°, P, R, Fe Sn	
			15				+0.10					(9.22m) Ji, 45°, C	
			16				+0.040					(9.34m) Be, 0°, P, S, Clay Ct	
			17				+0.10					(9.39m) J, 80°, St, R, Fe Ct	
			18				+0.040					(9.44-9.82m) Ji, 80°, P	
			19		+0.90					(9.98m) J x 3, 90°, P, R, Fe Ct			
			20		+0.040					(10.10m) Jh, 80°, P			
			21		+0.040					(10.26m) J, 70°, C, S, Clay Ct			
			22		+0.040					(10.46m) Ji, 45°, C			
			23		+0.040					(10.62m) Ji, 90°, P			
			24		+0.040					(10.75m) Ji, 90°, P			
			25		+0.040					(10.92m) Be, 5°, P, R, Clay Ct			
			26		+0.040					(11.04m) Be, 0°, P, R, Fe Ct			
			27		+0.040					(11.18m) Jh, 90°, St			
			28		+0.040					(11.28m) CS, 0°, 70 mm.t			
			29		+0.040					(11.35m) XWS, 0°, 70 mm.t			
			30		NO CORE 0.13m							(11.55m) CS, 0°, 40 mm.t	
			31		SANDSTONE: fine to medium grained, light brown and light grey, with occasional quartz gravel, bedded at 0-10°.	MW	M	+1.4					
			32	M			+0.70					(12.15m) Jh, 90°, P	
			33		NO CORE 0.15m							(12.20m) Cr, 0°, 50 mm.t	
			34		SANDSTONE: fine grained, light brown and light grey, with occasional quartz gravel, bedded at 0-10°.	MW	M	+0.30					
			35	M			+0.30					(12.60m) J, 70°, Ir, R, Fe Ct	
			36									(12.83m) J, 70°, P, R, Cn	

JK 9.024.LB.GLB Log\_JK\_CORED\_BOREHOLE - MASTER\_37790P\_GOSFORD.GPJ -> DrawingFile -> 22/08/2025 15:37 10.01.00.01 D:\get\Lab\and\In Situ\Tool - DGD | Lib: JK 9.024 2019-05-31 Proj: JK 9.01.0 2018-03-20

## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** NMLC      **R.L. Surface:** ~2.7 m  
**Date:** 31/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK500      **Bearing:** N/A      **Logged/Checked By:** C.A.R./P.W.

Water Loss Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS		Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	
									600 200 60 20	Specific General	
0% RETURN		-11			SANDSTONE: fine grained, light brown and light grey, with occasional quartz gravel, bedded at 0-10°. <i>(continued)</i>	MW	M	0.30		(13.10m) XWS, 5°, 15 mm.t	Terrigal Formation
		14					0.40		(13.47m) Be, 5 - 10°, P, R, Fe Ct		
									(13.77m) Be, 10°, P, R, Fe Sn		
									(13.98m) J, 80°, P, R, Fe Ct		
		-12					1.2		(14.30m) Be, 5 - 10°, P, R, Fe Ct		
									(14.43m) Be, 5 - 10°, P, R, Fe Ct		
									(14.55m) Be, 5 - 10°, P, R, Fe Ct		
							1.4		(14.92m) Be, 10°, P, R, Fe Ct		
							0.70				
									(15.35m) Be, 5°, P, R, Fe Ct		
70% RETURN		-13						0.90			
		16			END OF BOREHOLE AT 16.06 m						
		-14							660 260 66 26		
		17									
		-15									
		18									
		-16									
		19									
		-17									

JK 9.02.4.LB.GLB Log JK CORED BOREHOLE - MASTER - 37790P GOSFORD.GPJ <-DrawingFile>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab\area\In Situ\Tool - DGD | Lib: JK 9.02.4.2019.05-31 Proj: JK 9.01.0.2018.03.20

## BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Method:** SPIRAL AUGER      **R.L. Surface:** ~3.1 m  
**Date:** 30/7/25      **Datum:** AHD  
**Plant Type:** JK400      **Logged/Checked By:** J.L.O./P.W.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
					N = 2 1,0,2	3				FILL: Silty sand, fine to medium grained, brown and grey brown, with clay fines, trace of fine to medium grained igneous and ironstone gravel, organics and root fibres.  FILL: Sandy silt, low plasticity, dark grey, fine to medium grained sand, trace of clay fines.	W  w>PL		50 40 40	GRASS COVER  APPEARS POORLY COMPACTED  POSSIBLY ALLUVIAL
					N = 9 3,4,5	2			CL	Silty CLAY: low to medium plasticity, light grey, trace of fine grained sand.	w>PL	St	100 200 170	ALLUVIAL
					N = 28 6,11,17	1			CL-CI	Silty CLAY: low to medium plasticity, light grey mottled light brown, trace of fine to medium grained sand.				
					N=SPT 6/50mm REFUSAL	0				as above, but with fine to coarse grained ironstone gravel and fine to medium grained sand.		Hd	>600 >600 >600	
						-1						Vst	250 260	SPT REFUSAL ON IRONSTONE GRAVEL
						-2				REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 16.3m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 9.3m TO 16.3m. CASING 0.1m TO 9.3m. 2mm SAND FILTER PACK 8.8m TO 16.3m. BENTONITE SEAL 6.7m TO 8.8m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						-3								

JK 9.02.4.LB.GLB Log JK AUGERHOLE - MASTER 37790P GOSFORD.GPJ <<DrawingFiles>> 22/08/2025 15:37 10.01.00.01 D:\git\Lab and In Situ Tool - DGD | Lib JK 9.02.4.2019\05-31 Proj JK 9.01.0.2018-03-20

## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** HQ      **R.L. Surface:** ~3.1 m  
**Date:** 30/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK400      **Bearing:** N/A      **Logged/Checked By:** J.L.O./P.W.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS				Formation		
									SPACING (mm)		DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness				
								600 200 60 20		Specific General					
		-1													
					START CORING AT 4.70m										
					NO CORE 0.11m										
					SANDSTONE: fine to medium grained, grey and light brown, bedded at 0-5°.	HW MW	VL VL - L	0.080 0.10							
					as above, but light grey, bedded at 0-5°.		M	0.50 0.50							
						FR		1.0 0.50							
							H	1.5 1.4 1.7 1.4 1.7 1.7							
					SANDSTONE: fine grained, light grey, with siltstone seams and laminae, bedded at 0-10°.										

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## CORED BOREHOLE LOG

**Client:** URBAN PROPERTY GROUP  
**Project:** PROPOSED CCQ2 RESIDENTIAL DEVELOPMENT  
**Location:** 26-30 MANN STREET, GOSFORD, NSW

**Job No.:** 37790P      **Core Size:** HQ      **R.L. Surface:** ~3.1 m  
**Date:** 30/7/25      **Inclination:** VERTICAL      **Datum:** AHD  
**Plant Type:** JK400      **Bearing:** N/A      **Logged/Checked By:** J.L.O./P.W.

Water Loss Level Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	DEFECT DETAILS		Formation
								SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	
	-8			SANDSTONE: fine grained, light grey, with siltstone seams and laminae, bedded at 0-10°. <i>(continued)</i>	FR	H	1.4 2.9 1.7	600 200 60 20		Terrigal Formation
	-9	12		SANDSTONE: fine to coarse grained, light grey and light brown, with occasional quartz gravel, bedded at 5-15°.	SW		0.80 1.6 1.2	600 200 60 20	(12.56m) CS, 5°, 4 mm.t (12.67m) XWS, 0°, 13 mm.t (12.70m) XWS, 0°, 5 mm.t (12.77m) Be, 0°, P, R, Clay, 4 mm.t  (13.29m) CS, 10°, 9 mm.t (13.58m) J, 60°, P, R, Fe Ct	
	-10	13		SANDSTONE: fine to medium grained, light grey, bedded at 0-5°.	FR		1.3 1.2 1.3 1.5	600 200 60 20	(13.87m) J, 36°, P, R, Fe Vn	
	-11	14		as above, but brown.	SW		1.8	600 200 60 20		
	-13	16		END OF BOREHOLE AT 16.30 m						
	-14	17								

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# ENVIRONMENTAL LOGS EXPLANATION NOTES

## INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

## DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 'Geotechnical Site Investigations'. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

## INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

**Test Pits:** These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

**Hand Auger Drilling:** A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

**Continuous Spiral Flight Augers:** The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

**Rock Augering:** Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

**Wash Boring:** The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from “feel” and rate of penetration.

**Mud Stabilised Drilling:** Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term ‘mud’ encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

**Continuous Core Drilling:** A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

**Standard Penetration Tests:** Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is

described in Australian Standard 1289.6.3.1–2004 (R2016) ‘*Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)*’.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the ‘N’ value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

N = 13  
4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

N > 30  
15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as ‘N<sub>c</sub>’ on the borehole logs, together with the number of blows per 150mm penetration.

## LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than ‘straight line’ variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

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## **GROUNDWATER**

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

## **FILL**

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

## **LABORATORY TESTING**

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

## SYMBOL LEGENDS

### SOIL



FILL



TOPSOIL



CLAY (CL, CI, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CI, CH)



SILTY CLAY (CL, CI, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CI, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML, MH)



PEAT AND HIGHLY ORGANIC SOILS (Pt)

### ROCK



CONGLOMERATE



SANDSTONE



SHALE/MUDSTONE



SILTSTONE



CLAYSTONE



COAL



LAMINITE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

### OTHER MATERIALS



BRICKS OR PAVERS



CONCRETE



ASPHALTIC CONCRETE

## CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 68% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

**Laboratory Classification Criteria**

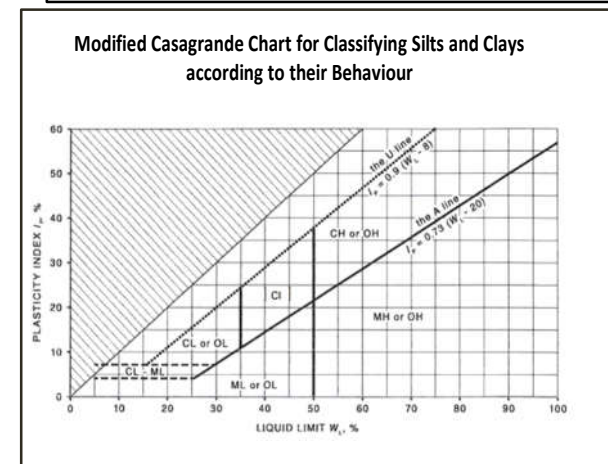
A well graded coarse grained soil is one for which the coefficient of uniformity  $C_u > 4$  and the coefficient of curvature  $1 < C_c < 3$ . Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

Where  $D_{10}$ ,  $D_{30}$  and  $D_{60}$  are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

- NOTES:**
- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
  - Where the grading is determined from laboratory tests, it is defined by coefficients of curvature ( $C_c$ ) and uniformity ( $C_u$ ) derived from the particle size distribution curve.
  - Clay soils with liquid limits  $> 35\%$  and  $\leq 50\%$  may be classified as being of medium plasticity.
  - The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	
fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–





## LOG SYMBOLS

Log Column	Symbol	Definition		
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.		
		Extent of borehole/test pit collapse shortly after drilling/excavation.		
		Groundwater seepage into borehole or test pit noted during drilling or excavation.		
Samples	ES	Sample taken over depth indicated, for environmental analysis.		
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.		
	DB	Bulk disturbed sample taken over depth indicated.		
	DS	Small disturbed bag sample taken over depth indicated.		
	ASB	Soil sample taken over depth indicated, for asbestos analysis.		
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.		
	SAL	Soil sample taken over depth indicated, for salinity analysis.		
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.		
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.		
	N <sub>c</sub> =	5	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.	
		7		
		3R		
VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).			
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.		
	w ≈ PL	Moisture content estimated to be approximately equal to plastic limit.		
	w < PL	Moisture content estimated to be less than plastic limit.		
	w ≈ LL	Moisture content estimated to be near liquid limit.		
	w > LL	Moisture content estimated to be wet of liquid limit.		
	(Coarse Grained Soils)	D	DRY – runs freely through fingers.	
M		MOIST – does not run freely but no free water visible on soil surface.		
W		WET – free water visible on soil surface.		
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.		
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.		
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.		
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.		
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.		
	Hd	HARD – unconfined compressive strength > 400kPa.		
	Fr	FRIABLE – strength not attainable, soil crumbles.		
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.		
Density Index/ Relative Density (Cohesionless Soils)		<b>Density Index (I<sub>D</sub>) Range (%)</b>	<b>SPT 'N' Value Range (Blows/300mm)</b>	
	VL	VERY LOOSE	≤ 15	0 – 4
	L	LOOSE	> 15 and ≤ 35	4 – 10
	MD	MEDIUM DENSE	> 35 and ≤ 65	10 – 30
	D	DENSE	> 65 and ≤ 85	30 – 50
	VD	VERY DENSE	> 85	> 50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.		



Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit 'TC' bit <b>T</b> <sub>60</sub> Soil Origin	<p>Hardened steel 'V' shaped bit.</p> <p>Twin pronged tungsten carbide bit.</p> <p>Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.</p> <p>The geological origin of the soil can generally be described as:</p> <p><b>RESIDUAL</b> – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock.</p> <p><b>EXTREMELY WEATHERED</b> – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock.</p> <p><b>ALLUVIAL</b> – soil deposited by creeks and rivers.</p> <p><b>ESTUARINE</b> – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents.</p> <p><b>MARINE</b> – soil deposited in a marine environment.</p> <p><b>AEOLIAN</b> – soil carried and deposited by wind.</p> <p><b>COLLUVIAL</b> – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits.</p> <p><b>LITTORAL</b> – beach deposited soil.</p>



## Classification of Material Weathering

Term	Abbreviation	Definition
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		
Slightly Weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

**NOTE 1:** The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'. There is some change in rock strength.

## Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.



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## **Appendix G: Laboratory Reports & COC Documents**

## CERTIFICATE OF ANALYSIS 387577

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Vittal Boggaram
<b>Address</b>	PO Box 976, North Ryde BC, NSW, 1670

### Sample Details

<b>Your Reference</b>	<u>E37799B, Gosford NSW</u>
<b>Number of Samples</b>	24 Soil
<b>Date samples received</b>	04/08/2025
<b>Date completed instructions received</b>	05/08/2025

### Analysis Details

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

Samples were analysed as received from the client unless as indicated below in the method summaries. 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

<b>Date results requested by</b>	12/08/2025
<b>Date of Issue</b>	12/08/2025

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

Loren Bardwell, Development Chemist  
 Priya Samarawickrama, Senior Chemist

#### Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: E37799B, Gosford NSW

Misc Inorg - Soil						
Our Reference		387577-1	387577-5	387577-6	387577-7	387577-8
Your Reference	UNITS	BH1	BH1	BH1	BH1	BH1
Depth		0-0.2	2.3-2.5	6-6.02	7.5-7.7	9-9.2
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
pH 1:5 soil:water	pH Units	6.2	6.2	8.0	7.8	7.1
Sulphate, SO4 1:5 soil:water	mg/kg	<10	10	<10	<10	<10
Chloride, Cl 1:5 soil:water	mg/kg	10	31	10	20	10
Resistivity in soil*	ohm m	330	150	140	190	300

Misc Inorg - Soil						
Our Reference		387577-9	387577-11	387577-12	387577-13	387577-15
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH3
Depth		0.1-0.2	1.8-2	2.2-2.5	2.8-3	0.6-0.7
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
pH 1:5 soil:water	pH Units	7.1	6.3	6.3	5.9	6.3
Sulphate, SO4 1:5 soil:water	mg/kg	75	10	28	20	<10
Chloride, Cl 1:5 soil:water	mg/kg	53	20	20	31	<10
Resistivity in soil*	ohm m	43	140	160	210	230

Misc Inorg - Soil						
Our Reference		387577-17	387577-18	387577-20	387577-22	387577-23
Your Reference	UNITS	BH3	BH3	BH4	BH4	BH4
Depth		2.5-2.7	4-4.1	0.6-0.7	1.7-1.9	4-4.2
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
pH 1:5 soil:water	pH Units	5.3	6.4	8.1	6.0	7.1
Sulphate, SO4 1:5 soil:water	mg/kg	57	58	29	50	32
Chloride, Cl 1:5 soil:water	mg/kg	10	10	10	20	10
Resistivity in soil*	ohm m	160	150	120	180	150

Misc Inorg - Soil		
Our Reference		387577-24
Your Reference	UNITS	BH1
Depth		3.1-3.2
Date Sampled		30/07/2025
Type of sample		Soil
Date prepared	-	06/08/2025
Date analysed	-	06/08/2025
pH 1:5 soil:water	pH Units	6.5
Sulphate, SO4 1:5 soil:water	mg/kg	20
Chloride, Cl 1:5 soil:water	mg/kg	20
Resistivity in soil*	ohm m	250

Client Reference: E37799B, Gosford NSW

Texture and Salinity*						
Our Reference		387577-1	387577-5	387577-6	387577-7	387577-8
Your Reference	UNITS	BH1	BH1	BH1	BH1	BH1
Depth		0-0.2	2.3-2.5	6-6.02	7.5-7.7	9-9.2
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Date analysed	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	30	67	72	52	33
Texture Value	-	9.0	8.5	7.0	7.0	8.0
Texture	-	CLAY LOAM	LIGHT CLAY	MEDIUM CLAY	MEDIUM CLAY	LIGHT MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		387577-9	387577-11	387577-12	387577-13	387577-15
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH3
Depth		0.1-0.2	1.8-2	2.2-2.5	2.8-3	0.6-0.7
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Date analysed	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	230	74	62	48	43
Texture Value	-	9.0	8.5	8.5	8.5	7.0
Texture	-	CLAY LOAM	LIGHT CLAY	LIGHT CLAY	LIGHT CLAY	MEDIUM CLAY
ECe	dS/m	2.1	<2	<2	<2	<2
Class	-	SLIGHTLY SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*						
Our Reference		387577-17	387577-18	387577-20	387577-22	387577-23
Your Reference	UNITS	BH3	BH3	BH4	BH4	BH4
Depth		2.5-2.7	4-4.1	0.6-0.7	1.7-1.9	4-4.2
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Date analysed	-	07/08/2025	07/08/2025	07/08/2025	07/08/2025	07/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	62	68	86	55	65
Texture Value	-	8.5	8.0	14	8.5	8.0
Texture	-	LIGHT CLAY	LIGHT MEDIUM CLAY	SANDY LOAM	LIGHT CLAY	LIGHT MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*		
Our Reference		387577-24
Your Reference	UNITS	BH1
Depth		3.1-3.2
Date Sampled		30/07/2025
Type of sample		Soil
Date prepared	-	07/08/2025
Date analysed	-	07/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	40
Texture Value	-	9.0
Texture	-	CLAY LOAM
ECe	dS/m	<2
Class	-	NON SALINE

Client Reference: E37799B, Gosford NSW

CEC					
Our Reference		387577-1	387577-9	387577-15	387577-20
Your Reference	UNITS	BH1	BH2	BH3	BH4
Depth		0-0.2	0.1-0.2	0.6-0.7	0.6-0.7
Date Sampled		30/07/2025	30/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	12/08/2025	12/08/2025	12/08/2025	12/08/2025
Date analysed	-	12/08/2025	12/08/2025	12/08/2025	12/08/2025
Exchangeable Ca	meq/100g	0.8	7.6	3.0	4.0
Exchangeable K	meq/100g	<0.1	0.3	0.2	<0.1
Exchangeable Mg	meq/100g	0.4	1.9	1.6	0.4
Exchangeable Na	meq/100g	<0.1	0.4	0.1	<0.1
Cation Exchange Capacity	meq/100g	1.3	10	5.0	4.5

**Client Reference: E37799B, Gosford NSW**

<b>Method ID</b>	<b>Methodology Summary</b>
<b>Inorg-001</b>	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
<b>Inorg-002</b>	Conductivity and Salinity - measured using a conductivity cell.
<b>Inorg-002</b>	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity (non NATA). Resistivity (calculated) may not correlate with results otherwise obtained using Resistivity-Current method, depending on the nature of the soil being analysed.
<b>Inorg-081</b>	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
<b>INORG-123</b>	Determined using a "Texture by Feel" method.
<b>Metals-020</b>	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Misc Inorg - Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	387577-5
Date prepared	-			06/08/2025	1	06/08/2025	06/08/2025		06/08/2025	06/08/2025
Date analysed	-			06/08/2025	1	06/08/2025	06/08/2025		06/08/2025	06/08/2025
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	6.2	6.2	0	100	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	1	<10	<10	0	103	87
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	1	10	10	0	98	84
Resistivity in soil*	ohm m	1	Inorg-002	[NT]	1	330	330	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			[NT]	17	06/08/2025	06/08/2025		06/08/2025	[NT]
Date analysed	-			[NT]	17	06/08/2025	06/08/2025		06/08/2025	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	17	5.3	5.3	0	100	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	17	57	60	5	97	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	17	10	10	0	91	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	[NT]	17	160	160	0	[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Texture and Salinity*							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			07/08/2025	[NT]	[NT]	[NT]	[NT]	07/08/2025	[NT]
Date analysed	-			07/08/2025	[NT]	[NT]	[NT]	[NT]	07/08/2025	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Texture and Salinity*							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	07/08/2025	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	07/08/2025	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	[NT]	[NT]	[NT]	[NT]	94	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: CEC				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	387577-1
Date prepared	-			12/08/2025	20	12/08/2025	12/08/2025		12/08/2025	12/08/2025
Date analysed	-			12/08/2025	20	12/08/2025	12/08/2025		12/08/2025	12/08/2025
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	20	4.0	4.0	0	95	96
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	20	<0.1	<0.1	0	96	93
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	20	0.4	0.4	0	90	91
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	20	<0.1	<0.1	0	89	86

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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.

## 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.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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.

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.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Vittal Boggaram

### Sample Login Details

<b>Your reference</b>	E37799B, Gosford NSW
<b>Envirolab Reference</b>	387577
<b>Date Sample Received</b>	04/08/2025
<b>Date Instructions Received</b>	05/08/2025
<b>Date Results Expected to be Reported</b>	12/08/2025

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	24 Soil
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	17
<b>Cooling Method</b>	None
<b>Sampling Date Provided</b>	YES

### Comments

BH1/3.1-3.2 received 5/8/25

BH1/4.5-4.6 not received

Please direct any queries to:

#### Aileen Hie

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** ahie@envirolab.com.au

#### Jacinta Hurst

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** jhurst@envirolab.com.au

*Analysis Underway, details on the following page:*



Sample ID	Misc Inorg - Soil	Texture and Salinity*	CEC	On Hold
BH1-0-0.2	✓	✓	✓	
BH1-0.5-0.7				✓
BH1-1.3-1.5				✓
BH1-1.8-1.9				✓
BH1-2.3-2.5	✓	✓		
BH1-6-6.02	✓	✓		
BH1-7.5-7.7	✓	✓		
BH1-9-9.2	✓	✓		
BH2-0.1-0.2	✓	✓	✓	
BH2-0.7-1				✓
BH2-1.8-2	✓	✓		
BH2-2.2-2.5	✓	✓		
BH2-2.8-3	✓	✓		
BH3-0.2-0.3				✓
BH3-0.6-0.7	✓	✓	✓	
BH3-1.2-1.3				✓
BH3-2.5-2.7	✓	✓		
BH3-4-4.1	✓	✓		
BH4-0.1-0.3				✓
BH4-0.6-0.7	✓	✓	✓	
BH4-1.1-1.2				✓
BH4-1.7-1.9	✓	✓		
BH4-4-4.2	✓	✓		
BH1-3.1-3.2	✓	✓		

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.

Loc 418725 1430

**SAMPLE AND CHAIN OF CUSTODY FORM**

<b>TO:</b> ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	<b>JKE Job Number:</b> E377998  <b>Date Results Required:</b> STANDARD  <b>Page:</b> 1 of 1	<b>FROM:</b> <b>JK Environments</b> REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Vittal Boggaram vboggaram@jkenvironments.com.au
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Location: Gosford, NSW						Sample Preserved in Esky on Ice													
Sampler: CAR/ILO						Tests Required													
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	Ece (texture)	Sulphate	Chloride	Resistivity	CEC							
30.07.25	1	BH1	0-0.2	P	F: Silty Sand	X	X	X	X	X	X	X							
30.07.25	2	BH1	0.5-0.7	P	F: Silty Sand														
30.07.25	3	BH1	1.3-1.5	P	F: Silty Sand														
30.07.25	4	BH1	1.8-1.9	P	F: Silty Clay														
30.07.25	5	BH1	2.3-2.5	P	Sand	X	X	X	X	X	X								
30.07.25	24	BH1	3.1-3.2	P	Sandy Clay	X	X	X	X	X	X								
30.07.25	NR	BH1	4.5-4.6	P	Silty Clay														
30.07.25	6	BH1	6-6.02	P	sandy clay	X	X	X	X	X	X								
30.07.25	7	BH1	7.5-7.7	P	Silty clay	X	X	X	X	X	X								
30.07.25	8	BH1	9-9.2	P	Silty Clay	X	X	X	X	X	X								
30.07.25	9	BH2	0.1-0.2	P	F: clayey silty sand	X	X	X	X	X	X	X							
30.07.25	10	BH2	0.7-1	P	F: Sandy clay														
30.07.25	11	BH2	1.8-2	P	sandy silt	X	X	X	X	X	X								
30.07.25	12	BH2	2.2-2.5	P	clayey sand	X	X	X	X	X	X								
30.07.25	13	BH2	2.8-3	P	sandy clay	X	X	X	X	X	X								
31.07.25	14	BH3	0.2-0.3	P	f: clayey gravel														
31.07.25	15	BH3	0.6-0.7	P	F: Clayey silty sand	X	X	X	X	X	X	X							
31.07.25	16	BH3	1.2-1.3	P	F: sandy silt														
31.07.25	17	BH3	2.5-2.7	P	Silty clay	X	X	X	X	X	X								
31.07.25	18	BH3	4-4.1	P	Silty clay	X	X	X	X	X	X								
31.07.25	19	BH4	0.1-0.3	P	F: Sandy gravel														
31.07.25	20	BH4	0.6-0.7	P	F: silty sand	X	X	X	X	X	X	X							
31.07.25	21	BH4	1.1-1.2	P	F: sandy silt														
31.07.25	22	BH4	1.7-1.9	P	sandy clay	X	X	X	X	X	X								
31.07.25	23	BH4	4-4.2	P	silty clay	X	X	X	X	X	X								

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag
---	--

Relinquished By: VB	Date: 4/08/25	Time: 14:30	Received By: ELS SYD K.C	Date: 4/9/25
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**Envirolab Services**  
 12 Ashley St  
 Chatswood NSW 2067  
 Ph: (02) 9910 2233  
 Job No: 387577  
 Date Received: 4/8/25  
 Time Received: 1510  
 Received By: K.C  
 Temp: Cool Ambient  
 Cooling: Ice/icepack  
 Security: Intact/Broken/None

**SAMPLE AND CHAIN OF CUSTODY FORM**

<b>TO:</b> ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201  Attention: Aileen	<b>JKE Job Number:</b> E377998  <b>Date Results Required:</b> STANDARD  <b>Page:</b> 1 of 1	<b>FROM:</b>  REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: <u>Vittal Boggaram</u>
---	---	--

<b>Location:</b>	Gosford, NSW					Sample Preserved in Esky on Ice													
<b>Sampler:</b>	CAR/JLO					Tests Required													
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	E <sub>c</sub> e (texture)	Sulphate	Chloride	Resistivity								
30.07.25		BH1	0-0.2	P	F: Silty Sand														
30.07.25		BH1	0.5-0.7	P	F: Silty Sand														
30.07.25		BH1	1.3-1.5	P	F: Silty Sand														
30.07.25		BH1	1.8-1.9	P	F: Silty Clay														
30.07.25		BH1	2.3-2.5	P	Sand														
30.07.25		BH1	3.1-3.2	P	Sandy Clay														
30.07.25		BH1	4.5-4.6	P	silty clay														
30.07.25		BH1	6-6.02	P	sandy clay														
30.07.25		BH1	7.5-7.7	P	Silty clay														
30.07.25		BH1	9-9.2	P	Silty Clay														
30.07.25		BH2	0.1-0.2	P	F: clayey silty sand														
30.07.25		BH2	0.7-1	P	F: Sandy clay														
30.07.25		BH2	1.8-2	P	sandy silt														
30.07.25		BH2	2.2-2.5	P	clayey sand														
30.07.25		BH2	2.8-3	P	sandy clay														
31.07.25		BH3	0.2-0.3	P	f: clayey gravel														
31.07.25		BH3	0.6-0.7	P	F: Clayey silty sand														
31.07.25		BH3	1.2-1.3	P	F: sandy silt														
31.07.25		BH3	2.5-2.7	P	Silty clay														
31.07.25		BH3	4-4.1	P	Silty clay														
31.07.25		BH4	0.1-0.3	P	F: Sandy gravel														
31.07.25		BH4	0.6-0.7	P	F: silty sand														
31.07.25		BH4	1.1-1.2	P	F: sandy silt														
31.07.25		BH4	1.7-1.9	P	sandy clay														
31.07.25		BH4	4-4.2	P	silty clay														
<b>Remarks (comments/detection limits required):</b>						Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag													
<b>Relinquished By:</b>				<b>Date:</b>		<b>Time:</b>				<b>Received By:</b>				<b>Date:</b>					

See ECOC

#387577  
4/8/25  
m



**Envirolab Services Pty Ltd**  
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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 387581**

### **Client Details**

<b>Client</b>	JK Environments
<b>Attention</b>	Vittal Boggaram
<b>Address</b>	PO Box 976, North Ryde BC, NSW, 1670

### **Sample Details**

<b>Your Reference</b>	<b><u>E37799B, Gosford NSW</u></b>
<b>Number of Samples</b>	44 Soil
<b>Date samples received</b>	04/08/2025
<b>Date completed instructions received</b>	04/08/2025

### **Analysis Details**

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

Samples were analysed as received from the client unless as indicated below in the method summaries. 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**

<b>Date results requested by</b>	11/08/2025
<b>Date of Issue</b>	11/08/2025

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

#### **Results Approved By**

Nick Sarlamis, Assistant Operation Manager

#### **Authorised By**

Nancy Zhang, Laboratory Manager

Client Reference: E37799B, Gosford NSW

sPOCAS field test						
Our Reference		387581-1	387581-2	387581-3	387581-4	387581-5
Your Reference	UNITS	BH1	BH1	BH1	BH1	BH1
Depth		0-0.1	0.1-0.2	0.5-0.7	1-1.1	1.3-1.5
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	8.6	6.2	4.8	4.9	4.7
pH <sub>FOX</sub> (field peroxide test)	pH Units	6.5	3.7	4.2	4.0	3.4
Reaction Rate*	-	Low reaction	Medium reaction	High reaction	High reaction	Medium reaction

sPOCAS field test						
Our Reference		387581-6	387581-7	387581-8	387581-9	387581-10
Your Reference	UNITS	BH1	BH1	BH1	BH1	BH1
Depth		1.8-1.9	2.3-2.5	3.1-3.2	4.5-4.6	6-6.2
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.4	6.1	6.0	6.8	7.6
pH <sub>FOX</sub> (field peroxide test)	pH Units	4.6	3.6	3.6	4.2	6.1
Reaction Rate*	-	Volcanic reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		387581-11	387581-12	387581-13	387581-14	387581-15
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH2
Depth		7.5-7.7	9-9.2	0.1-0.2	0.7-1	1.3-1.5
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	7.4	7.2	6.2	6.0	5.6
pH <sub>FOX</sub> (field peroxide test)	pH Units	6.0	6.0	3.5	4.2	3.3
Reaction Rate*	-	High reaction	Low reaction	Medium reaction	High reaction	Medium reaction

Client Reference: E37799B, Gosford NSW

sPOCAS field test						
Our Reference		387581-16	387581-17	387581-18	387581-19	387581-20
Your Reference	UNITS	BH2	BH2	BH2	BH2	BH2
Depth		1.65-1.7	2.2-2.5	2.8-3	3.3-3.45	4.65-4.95
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.6	6.4	5.4	5.7	6.5
pH <sub>FOX</sub> (field peroxide test)	pH Units	4.2	3.2	3.9	4.3	5.6
Reaction Rate*	-	Volcanic reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		387581-21	387581-22	387581-23	387581-24	387581-25
Your Reference	UNITS	BH3	BH3	BH3	BH3	BH3
Depth		0.2-0.3	0.6-0.7	1.2-1.3	2-2.1	2.5-2.7
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.1	5.2	6.4	5.2	5.6
pH <sub>FOX</sub> (field peroxide test)	pH Units	3.5	2.6	4.1	2.7	2.8
Reaction Rate*	-	Low reaction	Medium reaction	Volcanic reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		387581-26	387581-27	387581-28	387581-29	387581-30
Your Reference	UNITS	BH3	BH3	BH3	BH3	BH3
Depth		3.1-3.3	4-4.1	4.4-4.5	5-5.1	5.5-5.7
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	5.8	6.1	6.3	6.4	6.3
pH <sub>FOX</sub> (field peroxide test)	pH Units	3.8	4.6	4.9	4.4	4.7
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

Client Reference: E37799B, Gosford NSW

sPOCAS field test						
Our Reference		387581-31	387581-32	387581-33	387581-34	387581-35
Your Reference	UNITS	BH3	BH4	BH4	BH4	BH4
Depth		6-6.2	0.1-0.2	0.6-0.7	1.1-1.2	1.5-1.7
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.3	7.9	8.3	6.8	7.1
pH <sub>FOX</sub> (field peroxide test)	pH Units	4.4	5.9	6.0	2.9	3.2
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Medium reaction	Medium reaction

sPOCAS field test						
Our Reference		387581-36	387581-37	387581-38	387581-39	387581-40
Your Reference	UNITS	BH4	BH4	BH4	BH4	BH4
Depth		1.7-1.9	2-2.2	2.6-2.7	2.9-3	3.7-3.9
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.8	6.7	6.8	6.6	6.7
pH <sub>FOX</sub> (field peroxide test)	pH Units	2.9	4.3	3.6	3.9	5.1
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test				
Our Reference		387581-41	387581-42	387581-43
Your Reference	UNITS	BH4	BH4	BH4
Depth		4-4.2	4.5-4.7	5.1-5.3
Date Sampled		31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil
Date prepared	-	04/08/2025	04/08/2025	04/08/2025
Date analysed	-	05/08/2025	05/08/2025	05/08/2025
pH <sub>F</sub> (field pH test)	pH Units	6.8	7.5	7.4
pH <sub>FOX</sub> (field peroxide test)	pH Units	5.0	4.9	4.4
Reaction Rate*	-	Low reaction	Low reaction	Low reaction

Method ID	Methodology Summary
<b>Inorg-063</b>	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: sPOCAS field test							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	04/08/2025	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	05/08/2025	[NT]
pH <sub>F</sub> (field pH test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]
pH <sub>Fox</sub> (field peroxide test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: sPOCAS field test							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	04/08/2025	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	05/08/2025	[NT]
pH <sub>F</sub> (field pH test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]
pH <sub>Fox</sub> (field peroxide test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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.

## 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.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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.

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.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.



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## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Vittal Boggaram

### Sample Login Details

<b>Your reference</b>	E37799B, Gosford NSW
<b>Envirolab Reference</b>	387581
<b>Date Sample Received</b>	04/08/2025
<b>Date Instructions Received</b>	04/08/2025
<b>Date Results Expected to be Reported</b>	11/08/2025

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	44 Soil
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	5
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Sample #44 - BH2/1.8-2.0: Extra sample received; placed on hold until further confirmation from client.

Please direct any queries to:

#### Aileen Hie

Phone: 02 9910 6200

Fax: 02 9910 6201

Email: ahie@envirolab.com.au

#### Jacinta Hurst

Phone: 02 9910 6200

Fax: 02 9910 6201

Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	sPOCAS field test	On Hold
BH1-0-0.1	✓	
BH1-0.1-0.2	✓	
BH1-0.5-0.7	✓	
BH1-1-1.1	✓	
BH1-1.3-1.5	✓	
BH1-1.8-1.9	✓	
BH1-2.3-2.5	✓	
BH1-3.1-3.2	✓	
BH1-4.5-4.6	✓	
BH1-6-6.2	✓	
BH1-7.5-7.7	✓	
BH1-9-9.2	✓	
BH2-0.1-0.2	✓	
BH2-0.7-1	✓	
BH2-1.3-1.5	✓	
BH2-1.65-1.7	✓	
BH2-2.2-2.5	✓	
BH2-2.8-3	✓	
BH2-3.3-3.45	✓	
BH2-4.65-4.95	✓	
BH3-0.2-0.3	✓	
BH3-0.6-0.7	✓	
BH3-1.2-1.3	✓	
BH3-2-2.1	✓	
BH3-2.5-2.7	✓	
BH3-3.1-3.3	✓	
BH3-4-4.1	✓	
BH3-4.4-4.5	✓	
BH3-5-5.1	✓	
BH3-5.5-5.7	✓	
BH3-6-6.2	✓	
BH4-0.1-0.2	✓	



Sample ID	sPOCAs field test	On Hold
BH4-0.6-0.7	✓	
BH4-1.1-1.2	✓	
BH4-1.5-1.7	✓	
BH4-1.7-1.9	✓	
BH4-2-2.2	✓	
BH4-2.6-2.7	✓	
BH4-2.9-3	✓	
BH4-3.7-3.9	✓	
BH4-4-4.2	✓	
BH4-4.5-4.7	✓	
BH4-5.1-5.3	✓	
BH2-1.8-2.0		✓

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.

Cccc 4/8725 1430

**SAMPLE AND CHAIN OF CUSTODY FORM**

<b>TO:</b> ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	<b>JKE Job Number:</b> E37799B  <b>Date Results Required:</b> STANDARD  <b>Page:</b> 1 of 2	<b>FROM:</b>  <b>JKE Environments</b> REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: <u>Vittal Boggaram</u> vboggaram@jkenvironments.com.au
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<b>Location:</b>	Gosford, NSW	<b>Sample Preserved in Esky on Ice</b>
<b>Sampler:</b>	CAR/JLO	<b>Tests Required</b>

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	SCr Suite	pH field test (pH/ apHFOX)											
30.07.25	1	BH1	0-0.1	P	F: Silty Sand		X											
30.07.25	2	BH1	0.1-0.2	P	F: Silty Sand		X											
30.07.25	3	BH1	0.5-0.7	P	F: Silty Sand		X											
30.07.25	4	BH1	1-1.1	P	F: Silty Sand		X											
30.07.25	5	BH1	1.3-1.5	P	F: Silty Sand		X											
30.07.25	6	BH1	1.8-1.9	P	F: Silty Clay		X											
30.07.25	7	BH1	2.3-2.5	P	Sand		X											
30.07.25	8	BH1	3.1-3.2	P	Sandy Clay		X											
30.07.25	9	BH1	4.5-4.6	P	Silty Clay		X											
30.07.25	10	BH1	6-6.2	P	Sandy Clay		X											
30.07.25	11	BH1	7.5-7.7	P	Silty Clay		X											
30.07.25	12	BH1	9-9.2	P	Silty Clay		X											
30.07.25	13	BH2	0.1-0.2	P	F: Clayey silty sand		X											
30.07.25	14	BH2	0.7-1	P	F: Sandy Clay		X											
30.07.25	15	BH2	1.3-1.5	P	F: Sandy Clay		X											
30.07.25	16	BH2	1.65-1.7	P	Sandy Silt		X											
30.07.25	17	BH2	2.2-2.5	P	Clayey sand		X											
30.07.25	18	BH2	2.8-3	P	Sandy clay		X											
30.07.25	19	BH2	3.3-3.45	P	Sandy Clay		X											
30.07.25	20	BH2	4.65-4.95	P	Silty Clay		X											
31.07.25	21	BH3	0.2-0.3	P	F: Clayey Gravel		X											
31.07.25	22	BH3	0.6-0.7	P	F: Clayey silty sand		X											
31.07.25	23	BH3	1.2-1.3	P	F: Sandy Silt		X											
31.07.25	24	BH3	2-2.1	P	Sandy Clay		X											
31.07.25	25	BH3	2.5-2.7	P	Silty Clay		X											

<b>Remarks (comments/detection limits required):</b>	<b>Sample Containers:</b> G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag
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Relinquished By: VB	Date: 4/08/2025	Time: 14:30	Received By:	Date:
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**Envirolab Services**  
 12 Ashley St  
 Chatswood NSW 2067  
 Ph: (02) 9910 6200

Job No: 387581

Date Received: 4/08/25  
 Time Received: 1510  
 Received By: TV  
 Temp: Con Ambient  
 Cooling: IC Icepack  
 Security: IC Broken/None





**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 387581-A**

### **Client Details**

<b>Client</b>	JK Environments
<b>Attention</b>	Alexis Diodati
<b>Address</b>	PO Box 976, North Ryde BC, NSW, 1670

### **Sample Details**

<b>Your Reference</b>	<b><u>E37799B, Gosford NSW</u></b>
<b>Number of Samples</b>	additional analysis
<b>Date samples received</b>	04/08/2025
<b>Date completed instructions received</b>	12/08/2025

### **Analysis Details**

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

Samples were analysed as received from the client unless as indicated below in the method summaries. 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**

<b>Date results requested by</b>	19/08/2025
<b>Date of Issue</b>	19/08/2025

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**  
Jenny He, Inorganic Team Leader

**Authorised By**  
Nancy Zhang, Laboratory Manager

Acid Sulphate Soil Suite						
Our Reference		387581-A-6	387581-A-11	387581-A-12	387581-A-16	387581-A-19
Your Reference	UNITS	BH1	BH1	BH1	BH2	BH2
Depth		1.8-1.9	7.5-7.7	9-9.2	1.65-1.7	3.3-3.45
Date Sampled		30/07/2025	30/07/2025	30/07/2025	30/07/2025	30/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/08/2025	13/08/2025	13/08/2025	13/08/2025	13/08/2025
Date analysed	-	14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
pH <sub>kcl</sub>	pH units	4.9	6.2	6.1	5.6	3.8
s-TAA pH 6.5	%w/w S	0.05	<0.01	<0.01	0.02	0.06
TAA pH 6.5	moles H <sup>+</sup> /t	30	<5	<5	12	36
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	10	8	12	5	5
Chromium Reducible Sulfur	%w/w	0.02	0.01	0.02	0.008	0.008
S <sub>KCl</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]	0.014
S <sub>HCl</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]	0.007
S <sub>NAS</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]	<0.005
ANC <sub>BT</sub>	% CaCO <sub>3</sub>	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC <sub>BT</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity excluding ANC	%w/w S	0.064	0.012	0.022	0.027	0.066
a-Net Acidity excluding ANC	moles H <sup>+</sup> /t	40	7.8	14	17	41
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t	3.0	<0.75	1.1	1.3	3.1
s-Net Acidity including ANC	%w/w S	0.064	0.012	0.022	0.027	0.066
a-Net Acidity including ANC	moles H <sup>+</sup> /t	40	7.8	14	17	41
Liming rate including ANC	kg CaCO <sub>3</sub> /t	3	<0.75	1	1	3

Acid Sulphate Soil Suite						
Our Reference		387581-A-23	387581-A-25	387581-A-29	387581-A-31	387581-A-35
Your Reference	UNITS	BH3	BH3	BH3	BH3	BH4
Depth		1.2-1.3	2.5-2.7	5-5.1	6-6.2	1.5-1.7
Date Sampled		31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/08/2025	13/08/2025	13/08/2025	13/08/2025	13/08/2025
Date analysed	-	14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
pH <sub>kcl</sub>	pH units	5.8	4.1	5.3	5.2	6.2
s-TAA pH 6.5	%w/w S	<0.01	0.04	<0.01	<0.01	<0.01
TAA pH 6.5	moles H <sup>+</sup> /t	5	26	5	<5	<5
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	8	10	8	5	12
Chromium Reducible Sulfur	%w/w	0.01	0.02	0.01	0.008	0.02
S <sub>KCl</sub>	%w/w S	[NT]	0.007	[NT]	[NT]	[NT]
S <sub>HCl</sub>	%w/w S	[NT]	0.006	[NT]	[NT]	[NT]
S <sub>NAS</sub>	%w/w S	[NT]	<0.005	[NT]	[NT]	[NT]
ANC <sub>BT</sub>	% CaCO <sub>3</sub>	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC <sub>BT</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity excluding ANC	%w/w S	0.020	0.057	0.020	0.016	0.021
a-Net Acidity excluding ANC	moles H <sup>+</sup> /t	13	36	13	9.8	13
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t	0.96	2.7	0.96	<0.75	0.98
s-Net Acidity including ANC	%w/w S	0.020	0.057	0.020	0.016	0.021
a-Net Acidity including ANC	moles H <sup>+</sup> /t	13	36	13	9.8	13
Liming rate including ANC	kg CaCO <sub>3</sub> /t	1	3	1	<0.75	1

Acid Sulphate Soil Suite			
Our Reference		387581-A-38	387581-A-43
Your Reference	UNITS	BH4	BH4
Depth		2.6-2.7	5.1-5.3
Date Sampled		31/07/2025	31/07/2025
Type of sample		Soil	Soil
Date prepared	-	13/08/2025	13/08/2025
Date analysed	-	14/08/2025	14/08/2025
pH <sub>kcl</sub>	pH units	5.2	6.0
s-TAA pH 6.5	%w/w S	<0.01	<0.01
TAA pH 6.5	moles H <sup>+</sup> /t	<5	<5
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	10	8
Chromium Reducible Sulfur	%w/w	0.02	0.01
S <sub>KCl</sub>	%w/w S	[NT]	<0.005
S <sub>HCl</sub>	%w/w S	[NT]	<0.005
S <sub>NAS</sub>	%w/w S	[NT]	<0.005
ANC <sub>BT</sub>	% CaCO <sub>3</sub>	[NT]	<0.05
s-ANC <sub>BT</sub>	%w/w S	[NT]	<0.05
s-Net Acidity excluding ANC	%w/w S	0.023	0.013
a-Net Acidity excluding ANC	moles H <sup>+</sup> /t	14	8.2
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t	1.1	<0.75
s-Net Acidity including ANC	%w/w S	0.023	0.013
a-Net Acidity including ANC	moles H <sup>+</sup> /t	14	8.2
Liming rate including ANC	kg CaCO <sub>3</sub> /t	1	<0.75

Method ID	Methodology Summary
<b>Inorg-068</b>	<p>Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition.</p> <p>Ideally samples should be received in the laboratory at &lt;40C. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation.</p> <p>There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples.</p> <p>Neutralising value (NV) of 100% is assumed for liming rate.</p> <p>Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.</p> <p>The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.</p>

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Acid Sulphate Soil Suite				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/08/2025	6	13/08/2025	13/08/2025		13/08/2025	[NT]
Date analysed	-			14/08/2025	6	14/08/2025	14/08/2025		14/08/2025	[NT]
pH <sub>KCl</sub>	pH units		Inorg-068	[NT]	6	4.9	4.9	0	100.0	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	6	0.05	0.05	0	[NT]	[NT]
TAA pH 6.5	moles H <sup>+</sup> /t	5	Inorg-068	<5	6	30	30	0	102	[NT]
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	3	Inorg-068	<3	6	10	10	0	[NT]	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	6	0.02	0.02	0	90	[NT]
S <sub>KCl</sub>	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
S <sub>HCl</sub>	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
S <sub>NAS</sub>	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
ANC <sub>BT</sub>	% CaCO <sub>3</sub>	0.05	Inorg-068	<0.05	6	[NT]	[NT]		101	[NT]
s-ANC <sub>BT</sub>	%w/w S	0.05	Inorg-068	<0.05	6	[NT]	[NT]		[NT]	[NT]
s-Net Acidity excluding ANC	%w/w S	0.005	Inorg-068	<0.005	6	0.064	0.063	2	[NT]	[NT]
a-Net Acidity excluding ANC	moles H <sup>+</sup> /t	5	Inorg-068	<5	6	40	40	0	[NT]	[NT]
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t	0.75	Inorg-068	<0.75	6	3.0	3.0	0	[NT]	[NT]
s-Net Acidity including ANC	%w/w S	0.005	Inorg-068	<0.005	6	0.064	0.063	2	[NT]	[NT]
a-Net Acidity including ANC	moles H <sup>+</sup> /t	5	Inorg-068	<5	6	40	40	0	[NT]	[NT]
Liming rate including ANC	kg CaCO <sub>3</sub> /t	0.75	Inorg-068	<0.75	6	3	3	0	[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Acid Sulphate Soil Suite				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	38	13/08/2025	13/08/2025		[NT]	[NT]
Date analysed	-			[NT]	38	14/08/2025	14/08/2025		[NT]	[NT]
pH <sub>kcl</sub>	pH units		Inorg-068	[NT]	38	5.2	5.2	0	[NT]	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	[NT]	38	<0.01	<0.01	0	[NT]	[NT]
TAA pH 6.5	moles H <sup>+</sup> /t	5	Inorg-068	[NT]	38	<5	<5	0	[NT]	[NT]
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	3	Inorg-068	[NT]	38	10	10	0	[NT]	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	[NT]	38	0.02	0.02	0	[NT]	[NT]
s-Net Acidity excluding ANC	%w/w S	0.005	Inorg-068	[NT]	38	0.023	0.023	0	[NT]	[NT]
a-Net Acidity excluding ANC	moles H <sup>+</sup> /t	5	Inorg-068	[NT]	38	14	14	0	[NT]	[NT]
Liming rate excluding ANC	kg CaCO <sub>3</sub> /t	0.75	Inorg-068	[NT]	38	1.1	1.1	0	[NT]	[NT]
s-Net Acidity including ANC	%w/w S	0.005	Inorg-068	[NT]	38	0.023	0.023	0	[NT]	[NT]
a-Net Acidity including ANC	moles H <sup>+</sup> /t	5	Inorg-068	[NT]	38	14	14	0	[NT]	[NT]
Liming rate including ANC	kg CaCO <sub>3</sub> /t	0.75	Inorg-068	[NT]	38	1	1	0	[NT]	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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.

## 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.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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.

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.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Alexis Diodati

### Sample Login Details

<b>Your reference</b>	E37799B, Gosford NSW
<b>Envirolab Reference</b>	387581-A
<b>Date Sample Received</b>	04/08/2025
<b>Date Instructions Received</b>	12/08/2025
<b>Date Results Expected to be Reported</b>	19/08/2025

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	additional analysis
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	5
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Nil

Please direct any queries to:

#### Aileen Hie

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** ahie@envirolab.com.au

#### Jacinta Hurst

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** jhurst@envirolab.com.au

*Analysis Underway, details on the following page:*



Sample ID	Acid Sulphate Soil Suite	On Hold
BH1-0-0.1		✓
BH1-0.1-0.2		✓
BH1-0.5-0.7		✓
BH1-1-1.1		✓
BH1-1.3-1.5		✓
BH1-1.8-1.9	✓	
BH1-2.3-2.5		✓
BH1-3.1-3.2		✓
BH1-4.5-4.6		✓
BH1-6-6.2		✓
BH1-7.5-7.7	✓	
BH1-9-9.2	✓	
BH2-0.1-0.2		✓
BH2-0.7-1		✓
BH2-1.3-1.5		✓
BH2-1.65-1.7	✓	
BH2-2.2-2.5		✓
BH2-2.8-3		✓
BH2-3.3-3.45	✓	
BH2-4.65-4.95		✓
BH3-0.2-0.3		✓
BH3-0.6-0.7		✓
BH3-1.2-1.3	✓	
BH3-2-2.1		✓
BH3-2.5-2.7	✓	
BH3-3.1-3.3		✓
BH3-4-4.1		✓
BH3-4.4-4.5		✓
BH3-5-5.1	✓	
BH3-5.5-5.7		✓
BH3-6-6.2	✓	
BH4-0.1-0.2		✓



Sample ID	Acid Sulphate Soil Suite	On Hold
BH4-0.6-0.7		✓
BH4-1.1-1.2		✓
BH4-1.5-1.7	✓	
BH4-1.7-1.9		✓
BH4-2-2.2		✓
BH4-2.6-2.7	✓	
BH4-2.9-3		✓
BH4-3.7-3.9		✓
BH4-4-4.2		✓
BH4-4.5-4.7		✓
BH4-5.1-5.3	✓	
BH2-1.8-2.0		✓

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.

## Anna Bui

---

**From:** Stuart Chen  
**Sent:** Tuesday, 12 August 2025 3:27 PM  
**To:** Alexis Diodati  
**Cc:** Customer Service  
**Subject:** RE: Results for Registration 387581 E37799B, Gosford NSW

Hey Alexis,

No worries at all.

@CS A-job please.

Kind Regards,

Stuart Chen | Report Coordinator | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067  
T 612 9910 6200  
E [SChen2@envirolab.com.au](mailto:SChen2@envirolab.com.au) | W [www.envirolab.com.au](http://www.envirolab.com.au)

Follow us on: [LinkedIn](#) | [Facebook](#) | [Twitter](#)

Samples will be analysed per our T&C's.

---

**From:** Alexis Diodati <[ADiodati@jkenvironments.com.au](mailto:ADiodati@jkenvironments.com.au)>  
**Sent:** Tuesday, 12 August 2025 2:21 PM  
**To:** Stuart Chen <[SChen2@envirolab.com.au](mailto:SChen2@envirolab.com.au)>  
**Subject:** FW: Results for Registration 387581 E37799B, Gosford NSW

**CAUTION:** This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Stuart,

Can we please schedule the following samples for the SCr suite on standard TAT:

JKE Ref	Envirolab Ref
BH1 (1.8-1.9m)	387581-6
BH1 (7.5-7.7m)	387581-11
BH1 (9.0-9.2m)	387581-12
BH2 (1.65-1.7m)	387581-16
BH2 (3.3-3.45m)	387581-19
BH3 (1.2-1.3m)	387581-23
BH3 (2.5-2.7m)	387581-25
BH3 (5.0-5.1m)	387581-29
BH3 (6.0-6.2m)	387581-31
BH4 (1.5-1.7m)	387581-35
BH4 (2.6-2.7m)	387581-38
BH4 (5.1-5.3m)	387581-43

387581-A  
STD  
due 19/8/25

## CERTIFICATE OF ANALYSIS 388639

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Alexis Diodati
<b>Address</b>	PO Box 976, North Ryde BC, NSW, 1670

### Sample Details

<b>Your Reference</b>	<u>E37799B, Gosford NSW</u>
<b>Number of Samples</b>	6 Water
<b>Date samples received</b>	15/08/2025
<b>Date completed instructions received</b>	15/08/2025

### Analysis Details

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

Samples were analysed as received from the client unless as indicated below in the method summaries. 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.

**Please refer to the last page of this report for any comments relating to the results.**

### Report Details

**Date results requested by** 22/08/2025

**Date of Issue** 22/08/2025

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

Diego Bigolin, Inorganics Supervisor  
 Jack Wallis, Senior Chemist  
 Nancy Zhang, Laboratory Manager, Sydney  
 Sean McAlary, Senior Chemist  
 Tabitha Roberts, Senior Chemist  
 Timothy Toll, Senior Chemist

#### Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date Extracted	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date Analysed	-	19/08/2025	19/08/2025	19/08/2025	19/08/2025
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	2	6	2	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	102	102	102	101
Surrogate Toluene-d8	%	98	98	98	98
Surrogate 4-Bromofluorobenzene	%	104	103	103	102

vTRH(C6-C10)/BTEXN in Water						
Our Reference		388639-1	388639-2	388639-3	388639-4	388639-5
Your Reference	UNITS	MW1A	MW3	MW4	MW5	WDUP1
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date analysed	-	19/08/2025	19/08/2025	19/08/2025	19/08/2025	19/08/2025
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	<10	<10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	<10	<10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	102	102	102	101	101
Surrogate Toluene-d8	%	98	98	98	98	98
Surrogate 4-Bromofluorobenzene	%	104	103	103	102	103

vTRH(C6-C10)/BTEXN in Water		
Our Reference		388639-6
Your Reference	UNITS	TB1
Date Sampled		14/08/2025
Type of sample		Water
Date extracted	-	18/08/2025
Date analysed	-	19/08/2025
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	<10
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	<10
TRH C <sub>6</sub> - C <sub>10</sub> 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	%	101
Surrogate Toluene-d8	%	98
Surrogate 4-Bromofluorobenzene	%	103

svTRH (C10-C40) in Water						
Our Reference		388639-1	388639-2	388639-3	388639-4	388639-5
Your Reference	UNITS	MW1A	MW3	MW4	MW5	WDUP1
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date analysed	-	18/08/2025	18/08/2025	18/08/2025	19/08/2025	19/08/2025
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	79	85	92	82	91

PAHs in Water						
Our Reference		388639-1	388639-2	388639-3	388639-4	388639-5
Your Reference	UNITS	MW1A	MW3	MW4	MW5	WDUP1
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date analysed	-	20/08/2025	20/08/2025	20/08/2025	20/08/2025	20/08/2025
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate <i>p</i> -Terphenyl-d14	%	87	85	85	93	84

All metals in water-dissolved						
Our Reference		388639-1	388639-2	388639-3	388639-4	388639-5
Your Reference	UNITS	MW1A	MW3	MW4	MW5	WDUP1
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date analysed	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Arsenic-Dissolved	µg/L	6	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	4	3	3	3
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	4	22	9	6	7
Aluminium-Dissolved	µg/L	20	20	20	<10	[NA]
Silver-Dissolved	µg/L	<1	<1	<1	<1	[NA]
Antimony-Dissolved	µg/L	<1	<1	<1	<1	[NA]
Barium-Dissolved	µg/L	390	67	48	98	[NA]
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	[NA]
Boron-Dissolved	µg/L	100	70	70	60	[NA]
Cobalt-Dissolved	µg/L	1	6	2	2	[NA]
Iron-Dissolved	µg/L	49,000	3,300	5,600	6,400	[NA]
Lithium-Dissolved	µg/L	2	34	31	41	[NA]
Manganese-Dissolved	µg/L	900	300	250	260	[NA]
Molybdenum-Dissolved	µg/L	3	1	<1	<1	[NA]
Selenium-Dissolved	µg/L	<1	<1	<1	<1	[NA]
Strontium-Dissolved	µg/L	160	100	59	100	[NA]
Uranium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	[NA]
Vanadium-Dissolved	µg/L	2	<1	<1	<1	[NA]

**Client Reference: E37799B, Gosford NSW**

Metals in Waters - Acid extractable					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date prepared	-	18/08/2025	18/08/2025	18/08/2025	18/08/2025
Date analysed	-	19/08/2025	19/08/2025	19/08/2025	19/08/2025
Phosphorus - Total	mg/L	0.1	<0.05	0.4	0.2

Miscellaneous Inorganics					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date prepared	-	15/08/2025	15/08/2025	15/08/2025	15/08/2025
Date analysed	-	15/08/2025	15/08/2025	15/08/2025	15/08/2025
pH	pH Units	6.3	6.4	6.2	6.2
Electrical Conductivity	µS/cm	690	1,000	770	960
Redox Potential*	mV	164	155	149	151
Dissolved Oxygen*	mg/L	7.7	7.2	7.5	7.7
Turbidity	NTU	410	78	40	100
Total Dissolved Solids (grav)	mg/L	370	500	400	520
Total Suspended Solids	mg/L	130	94	24	140
Total Organic Carbon	mg/L	21	2	<1	1
Sodium Adsorption Ratio	-	3.4	6.5	6.4	6.9
Silica (Reactive - SiO <sub>2</sub> )	mg/L	9.1	11	11	10
Ammonia as N in water	mg/L	6.4	0.18	0.059	0.082
Nitrate as N in water	mg/L	0.006	<0.005	0.007	<0.005
Nitrite as N in water	mg/L	<0.005	<0.005	0.01	<0.005
NOx as N in water	mg/L	0.008	<0.005	0.02	<0.005
Total Nitrogen in water	mg/L	6.8	0.3	0.2	<0.1
TKN in water	mg/L	6.8	0.3	0.1	<0.1
Phosphate as P in water	mg/L	<0.005	<0.005	0.060	0.02
Organic Nitrogen as N	mg/L	0.4	<0.2	<0.2	<0.2

Ion Balance					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date prepared	-	15/08/2025	15/08/2025	15/08/2025	15/08/2025
Date analysed	-	15/08/2025	15/08/2025	15/08/2025	15/08/2025
Calcium - Dissolved	mg/L	19	23	12	16
Potassium - Dissolved	mg/L	6.0	8.4	5.7	7.0
Sodium - Dissolved	mg/L	76	170	130	160
Magnesium - Dissolved	mg/L	10	16	10	13
Hardness (calc) equivalent CaCO <sub>3</sub>	mg/L	91	120	73	96
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	230	190	130	170
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	230	190	130	170
Sulphate, SO <sub>4</sub>	mg/L	24	35	23	28
Chloride, Cl	mg/L	66	160	130	170
Ionic Balance	%	-13	4.0	3.0	2.0

PFAS in Waters Trace Extended					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date prepared	-	20/08/2025	20/08/2025	20/08/2025	20/08/2025
Date analysed	-	20/08/2025	20/08/2025	20/08/2025	20/08/2025
Perfluorobutanesulfonic acid	µg/L	0.003	<0.0004	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0039	0.0003	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	0.0093	0.0006	0.0003	<0.0002
Perfluorodecanesulfonic acid	µg/L	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	<0.01	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.01	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0084	<0.0004	<0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0043	<0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.013	0.0006	<0.0002	<0.0002
Perfluorononanoic acid	µg/L	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0008	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	µg/L	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%	98	103	100	107
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%	136	136	132	134
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%	88	89	101	102
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%	93	98	107	112
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%	56	74	83	81
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%	#	41	58	58

PFAS in Waters Trace Extended					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%	55	84	95	98
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%	62	79	93	96
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%	77	89	104	108
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%	77	87	94	99
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%	86	91	95	99
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%	89	96	100	101
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%	105	108	108	118
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%	92	88	91	88
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%	97	93	102	107
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%	97	100	126	125
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%	134	140	140	140
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%	157	152	151	145
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%	84	91	100	99
Extracted ISTD d <sub>3</sub> N MeFOSA	%	108	109	115	112
Extracted ISTD d <sub>5</sub> N EtFOSA	%	106	107	113	116
Extracted ISTD d <sub>7</sub> N MeFOSE	%	102	115	111	108
Extracted ISTD d <sub>9</sub> N EtFOSE	%	103	108	107	109
Extracted ISTD d <sub>3</sub> N MeFOSAA	%	112	107	115	117
Extracted ISTD d <sub>5</sub> N EtFOSAA	%	176	161	168	168
Total Positive PFHxS & PFOS	µg/L	0.013	0.001	0.0003	<0.0002
Total Positive PFOS & PFOA	µg/L	0.022	0.001	0.0003	<0.0002
Total Positive PFAS	µg/L	0.053	0.002	0.0003	<0.0002

Microbiological Testing					
Our Reference		388639-1	388639-2	388639-3	388639-4
Your Reference	UNITS	MW1A	MW3	MW4	MW5
Date Sampled		14/08/2025	14/08/2025	14/08/2025	14/08/2025
Type of sample		Water	Water	Water	Water
Date of testing	-	16/08/2025	16/08/2025	16/08/2025	16/08/2025
E. coli	cfu/100mL	<1000	<100	<100	<10
Thermotolerant Coliforms	cfu/100mL	<1000	<100	<100	<10

Method ID	Methodology Summary
<b>Ext-008</b>	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.
<b>Inorg-001</b>	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
<b>Inorg-002</b>	Conductivity and Salinity - measured using a conductivity cell.
<b>Inorg-006</b>	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
<b>Inorg-018</b>	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C.  NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation below:-  TDS = EC * 0.6
<b>Inorg-019</b>	Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5°C.
<b>Inorg-022</b>	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130-B.
<b>Inorg-035</b>	Analysed using an electrode. Please note that the results for water analyses are indicative only, samples are ideally analysed on collection.
<b>Inorg-040</b>	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
<b>Inorg-055</b>	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
<b>Inorg-055</b>	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
<b>Inorg-055/062/127</b>	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
<b>Inorg-057</b>	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
<b>Inorg-060</b>	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
<b>Inorg-062</b>	TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx).
<b>Inorg-079</b>	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
<b>Inorg-081</b>	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
<b>Inorg-112</b>	Dissolved Oxygen using membrane electrode. Note this analysis should ideally be carried out immediately after sampling.
<b>INORG-120</b>	Reactive Silica (SiO2) determined colorimetrically. Waters samples are filtered on receipt prior to analysis.

Method ID	Methodology Summary
<b>Metals-020</b>	<p>Determination of various metals/elements by ICP-AES.</p> <p>Total Phosphate determined stoichiometrically from Phosphorus (assumed to be present as Phosphate).</p> <p>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.</p> <p>Submission of low masses of sample e.g. for dust samples, may result in raised PQLs.</p> <p>Where molecular anion forms are calculated from an element (e.g. SO<sub>4</sub> from S or PO<sub>4</sub> from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.</p>
<b>Metals-020</b>	Calcium and Magnesium analysed by ICP-AES and SAR calculated.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Metals-022</b>	<p>Determination of various metals by ICP-MS.</p> <p>Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.</p> <p>Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.</p>
<b>Org-020</b>	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.</p> <p>F2 = (&gt;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.</p>
<b>Org-022/025</b>	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.
<b>Org-023</b>	Water samples are analysed directly by purge and trap GC-MS.
<b>Org-023</b>	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.
<b>Org-029</b>	<p>Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.</p> <p>Analysis is undertaken with LC-MS/MS.</p> <p>PFAS results include the sum of branched and linear isomers where applicable.</p> <p>Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.</p> <p>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.</p>

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: VOCs in water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date Extracted	-			18/08/2025	1	18/08/2025	21/08/2025		18/08/2025	[NT]
Date Analysed	-			19/08/2025	1	19/08/2025	22/08/2025		19/08/2025	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	90	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	2	3	40	94	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	88	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	85	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	81	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	96	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: VOCs in water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	1	102	101	1	99	[NT]
Surrogate Toluene-d8	%		Org-023	97	1	98	98	0	100	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	103	1	104	106	2	100	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			18/08/2025	1	18/08/2025	21/08/2025		18/08/2025	[NT]
Date analysed	-			19/08/2025	1	19/08/2025	22/08/2025		19/08/2025	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	Org-023	<10	1	<10	<10	0	95	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	Org-023	<10	1	<10	<10	0	95	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	96	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	1	102	101	1	99	[NT]
Surrogate Toluene-d8	%		Org-023	97	1	98	98	0	100	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	103	1	104	106	2	100	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	388639-2
Date extracted	-			18/08/2025	1	18/08/2025	18/08/2025		18/08/2025	18/08/2025
Date analysed	-			18/08/2025	1	18/08/2025	18/08/2025		18/08/2025	18/08/2025
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	Org-020	<50	1	<50	<50	0	92	122
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	97	123
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	86	92
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	Org-020	<50	1	<50	<50	0	92	122
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	97	123
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	86	92
Surrogate o-Terphenyl	%		Org-020	75	1	79	76	4	94	118

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: PAHs in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	388639-2
Date extracted	-			18/08/2025	1	18/08/2025	18/08/2025		18/08/2025	18/08/2025
Date analysed	-			20/08/2025	1	20/08/2025	20/08/2025		20/08/2025	20/08/2025
Naphthalene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	76	86
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	90
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	100
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	91
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	86
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	95
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	69	77
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	76	83
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	88	1	87	79	10	83	87

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: All metals in water-dissolved				Duplicate			Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date prepared	-			18/08/2025	2	18/08/2025	18/08/2025		18/08/2025	[NT]
Date analysed	-			18/08/2025	2	18/08/2025	18/08/2025		18/08/2025	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	104	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	2	<0.1	<0.1	0	105	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	108	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	107	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	2	<0.05	[NT]		109	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	2	4	4	0	106	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	101	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	2	22	22	0	108	[NT]
Aluminium-Dissolved	µg/L	10	Metals-022	<10	2	20	20	0	106	[NT]
Silver-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	99	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	104	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	2	67	69	3	105	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	2	<0.5	<0.5	0	110	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	2	70	70	0	103	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	2	6	6	0	106	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	2	3300	3200	3	103	[NT]
Lithium-Dissolved	µg/L	1	Metals-022	<1	2	34	35	3	110	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	2	300	300	0	108	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	2	1	1	0	105	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	104	[NT]
Strontium-Dissolved	µg/L	1	Metals-022	<1	2	100	110	10	107	[NT]
Uranium-Dissolved	µg/L	0.5	Metals-022	<0.5	2	<0.5	<0.5	0	95	[NT]
Vanadium-Dissolved	µg/L	1	Metals-022	<1	2	<1	<1	0	109	[NT]

**Client Reference: E37799B, Gosford NSW**

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	388639-2
Date prepared	-			18/08/2025	1	18/08/2025	18/08/2025		18/08/2025	18/08/2025
Date analysed	-			19/08/2025	1	19/08/2025	19/08/2025		19/08/2025	19/08/2025
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	1	0.1	0.1	0	103	104

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	388639-2
Date prepared	-			15/08/2025	1	15/08/2025	15/08/2025		15/08/2025	15/08/2025
Date analysed	-			15/08/2025	1	15/08/2025	15/08/2025		15/08/2025	15/08/2025
pH	pH Units		Inorg-001	[NT]	1	6.3	[NT]		99	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	690	[NT]		96	[NT]
Redox Potential*	mV		Inorg-035	[NT]	1	164	[NT]		97	[NT]
Dissolved Oxygen*	mg/L	0.1	Inorg-112	<0.1	1	7.7	[NT]		[NT]	[NT]
Turbidity	NTU	0.1	Inorg-022	<0.1	1	410	[NT]		102	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	1	370	[NT]		97	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	<5	1	130	130	0	95	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	21	[NT]		96	[NT]
Sodium Adsorption Ratio	-	0.01	Metals-020	[NT]	1	3.4	3.5	3	96	[NT]
Silica (Reactive - SiO <sub>2</sub> )	mg/L	0.1	INORG-120	<0.1	1	9.1	9.3	2	93	110
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	6.4	[NT]		108	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.006	[NT]		86	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	1	<0.005	[NT]		101	[NT]
NO <sub>x</sub> as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.008	[NT]		86	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	1	6.8	7.6	11	87	[NT]
TKN in water	mg/L	0.1	Inorg-062	<0.1	1	6.8	[NT]		[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	1	<0.005	[NT]		109	[NT]
Organic Nitrogen as N	mg/L	0.2	Inorg-055/062/127	<0.2	1	0.4	[NT]		[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	2	15/08/2025	15/08/2025		[NT]	[NT]
Date analysed	-			[NT]	2	15/08/2025	15/08/2025		[NT]	[NT]
pH	pH Units		Inorg-001	[NT]	2	6.4	[NT]		[NT]	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	[NT]	2	1000	[NT]		[NT]	[NT]
Redox Potential*	mV		Inorg-035	[NT]	2	155	[NT]		[NT]	[NT]
Dissolved Oxygen*	mg/L	0.1	Inorg-112	[NT]	2	7.2	[NT]		[NT]	[NT]
Turbidity	NTU	0.1	Inorg-022	[NT]	2	78	[NT]		[NT]	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	[NT]	2	500	[NT]		[NT]	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	[NT]	2	94	[NT]		[NT]	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	[NT]	2	2	[NT]		[NT]	[NT]
Sodium Adsorption Ratio	-	0.01	Metals-020	[NT]	2	6.5	[NT]		[NT]	[NT]
Silica (Reactive - SiO <sub>2</sub> )	mg/L	0.1	INORG-120	[NT]	2	11	[NT]		[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	[NT]	2	0.18	0.19	5	[NT]	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	[NT]	2	<0.005	<0.005	0	[NT]	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	[NT]	2	<0.005	<0.005	0	[NT]	[NT]
NO <sub>x</sub> as N in water	mg/L	0.005	Inorg-055	[NT]	2	<0.005	<0.005	0	[NT]	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	[NT]	2	0.3	[NT]		[NT]	[NT]
TKN in water	mg/L	0.1	Inorg-062	[NT]	2	0.3	[NT]		[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	[NT]	2	<0.005	<0.005	0	[NT]	[NT]
Organic Nitrogen as N	mg/L	0.2	Inorg-055/062/127	[NT]	2	<0.2	[NT]		[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	388639-2
Date prepared	-			15/08/2025	1	15/08/2025	15/08/2025		15/08/2025	15/08/2025
Date analysed	-			15/08/2025	1	15/08/2025	15/08/2025		15/08/2025	15/08/2025
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	19	19	0	98	100
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	6.0	6.1	2	98	96
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	76	78	3	96	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	10	11	10	100	107
Hardness (calc) equivalent CaCO <sub>3</sub>	mg/L	3	Metals-020	[NT]	1	91	92	1	[NT]	[NT]
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	230	[NT]		[NT]	[NT]
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	230	[NT]		101	[NT]
Sulphate, SO <sub>4</sub>	mg/L	1	Inorg-081	<1	1	24	[NT]		113	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	66	[NT]		117	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-13	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	388639-3
Date prepared	-			[NT]	2	15/08/2025	15/08/2025		[NT]	15/08/2025
Date analysed	-			[NT]	2	15/08/2025	15/08/2025		[NT]	15/08/2025
Calcium - Dissolved	mg/L	0.5	Metals-020	[NT]	2	23	[NT]		[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	[NT]	2	8.4	[NT]		[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	[NT]	2	170	[NT]		[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	[NT]	2	16	[NT]		[NT]	[NT]
Hardness (calc) equivalent CaCO <sub>3</sub>	mg/L	3	Metals-020	[NT]	2	120	[NT]		[NT]	[NT]
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	[NT]	2	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	[NT]	2	190	[NT]		[NT]	[NT]
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	[NT]	2	<5	[NT]		[NT]	[NT]
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	[NT]	2	190	[NT]		[NT]	[NT]
Sulphate, SO <sub>4</sub>	mg/L	1	Inorg-081	[NT]	2	35	35	0	[NT]	81
Chloride, Cl	mg/L	1	Inorg-081	[NT]	2	160	160	0	[NT]	#
Ionic Balance	%		Inorg-040	[NT]	2	4.0	[NT]		[NT]	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			20/08/2025	[NT]	[NT]	[NT]	[NT]	20/08/2025	[NT]
Date analysed	-			20/08/2025	[NT]	[NT]	[NT]	[NT]	20/08/2025	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	91	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	66	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	92	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	93	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	90	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	82	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	76	[NT]
4:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	103	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	126	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	100	[NT]
10:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	124	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	129	[NT]
N-Ethyl perfluorooctanesulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	128	[NT]
N-Me perfluorooctanesulfonamid ethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
N-Et perfluorooctanesulfonamid ethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
MePerfluorooctanesulf-amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	111	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	100	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		Org-029	76	[NT]	[NT]	[NT]	[NT]	74	[NT]
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		Org-029	76	[NT]	[NT]	[NT]	[NT]	84	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		Org-029	66	[NT]	[NT]	[NT]	[NT]	72	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		Org-029	83	[NT]	[NT]	[NT]	[NT]	83	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		Org-029	88	[NT]	[NT]	[NT]	[NT]	87	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	87	[NT]
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		Org-029	79	[NT]	[NT]	[NT]	[NT]	84	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		Org-029	81	[NT]	[NT]	[NT]	[NT]	86	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		Org-029	84	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		Org-029	62	[NT]	[NT]	[NT]	[NT]	66	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		Org-029	132	[NT]	[NT]	[NT]	[NT]	125	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		Org-029	87	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	109	[NT]
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		Org-029	69	[NT]	[NT]	[NT]	[NT]	70	[NT]
Extracted ISTD d <sub>3</sub> N MeFOSA	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD d <sub>5</sub> N EtFOSA	%		Org-029	112	[NT]	[NT]	[NT]	[NT]	102	[NT]
Extracted ISTD d <sub>7</sub> N MeFOSE	%		Org-029	113	[NT]	[NT]	[NT]	[NT]	108	[NT]

Client Reference: E37799B, Gosford NSW

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
<i>Extracted ISTD d<sub>9</sub> N EtFOSE</i>	%		Org-029	109	[NT]	[NT]	[NT]	[NT]	100	[NT]
<i>Extracted ISTD d<sub>3</sub> N MeFOSAA</i>	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	94	[NT]
<i>Extracted ISTD d<sub>5</sub> N EtFOSAA</i>	%		Org-029	116	[NT]	[NT]	[NT]	[NT]	124	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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.

## 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.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

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.

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.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

## Report Comments

ION\_BALANCE: # Percent recovery is not applicable due to the high concentration of the analyte/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Microbiology analysed by Sonic Food & Water Testing. Report No. W2518587

The time between collection and the commencement of testing should not exceed 24 hours. Samples tested outside this time may have their results compromised

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	JK Environments
<b>Attention</b>	Alexis Diodati

### Sample Login Details

<b>Your reference</b>	E37799B, Gosford NSW
<b>Envirolab Reference</b>	388639
<b>Date Sample Received</b>	15/08/2025
<b>Date Instructions Received</b>	15/08/2025
<b>Date Results Expected to be Reported</b>	22/08/2025

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	6 Water
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	4
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Nil

Please direct any queries to:

#### Aileen Hie

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** ahie@envirolab.com.au

#### Jacinta Hurst

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** jhurst@envirolab.com.au

*Analysis Underway, details on the following page:*





Sample ID	Microbiological Testing
MW1A	✓
MW3	✓
MW4	✓
MW5	✓
WDUP1	
TB1	

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

### Additional Info

<p>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.</p>
<p>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.</p>
<p>TAT for Micro is dependent on incubation. This varies from 3 to 6 days.</p>

**SAMPLE AND CHAIN OF CUSTODY FORM**

<b>TO:</b> ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201  Attention: Aileen	<b>JKE Job Number:</b> E377998  <b>Date Results Required:</b> STANDARD  <b>Page:</b> 1 of 1	<b>FROM:</b> <b>JKE Environments</b> REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 Attention: Alexis Diodati adiodati@jkenvironments.com.au
---	---	---

Location:		Sample Preserved in Esky on Ice																	
Sampler:		Tests Required																	
Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Alkalinity suite	EC, pH, redox, DO	Turbidity	TDS, TSS, TOC, SAR	Ionic balance, including hardness	#3	Additional metals: Al, Ag, Sb, Ba, Be, B, Co, Fe, Li, Mn, Mo, Se, Sr, U, V	Silica (reactive) dissolved silica	Nutrient suite	Faecal coliforms + Escherichia (E) coli	VOCs	PFAS (trace-extended)	BTEX	
14.08.2025	1	MW1A	##	0	Water sample	X	X	X	X	X	X	X	X	X	X	X	X		
14.08.2025	2	MW3	##	0.2	Water sample	X	X	X	X	X	X	X	X	X	X	X	X		
14.08.2025	3	MW4	##	0	Water sample	X	X	X	X	X	X	X	X	X	X	X	X		
14.08.2025	4	MW5	##	12.2	Water sample	X	X	X	X	X	X	X	X	X	X	X	X		
14.08.2025	5	WDUP1	#3	-	Duplicate sample						X								
14.08.2025	6	TB1	V	-	Trip Blank														X

Remarks (comments/detection limits required):		Sample Containers: ## Each sample includes: x2 amber bottles, x4 HCl preserved glass vials, x1 unpreserved plastic bottles, x2 nitric acid preserved bottles (1 is field filtered), x1 sulphuric acid preserved bottle and x1 sterile container	
Relinquished By:	Date:	Time:	Received By: <i>A. Wilcock</i>
			Date: 15/8/27

**EnviroLab Services**  
 12 Ashley St  
 Chatswood NSW 2067  
 Ph: (02) 9910 6200  
**Job No: 388659**  
 Date Received: 15/8/27  
 Time Received: 15:35  
 Received By: *AW*  
 Temp: Cool/Ambient  
 Cooling: Ice/Icepack  
 Security: Intact/Broken/None



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## **Appendix H: Report Explanatory Notes**



## Standard Sampling Procedure (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by JKE. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

### A. Soil Sampling:

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in appropriate sampling containers provided by the lab.
- Label the sampling containers with the JKE job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993<sup>22</sup>.
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

### B. Groundwater Sampling

Groundwater samples are more sensitive than soil samples and therefore adherence to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard. The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should be observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.

<sup>22</sup> Standards Australia, (1993), *Geotechnical Site Investigations*. (AS1726-1993)



- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
  - Filter paper for Micropore filtration system; Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/T meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow pump pack and associated tubing; and
  - Groundwater sampling forms.
- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.



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## **Appendix I: Groundwater Field Records**



## PID FIELD CALIBRATION FORM

Client: Urban Property Group			
Project: Proposed Central Coast Quarter 2 Development			
Location: 26-30 Mann Street, Gosford, NSW			
Job: E37799B			
<b>PID</b>			
Make: Honeywell	Model: <sup>Minirae</sup> lite +	Unit: PID3	Date of last factory calibration: 19/2/25
Date of calibration: 14/8/25		Name of Calibrator: LR	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.2 ppm		Error in measured reading: ± 0.2 ppm	
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes			
<b>PID</b>			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
<b>PID</b>			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
<b>PID</b>			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
<b>PID</b>			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			



## WATER QUALITY METER CALIBRATION FORM

Client: Urban Property Group		
Project: Proposed Central Coast Quarter 2 Development		
Location: 26-30 Mann Street, Gosford, NSW		
Job Number: E37799B		
<b>DISSOLVED OXYGEN</b>		
Make: Honeywell Professional Series	Model: YS14	
Date of calibration: 14/8/25	Name of Calibrator: LR	
Span value: 70% to 130%		
Measured value: 96%		
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No		
<b>pH</b>		
Make: Honeywell Professional Series	Model: YS14	
Date of calibration: 14/8/25	Name of Calibrator: LR	
Buffer 1: Theoretical pH = 7.01 ± 0.01	Expiry date: 12/25	Lot No: CC29024
Buffer 2: Theoretical pH = 4.01 ± 0.01	Expiry date: 01/26	Lot No: DO040125
Measured reading of Buffer 1: 6.98		
Measured reading of Buffer 2: 3.97		
Slope: -	Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	
<b>EC</b>		
Make: Honeywell Professional Series	Model: YS14	
Date: 14/8/25	Name of Calibrator: LR	Temperature: 15 °C
Calibration solution: Rowe's scientific	Expiry date: 2/26	Lot No: C7211124
Theoretical conductivity at temperature (see solution container): 1173 μS/cm		
Measured conductivity: 1122 μS/cm	Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	
<b>REDOX</b>		
Make: Honeywell Professional Series	Model: YS14	
Date of calibration: 14/8/25	Name of Calibrator: LR	
Calibration solution: ORP Test Solution	Expiry date: 01/26	Lot No: 0675
Theoretical redox value: 240mV		
Measured redox reading: 242 mV	Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	









Client:	Urban Property Group	Job No.:	E37799B
Project:	Proposed Central Coast Quarter 2 Development	Well No.:	MW5
Location:	26-30 Mann Street, Gosford, NSW	Depth (m):	16.3m

WELL FINISH			
<input checked="" type="checkbox"/>	Gatic Cover	<input type="checkbox"/>	Standpipe
		Other (describe)	

WELL PURGE DETAILS:			
Method:	Peri Pump	SWL - Before:	1.48m
Date:	14/8/25	Time - Before:	8:18am
Undertaken By:	LR	Total Vol Removed:	20L
Pump Program No:	Low Flow	PID (ppm):	12.2

PURGING / SAMPLING MEASUREMENTS									
Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)	
0)	8:30	1.48	0.5	-	16.2	6.2	696	6.21	140.3
4)	8:34	1.84	3	-	18.8	1.6	966	5.95	74.2
8)	8:38	2.07	5	-	19.3	1.0	992	5.85	58.0
12)	8:42	2.16	7	-	19.4	0.7	984	5.86	46.3
16)	8:46	2.24	9	Pump slowed	19.4	0.4	968	5.85	32.2
20)	8:50	2.23	12	-	19.3	0.4	952	5.87	30.4
24)	8:54	2.24	14	Pump slowed	19.3	0.1	941	5.88	22.3
28)	8:58	2.17	16	-	19.2	0.2	927	5.88	19.5
32)	9:02	2.16	18	-	19.1	0.2	918	5.89	13.5
36)	9:06	2.08	20	-	19.1	0.2	915	5.89	10.6
-	-	-	-	-	-	-	-	-	-
Steady State achieved									
Started Sampling									

Comments: Odours (YES / NO): NAPL/PSH (YES / NO): Sheen (YES / NO): Steady State Achieved (YES / NO)  
 Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 2 x HNO3 plastic, 1 x H2SO4 plastic, 1 x unpreserved plastic + 1 x microbial YSI used: YSI4 + 2 x plus  
 + 1 x DnPI - 2 x amber, 1 x HNO3, 2 x BTEX.

Tested By:		Remarks: - Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date Tested:		
Checked By:	VB	
Date:	17.09.25	

Data logger removed  
 8:16am - 9:22am