REPORT TO

HAMMONDCARE

ON

SALINITY INVESTIGATION

FOR

PROPOSED HOSPITAL REDEVELOPMENT

AT

GREENWICH HOSPITAL, 97-115 RIVER ROAD, GREENWICH, NSW

Date: 8 April 2022

Ref: E32507BRpt4Rev1

JKEnvironments

www.jkenvironments.com.au

T: +61 2 9888 5000

JK Environments Pty Ltd

ABN 90 633 911 403

Report prepared by:

Craig Ridley
Senior Environmental Scientist

Report reviewed by:

Vittal Boggaram
Principal Associate | Environmental Scientist

For and on behalf of
JKE
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E32507BRrpt4	Final Report	18 February 2022
E32507BRrpt4Rev1	Revision 1	8 April 2022

Executive Summary

HammondCare ('the client') commissioned JK Environments (JKE) to undertake a salinity investigation for the proposed hospital redevelopment at Greenwich Hospital, 97-115 River Road, Greenwich, NSW. This salinity investigation report is to be submitted to the Department of Planning and Environment (DPE) in support of a State Significant Development Application (SSD-13619238) for the redevelopment of Greenwich Hospital into an integrated hospital and seniors living facility on land identified as 97-115 River Road, Greenwich, NSW (the site).

The subject proposal is for the detailed design and construction of the facility following its concept approval under SSD-8699. Specifically, SSD-13619238 seeks approval for the following:

- Demolition of the existing hospital building and associated facilities at the site;
- Construction of a new hospital facility and integrated healthcare uses and services, including:
  - A new 7 storey main hospital building;
  - Two new 5-6 storey assisted independent living buildings;
  - A new 2 storey respite care building;
- Construction of associated site facilities and services, including pedestrian and vehicular access and basement parking;
- Site landscaping and infrastructure works; and
- Preservation of Pallister House which will continue to host dementia care and administrative functions.

JKE note that the development plans issued to JKE on 1 April 2022 indicate the new 7 storey main hospital building is to be constructed above set-down and mezzanine levels. The buildings will be terraced to account for the slope of the site.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-13619238 were issued on 24 February, 2021. This report has been prepared to respond to the following SEARs:

SEAR	Relevant section of report
17. Soil and Water. An assessment of salinity and acid sulphate soil (ASS) impacts, including a Salinity Management Plan (SMP) and/or Acid Sulphate Soils Management Plan (ASSMP), where relevant.	This report relates to the assessment of salinity. The results of the investigation are presented in Section 6. The conclusions of the investigation are presented in Section 8. The assessment of ASS impacts is presented in a separate report (E32507Brpt3Rev1, dated 8 April 2022).

The primary aim of the investigation was to characterise the salinity conditions at the site in the context of the proposed development works. The investigation objectives were to:

- Assess the current site conditions via a site walkover inspection;
- Assess the soil and groundwater salinity conditions via implementation of a sampling and analysis program; and
- Assess the requirements for developing a salinity management plan (SMP) for the proposed development.

The scope of work included a review of site information, a walkover inspection, soil sampling from eight locations and groundwater sampling from eight monitoring wells installed on-site shown on Figure 2. The site information reviewed for the investigation indicated that the site was not located within a dryland salinity risk area. No visual indications of saline conditions (such as scalding or significant vegetation dieback/stress) were observed during the investigation.

The investigation identified the following salinity conditions at the site:

- The soils are classed as very strongly acidic to very strongly alkaline;
- The soils are classed as non-saline with localised occurrences of slightly to moderately saline conditions;
- The soils are generally non-sodic;
- The soils are mildly aggressive towards buried concrete;

- The soils are mildly aggressive towards buried steel;
- The groundwater is moderately aggressive towards buried concrete; and
- The groundwater is not aggressive towards buried steel.

Based on the results of this investigation, JKE recommend preparing a salinity management plan (SMP) for the proposed development. The salinity results outlined in this report should be reviewed and incorporated into the design of the proposed development by the project team (civil, structural and landscaping). The SMP should be reviewed in conjunction with the recommendations provided by the design team.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

Table of Contents

List of Tables

Attachments

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**
Sampling, Analysis and Quality Plan	**SAQP**
Standard Secretary Environmental Assessment Requirements	**SEARs**
Standard Penetration Test	**SPT**
State Significant Development Application	**SSDA**
Standing Water Level	**SWL**
Sodium	**Na**
Western Sydney Regional Organisation of Councils	**WSROC**

Units

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	**µS/cm**

1 INTRODUCTION

HammondCare ('the client') commissioned JK Environments (JKE) to undertake a salinity investigation for the proposed hospital redevelopment at Greenwich Hospital, 97-115 River Road, Greenwich, NSW.

This salinity investigation report is to be submitted to the Department of Planning, Industry and Environment (DPIE) in support of a State Significant Development Application (SSD-13619238) for the redevelopment of Greenwich Hospital into an integrated hospital and seniors living facility on land identified as 97-115 River Road, Greenwich, NSW (the site). The extent of the site is shown below.

The subject proposal is for the detailed design and construction of the facility following its concept approval under SSD-8699. Specifically, SSD-13619238 seeks approval for the following:

- Demolition of the existing hospital building and associated facilities at the site;
- Construction of a new hospital facility and integrated healthcare uses and services, including:
  - A new 7 storey main hospital building;
  - Two new 5-6 storey assisted independent living buildings;
  - A new 2 storey respite care building;
- Construction of associated site facilities and services, including pedestrian and vehicular access and basement parking;
- Site landscaping and infrastructure works; and
- Preservation of Pallister House which will continue to host dementia care and administrative functions.

JKE note that the development plans issued to JKE on 1 April 2022 indicate the new 7 storey main hospital building is to be constructed above set-down and mezzanine levels. The buildings will be terraced to account for the slope of the site.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-13619238 were issued on 24 February, 2021. This report has been prepared to respond to the following SEARs:

SEAR	Relevant section of report
17. Soil and Water. An assessment of salinity and acid sulphate soil (ASS) impacts, including a Salinity Management Plan (SMP) and/or Acid Sulphate Soils Management Plan (ASSMP), where relevant.	This report relates to the assessment of salinity. The results of the investigation are presented in Section 6. The conclusions of the investigation are presented in Section 8. The assessment of ASS impacts is presented in a separate report (E32507Brpt3, dated 18 February 2022)[1].

Background information on salinity is included in the appendices.

1.1 Proposed Development Details

JKE has reviewed the development plans prepared by Bickerton Masters (DD-SW-0200 to 0210, dated 1 April 2022). Based on review of these plans, we understand the proposed development includes:

- The demolition of the existing hospital building and associated facilities (excluding Pallister House);
- Construction of the main hospital building and two serviced seniors living buildings constructed over 1-2 levels of carparking;
- The proposed lowest (basement) car park finished floor reduced level (RL) will be formed at between RL37.95m Australian Height Datum (AHD) and RL38.6mAHD;
- Construction of a new 2-3 storey respite care building to the east of the main building; and
- Reconfiguration of the surrounds including new access roads, external parking areas, walkways and landscaped areas.

The proposed development includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. The maximum cut is anticipated to be approximately 14m below ground level (BGL).

Selected development plans issued to JKE are attached in the appendices.

[1] JKE, (2022a). *Report to HammondCare on Acid Sulfate Soil Assessment for Proposed Hospital Redevelopment at Greenwich Hospital, 97-115 River Road, Greenwich, NSW.* (Ref: E32507BRrpt3Rev1) (referred to as ASS Report)

1.2 Aim and Objectives

The primary aim of the investigation was to characterise the salinity 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 soil and groundwater salinity conditions via implementation of a sampling and analysis program; and
- Assess the requirements for developing a salinity management plan (SMP) for the proposed development.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP53931BR) of 14 April 2021 and written acceptance in the form of a purchase order (PO No: 28737) issued by the client on 29 September 2021. The scope of work included the following:

- Review site information including topography, soils maps, regional geology and hydro-geology in the vicinity of the site;
- A walkover site inspection to identify obvious visual indicators of salinity or potential problem areas;
- Assess the soil and groundwater salinity conditions via implementation of a sampling and analysis program;
- Interpretation of the analytical results based on established assessment criteria;
- Preparation of a report presenting the results of the investigation; and
- Recommendation for the requirement of a SMP for the proposed development.

The investigation 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[2])
Salinity Code of Practice (2004)[3]
Managing Urban Stormwater – Soil and Construction (4th ed.) (2004)[4]
Piling – Design and Installation AS2159-2009 (2009)[5]
Industry Guide T56: Residential Slabs and Footings in Saline Environments (20018[6])

[2] Department of Land and Water Conservation (DLWC), (2002). *Site Investigations for Urban Salinity,* (referred to as DLWC 2002)

[3] 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)

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

[5] Standards Australia, (2009). *Piling – Design and Installation, AS2159-2009* (referred to as AS2159-2009)

[6] Cement, Concrete and Aggregates Australia (CCAA), (2018). Industry Guide *T56: Residential Slabs and Footings in Saline Environments* (referred to as CCAA 2018)

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Site Address:	97-115 River Road, Greenwich, NSW
Lot & Deposited Plan:	Lot 3 and Lot 4 in DP584287
Current Land Use:	Hospital
Proposed Land Use:	Hospital and Seniors Living
Local Government Authority (LGA):	Lane Cove Municipal Council
Development Area (m^2) (approx.):	23,700
RL (AHD in m) (approx.):	36-51
Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -33.827404 Longitude: 151.183875
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2

2.2 Site Location and Regional Setting

The site is located in a predominantly residential area of Greenwich. The site is bounded by River Road to the north and St Vincents Road to the east. The site is located approximately 75m to the north-east of the Gore Creek and 275m to the north-east of the Lane Cove River.

2.3 Topography

The site is located within undulating regional topography and sits on the southern edge of a topographic spur that falls steeply to the east, south and west. A significant fill batter slope exists along the western boundary. Parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 20 September 2021. The inspection was limited to accessible areas of the site and was focussed on assessing the site conditions relevant to salinity-related factors only.

At the time of the inspection, the main hospital buildings were located in the central to west portion of the site and included wards, theatres, two gas-fired boiler units, two emergency generators, clinical and general waste facilities, oxygen storage and maintenance equipment. A building to the east of the main hospital building contained non-clinical facilities. The main hospital buildings were of brick, fibre cement, and concrete construction typically on concrete slab and between one and four storeys.

The majority of the eastern portion of the site was grass covered with interspersed medium to large mature trees and small to medium shrubs. Medium to large trees were observed along the north, west and south boundaries of the site and small to medium shrubs were located in garden beds and around buildings across the site. The steep batter slope in the south-west corner of the site was densely vegetated with native and exotic shrubs and a small grass covered area was observed along the southern boundary (adjacent to the empty pool). The vegetation across the site appeared to be in reasonable condition based on a cursory inspection, with no obvious or extensive dieback observed. Grass coverage was generally good, with the exception of some areas beneath large trees and isolated areas adjacent to carparks and footpaths. No visible indications of saline conditions (such as scalding) were observed.

2.5 Surrounding Land Use

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

- North – Greenwich Public School and residential properties;
- South – Residential properties and Gore Creek Reserve;
- East – Garden and landscaped areas of the hospital, St Vincents Road and residential properties beyond; and
- West – Residential properties.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology and Soils

Regional geological information presented in the Lotsearch Report (attached in the appendices) indicated that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses.

Soil landscape information presented in the Lotsearch report indicated that the site is located within the Hawkesbury and Gymea soil landscapes. Hawkesbury and Gymea soils are characterised by well to rapidly drained soils with high sand content and very low salinity potential.

3.2 Dryland Salinity Mapping

Salinity hazard mapping 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[7]) indicated that the site is not located within a risk area.

An ASS assessment was undertaken in conjunction with this salinity investigation. The ASS assessment concluded that ASS and/or potential ASS (PASS) conditions were not encountered. Reference should be made to the ASS report for further details.

3.4 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 were a total of 21 registered bores within the report buffer of 2,000m. The nearest registered bore was located approximately 820m to the north of the site.

3.5 Receiving Water Bodies and Surface Water Run-off

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Gore Creek located approximately 75m to the south-west of the site, which in turn flows into the Lane Cove River which is approximately 275m south of the site. These water bodies are down-gradient of the site and are considered to be potential receptors.

Rainfall would be expected to infiltrate the site in the unsealed portions, and flow across sealed pavements into on-site drainage infrastructure, which is expected to discharge into Gore Creek.

[7] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2)*

During periods of heavy and/or prolonged rainfall, overland flow of stormwater would be expected to occur and generally flow towards the south-west in sympathy with the topography. Limited overland flow towards the south-east would be expected in the eastern portion of the site.

4 SAMPLING AND ANALYSIS PLAN

The sampling and analysis for this investigation was conducted generally in accordance with the Sampling, Analysis and Quality Plan (SAQP)[8] prepared for the site. Reference should be made to the SAQP for detailed information. A summary of the SAQP is provided in the following sub-sections.

4.1 Soil Sampling Rationale

The investigation included soil sampling from eight locations (BH101, BH102, BH104 and BH105-BH109) placed on a regular grid pattern as shown on Figure 2. This density is equivalent to approximately three sampling points per hectare (the area of the site is approximately 2.4 hectares) and meets the requirements for an 'initial site investigation' recommended in the DLWC 2002 document for 'moderately intensive construction'. The density was considered adequate to identify large areas of salinity impacted soils at the site.

Soil sampling for this investigation was confined to the depth of approximately 15mBGL. This was considered adequate as the proposed development includes excavations to a maximum depth of approximately 14mBGL for the basement construction.

The following areas were excluded from the investigation:

Table 4-1: Exclusion Areas

Area	Description
Buildings	Sampling was not undertaken beneath the existing buildings at the site as access was not possible during the field investigation.
Batter slope in south-west	Sampling was not undertaken within the batter slope in the south-west of the site as the area could not be safely accessed with the drilling rig. JKE note that excavation associated with the redevelopment is not proposed within the vicinity of the batter slope.

4.2 Soil Sampling Methods

Fieldwork for this investigation was undertaken in September and October 2021. Sampling locations were set out using a tape measure from existing site features. Locations were marked using spray paint and were cleared for underground services prior to drilling.

The sample locations were drilled using a track mounted hydraulically operated drill rig equipped with spiral flight augers. Coring techniques were used to advance boreholes into the bedrock. Soil samples were obtained from a Standard Penetration Test (SPT) sampler or directly from the auger and recovered rock core when conditions did not allow use of the SPT sampler.

[8] JKE, (2021). *Report to TSA Management on Sampling, Analysis and Quality Plan (SAQP) for Additional Site Investigation at 97-115 River Road, Greenwich, NSW*. (Ref: E32507BRpt2-SAQP) (Referred to as SAQP).

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 glass jars with plastic caps and Teflon seals 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.

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures. Field sampling protocols adopted for this assessment are summarised in the appendices.

4.3 Groundwater Sampling Rationale

The investigation included the installation of eight groundwater monitoring wells spread across the site as shown on Figure 2. The wells were positioned for site coverage.

4.4 Monitoring Well Installation

The monitoring well construction details are documented on appropriate borehole logs presented in the appendices. The well construction details are summarised in the following table:

Table 4-2: Monitoring Well Construction Details

Borehole Ref / Well Number	Installation Depth (BGL) (m)	Surface RL[1] (m) (approx.)	Casing & Screen[2] Depths (m)	Finishing Details (BGL) (m)
BH101/MW101	7.5	42.1	- Casing from 0 to 1.2 - Screen from 1.2 to 7.5	- Sand filter pack from 1.0 to 7.5 - Bentonite seal/plug from 0.25 to 1.0 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH102/MW102	6.1	37.7	- Casing from 0 to 1.2 - Screen from 1.2 to 6.1	- Sand filter pack from 1.0 to 6.1 - Bentonite seal/plug from 0.25 to 1.0 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH104/MW104	5.97	41.6	- Casing from 0 to 1.2 - Screen from 1.2 to 5.97	- Sand filter pack from 1.0 to 5.97 - Bentonite seal/plug from 0.25 to 1.0 - Finished with gatic cover flush with the surface surrounded by concrete grout.

Borehole Ref / Well Number	Installation Depth (BGL) (m)	Surface RL[1] (m) (approx.)	Casing & Screen[2] Depths (m)	Finishing Details (BGL) (m)
BH105/MW105	7.86	44.8	- Casing from 0 to 0.86 - Screen from 0.86 to 7.86	- Sand filter pack from 1.6 to 7.86 - Bentonite seal/plug from 0.8 to 1.6 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH106/MW106	12.52	49.1	- Casing from 0 to 1.52 - Screen from 1.52 to 12.52	- Sand filter pack from 1.2 to 12.52 - Bentonite seal/plug from 0.4 to 1.2 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH107/MW107	14.93	51.6	- Casing from 0 to 1.93 - Screen from 1.93 to 14.93	- Sand filter pack from 1.5 to 14.93 - Bentonite seal/plug from 0.3 to 1.5 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH109/MW109	12.54	49.1	- Casing from 0 to 1.54 - Screen from 1.54 to 12.54	- Sand filter pack from 1.4 to 12.54 - Bentonite seal/plug from 0.3 to 1.4 - Finished with gatic cover flush with the surface surrounded by concrete grout.
BH119/MW119	5.75	42.5	- Casing from 0 to 1.2 - Screen from 1.2 to 5.75	- Sand filter pack from 1.0 to 5.75 - Bentonite seal/plug from 0.25 to 1.0 - Finished with gatic cover flush with the surface surrounded by concrete grout.

Notes:

[1] RL: Reduced Level (AHD)

[2] 50mm diameter Class 18 PVC has been used for the wells

– information not available

The estimated surface RLs for the monitoring wells were interpolated between spot level measurements from the survey plan provided by the client. A detailed survey of the well heads was outside the scope of the investigation.

4.5 Monitoring Well Development and Groundwater Sampling

The monitoring wells were developed using a submersible electric pump between 5 and 7 October 2021. Groundwater samples were obtained from the monitoring wells using a low-flow peristaltic pump between 13 and 14 October 2021. 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 are attached in the appendices. The samples were preserved in accordance with the requirements detailed in AS/NZS 5667.1-1998[9] 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: 279440-A, 279440-E, 280023, 280027-A and 280509) attached in the appendices for further details of the analytical methods.

4.7 Analytical Schedule

The analytical schedule is outlined in the following table:

Table 4-3: Analytical Schedule

Analyte	Fill Samples	Natural Soil Samples	Natural Bedrock Samples	Groundwater Samples
pH	13	2	15	6
Electrical Conductivity (EC)	13	2	14	6
Resistivity	13	2	15	-
Texture (used to determine EC extract – ECe)	8	1	3	-
Sulphate	13	2	15	6
Chloride	13	2	15	6

For this project, the soil texture results of selected samples were analysed and considered representative of similar soil/rock profiles.

[9] 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)

5 SITE ASSESSMENT CRITERIA (SAC)

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[1]
<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[10]) presented below:

Table 5-2: Plant Response to Soil pH

pH	Rating
<4.5	Extremely acidic
4.5-5.0	Very strongly acidic

[10] 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)

pH	Rating
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[11]) 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

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[12]). 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.

[11] Metson, A.J, (1961). *Methods of Chemical Analysis for Soil Survey Samples* (referred to as Metson 1961)

[12] Eckert, D.J, (1987) .*Soil Test Interpretation: Basic Cation Saturation Ratios and Sufficiency Levels* (referred to as Eckert 1987)

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[13]) 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[14]) 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 (µS/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

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:

[13] Charman, P.E.V and Murphy, B.W (eds), (2000).*Soils: Their Management and Properties,* (referred to as Charman and Murphy 2000)
[14] Suttar, S., (1990). *Ribbons of Blue Handbook, Scitech*, Victoria (referred to as Suttar 1990)

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

ECe (dS/m)	Salinity Class	Concrete Grade[1]
<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_4)		pH	Chlorides in Groundwater (ppm)	Soil Conditions A[1]	Soil Conditions B[2]
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 (eg sands and gravels) which are in groundwater

2 – Low permeability soils (eg 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[1]**	**Soil Conditions B[2]**
	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 (eg sands and gravels) which are in groundwater

2 – Low permeability soils (eg silts and clays) or all soils above groundwater

6 INVESTIGATION RESULTS

6.1 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the table below. For completeness, the summary below includes details from all boreholes drilled for the concurrent ASI. 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	Asphaltic concrete (AC) pavements were encountered at the surface in BH101 to BH106, BH109, BH114, BH116 and BH119 and ranged in thickness from 20mm to 100mm. Concrete pavement was encountered at the surface in BH112 and was 220mm thickness.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.1mBGL (BH116) to 4.1mBGL (BH104). BH111 and BH117 were terminated in the fill at approximate depths of 0.8mBGL and 1.5mBGL. The fill typically comprised silty gravelly sand, sandy clay and silty clay, with occasional silty sand, clayey sand and sandy gravel, with inclusions of igneous, ironstone, sandstone and siltstone gravel, ash, slag, root fibres and building rubble (asphalt, brick, tile, ceramic, glass, metal and plastic fragments).
Natural Soil	Residual sandy clay, silty clay and silty sand was encountered beneath the fill in BH103, BH105, to BH107, BH109, BH110A, BH113 to BH116 and BH118 at depths of approximately 0.2mBGL (BH114) to 1.6mBGL (BH118).
Bedrock	Sandstone bedrock was encountered beneath the fill in BH101, BH102, BH104, BH108, BH112 and BH119, and beneath the residual soils in BH105 to BH107, BH109 and BH116 at depths of approximately 0.3mBGL (BH119) to 4.1mBGL (BH104). A layer of siltstone approximately 500mm thick was encountered within the sandstone bedrock at a depth of approximately 11mBGL in BH109. The siltstone was assessed to be of low strength.
Groundwater	All boreholes were dry during and on completion of auger drilling. Potable water is introduced during core drilling activities, which inhibits meaningful groundwater seepage measurements during drilling. Standing water level (SWL) measured during sampling of the monitoring wells installed at the site ranged from approximately 3.58mBGL to 9.9mBGL. Groundwater RLs calculated on these measurements ranged from approximately 34mAHD to 42mAHD. The groundwater RLs indicate that excavation for the proposed basement will intercept groundwater.

6.2 Laboratory Results

A summary of the results is presented below.

Table 6-2: Summary of Laboratory Results

Analyte	Results
EC & ECe	The EC results ranged from 9µS/m to 790µS/m. The ECe results ranged from <2dS/m to 7.1dS/m.
Resistivity	Resistivity values were calculated based on the raw EC values. The resistivity values for the soil samples ranged from 1266ohm.cm to 111,111ohm.cm.
pH	The results of the analysis ranged from pH 4.9 to pH 9.8.
CEC	The results of the analysis ranged from: • CEC – below the laboratory detection limits (PQL) to 153meq/100g; • Exchangeable Na – below the PQL to 2.2meq/100g; • Exchangeable K – below the PQL to 1.9meq/100g; • Exchangeable Ca – 0.1meq/100g to 100meq/100g; and • Exchangeable Mg – 0.4meq/100g to 49meq/100g.
Sulphate	The results ranged from below the PQL to 1,800mg/kg.
Chloride	The results ranged from below the PQL to 25mg/kg.
Groundwater	The results of the analysis ranged from: • pH – pH 4.5 to pH 7; • EC – 69µS/cm to 590µS/cm; • Chloride - 4mg/L to 42mg/L; and • Sulphate - 4mg/L to 150mg/L.

Note:

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

7 RESULTS INTERPRETATION

The soil and groundwater laboratory results were compared to the relevant SAC in the report tables attached in the appendices. 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 were generally <2dS/m. Soil samples collected from BH104 (0.04-0.3m and 3.2-3.45m) were classed as moderately saline and slightly saline respectively. All other soil samples were classed as non-saline.
Soil pH and Plant Growth	The soil pH results ranged from 4.9 to 9.8 and are classed as very strongly acidic to very strongly alkaline. The majority of the surficial soils were generally within the strongly alkaline range for plant growth. The acidic conditions generally increased with depth. 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 <1meq/100g to 153meq/100g in the very low to very high range. The majority of the samples were within the very low to moderate range 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 moderate. Lime and 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 0.5% to 6.8%. The majority of the ESP results were below the 5% threshold and were classed as non-sodic.
Groundwater Salinity	The laboratory results indicate that the groundwater is generally non-saline and within the 'freshwater rivers' water type.
Concrete Slabs and Footings in Saline Soils (CCAA 2018)	The proposed earthworks are anticipated to expose soils and bedrock generally classed as non-saline to moderately saline in the vicinity of BH104. The CCAA 2018 recommended concrete grade for slabs and footings in moderately-saline soils is N25. 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 low permeability soils (i.e. silts and clays) underlain by sandstone bedrock. Based on this, the exposure classification outlined under 'Soil Conditions B' has been adopted for the investigation.
Exposure Classification for Concrete Piles/Foundations (AS2159-2009)	The soil pH and sulphate results indicate that the soils are mildly aggressive towards buried concrete. The groundwater pH, sulphate and chloride results indicate that the groundwater is mild to moderately aggressive towards buried concrete.
Exposure Classification for Steel Piles/Foundations (AS2159-2009)	The soil resistivity, pH and chloride results indicate that the soils are mildly aggressive towards buried steel.

Parameter	Notes
	The groundwater pH and chloride results indicate that the groundwater is non aggressive towards buried steel.

8 CONCLUSIONS AND RECOMMENDATIONS

The investigation identified the following salinity conditions at the site:

- The soils are classed as very strongly acidic to very strongly alkaline;
- The soils are classed as non-saline with localised occurrences of slightly to moderately saline conditions;
- The soils are generally non-sodic;
- The soils are mildly aggressive towards buried concrete;
- The soils are mildly aggressive towards buried steel;
- The groundwater is moderately aggressive towards buried concrete; and
- The groundwater is not aggressive towards buried steel.

Based on the results of this investigation, JKE recommend preparing a salinity management plan (SMP) for the proposed development. The salinity results outlined in this report should be reviewed and incorporated into the design of the proposed development by the project team (civil, structural and landscaping). The SMP should be reviewed in conjunction with the recommendations provided by the design team.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

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 patters can also impact the salinity at the site. The results outlined in this report are a snap shot of conditions present at the time of the investigation and is bound to change over time;
- JKE accepts no responsibility for any unidentified salinity 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 salinity management 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
- 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.

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, eg addition of basement levels; 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.

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.

Appendix A: Report Figures

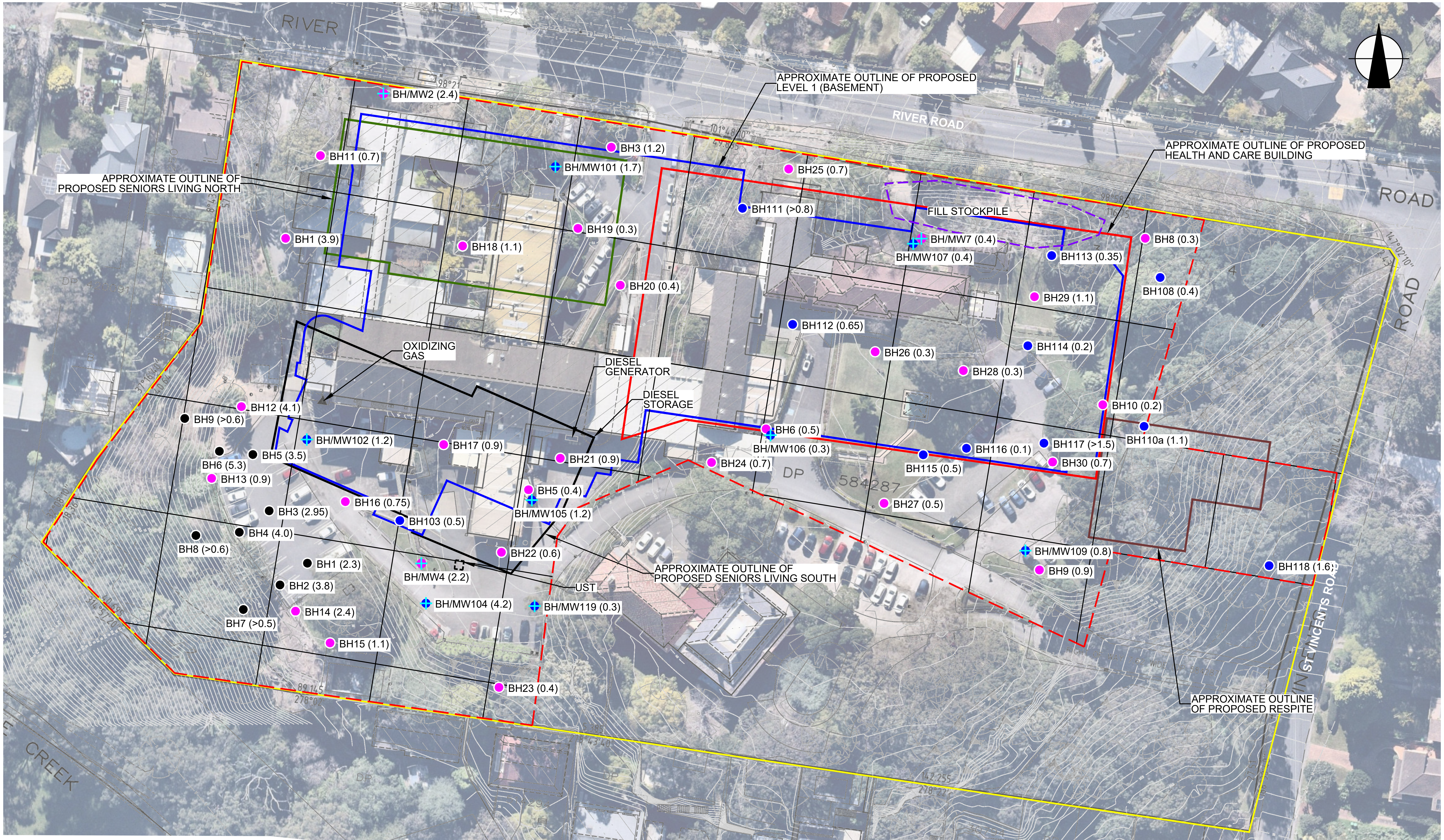
AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

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

Title:	SITE LOCATION PLAN
Location:	95-115 RIVER ROAD, GREENWICH, NSW
Project No: E32507BR	Figure No: 1

JKEnvironments

PLOT DATE: 16/09/2021 10:48:31 AM DWG FILE: Z:\5 EIS\5C EIS JOBS\32000'S\E32507BT GREENWICH\CAD\BR\E32507BR.DWG



LEGEND

(red dashed line)	APPROXIMATE SITE BOUNDARY
(yellow line)	APPROXIMATE WIDER PROPERTY BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, 2019)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, 2019)
BH/MW(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (EIS, 2014)
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 8 16 24 32 40

SCALE 1:800 @A3 METRES

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

Title:	**SAMPLE LOCATION PLAN**
Location:	95-115 RIVER ROAD, GREENWICH, NSW
Project No:	E32507BR
Figure No:	2

JKEnvironments

PLOT DATE: 9/02/2022 9:40:08 AM DWG FILE: S:\5 EIS\5C EIS JOBS\32000\5E32507BT GREENWICH\CAD\5E32507BR.DWG

Appendix B: 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 l

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.

JKEnvironments

TABLE A
SUMMARY OF SOIL LABORATORY RESULTS - EC and ECe

Borehole Number	Sample Depth (m)	Sample Description	EC (µS/cm)	ECe (dS/m)	Salinity Class
BH101	0.02-0.4	Fill: Silty Gravelly Sand	170	<2	NON SALINE
BH101	0.5-0.85	Fill: Silty Sand	110	<2	NON SALINE
BH101	1.7-1.95	XW Sandstone	60	<2	NON SALINE
BH102	0.05-0.1	Fill: Silty Gravelly Sand	71	<2	NON SALINE
BH102	0.5-0.95	Fill: Silty Clay	81	<2	NON SALINE
BH102	1.4-1.6	Sandstone	53	<2	NON SALINE
BH102	1.4-1.6	LAB DUPLICATE	49	<2	NON SALINE
BH104	0.04-0.3	Fill: Sandy Gravel	790	7.1	MODERATELY SALINE
BH104	1.5-1.95	Fill: Silty Gravelly Sand	110	<2	NON SALINE
BH104	3.2-3.45	Fill: Silty Sand	170	2.9	SLIGHTLY SALINE
BH105	0.25-0.4	Fill: Silty Gravelly Sand	110	<2	NON SALINE
BH105	0.5-0.95	Fill: Clayey Silty Sand	130	<2	NON SALINE
BH105	1.2-1.4	Sandy Clay	39	<2	NON SALINE
BH105	2.9-3.0	XW Sandstone	43	<2	NON SALINE
BH106	7.9-8.0	Sandstone	17	<2	NON SALINE
BH106	10.9-11.0	Sandstone	11	<2	NON SALINE
BH106	10.9-11.0	LAB DUPLICATE	9	<2	NON SALINE
BH107	0-0.2	Fill: Silty Clay	34	<2	NON SALINE
BH107	1.3-1.5	Silty Clay	21	<2	NON SALINE
BH107	3.9-4.0	Sandstone	10	<2	NON SALINE
BH107	5.9-6.0	Sandstone	13	<2	NON SALINE
BH107	5.9-6.0	LAB DUPLICATE	16	<2	NON SALINE
BH107	13.9-14.0	Sandstone	16	<2	NON SALINE
BH107	14.9-15.0	Sandstone	16	<2	NON SALINE
BH108	0.1-0.4	Fill: Sandy Silty Clay	49	<2	NON SALINE
BH108	1.9-2.0	Sandstone	19	<2	NON SALINE
BH108	2.9-3.0	Sandstone	11	<2	NON SALINE
BH108	6.9-7.0	Sandstone	13	<2	NON SALINE
BH108	6.9-7.0	LAB DUPLICATE	14	<2	NON SALINE
BH108	7.9-8.0	Sandstone	16	<2	NON SALINE
BH108	9.9-10.0	Sandstone	20	<2	NON SALINE
BH109	0.01-0.4	Fill: Clayey Gravelly Sand	77	<2	NON SALINE
BH109	0.5-0.8	Fill: Sandy Clay	60	<2	NON SALINE
Text1					
Total Number of Samples			33	33	-
Minimum Value			9	<PQL	-
Maximum Value			790	7.1	-

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 (µS/cm)	Resistivity (ohm.cm)	Classification Condition B
BH101	0.02-0.4	Fill: Silty Gravelly Sand	170	5,882	Non Aggressive
BH101	0.5-0.85	Fill: Silty Sand	110	9,091	Non Aggressive
BH101	1.7-1.95	XW Sandstone	60	16,667	Non Aggressive
BH102	0.05-0.1	Fill: Silty Gravelly Sand	71	14,085	Non Aggressive
BH102	0.5-0.95	Fill: Silty Clay	81	12,346	Non Aggressive
BH102	1.4-1.6	Sandstone	53	18,868	Non Aggressive
BH102	1.4-1.6	LAB DUPLICATE	49	20,408	Non Aggressive
BH104	0.04-0.3	Fill: Sandy Gravel	790	1,266	Mildly Aggressive
BH104	1.5-1.95	Fill: Silty Gravelly Sand	110	9,091	Non Aggressive
BH104	3.2-3.45	Fill: Silty Sand	170	5,882	Non Aggressive
BH105	0.25-0.4	Fill: Silty Gravelly Sand	110	9,091	Non Aggressive
BH105	0.5-0.95	Fill: Clayey Silty Sand	130	7,692	Non Aggressive
BH105	1.2-1.4	Sandy Clay	39	25,641	Non Aggressive
BH105	2.9-3.0	XW Sandstone	43	23,256	Non Aggressive
BH106	7.9-8.0	Sandstone	17	58,824	Non Aggressive
BH106	10.9-11.0	Sandstone	11	90,909	Non Aggressive
BH106	10.9-11.0	LAB DUPLICATE	9	111,111	Non Aggressive
BH107	0-0.2	Fill: Silty Clay	34	29,412	Non Aggressive
BH107	1.3-1.5	Silty Clay	21	47,619	Non Aggressive
BH107	3.9-4.0	Sandstone	10	100,000	Non Aggressive
BH107	5.9-6.0	Sandstone	13	76,923	Non Aggressive
BH107	5.9-6.0	LAB DUPLICATE	16	62,500	Non Aggressive
BH107	13.9-14.0	Sandstone	16	62,500	Non Aggressive
BH107	14.9-15.0	Sandstone	16	62,500	Non Aggressive
BH108	0.1-0.4	Fill: Sandy Silty Clay	49	20,408	Non Aggressive
BH108	1.9-2.0	Sandstone	19	52,632	Non Aggressive
BH108	2.9-3.0	Sandstone	11	90,909	Non Aggressive
BH108	6.9-7.0	Sandstone	13	76,923	Non Aggressive
BH108	6.9-7.0	LAB DUPLICATE	14	71,429	Non Aggressive
BH108	7.9-8.0	Sandstone	16	62,500	Non Aggressive
BH108	9.9-10.0	Sandstone	20	50,000	Non Aggressive
BH109	0.01-0.4	Fill: Clayey Gravelly Sand	77	12,987	Non Aggressive
BH109	0.5-0.8	Fill: Sandy Clay	60	16,667	Non Aggressive
Total Number of Samples			33	33	-
Minimum Value			9	1,266	-
Maximum Value			790	111,111	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

Resistivity Values (ohm.cm)	Classification for Steel Piles
>5,000	Non-Aggressive
2,000 - 5,000	Non-Aggressive
1,000 - 2,000	Mildly Aggressive
<1,000	Moderately Aggressive

TABLE C
SUMMARY OF SOIL LABORATORY RESULTS - pH

Borehole Number	Sample Depth (m)	Sample Description	pH	Classification for Concrete Piles Condition B	Classification for Steel Piles Condition B
BH101	0.02-0.4	Fill: Silty Gravelly Sand	9.8	Non-Aggressive	Non-Aggressive
BH101	0.5-0.85	Fill: Silty Sand	9.1	Non-Aggressive	Non-Aggressive
BH101	1.7-1.95	XW Sandstone	8.7	Non-Aggressive	Non-Aggressive
BH102	0.05-0.1	Fill: Silty Gravelly Sand	9	Non-Aggressive	Non-Aggressive
BH102	0.5-0.95	Fill: Silty Clay	7	Non-Aggressive	Non-Aggressive
BH102	1.4-1.6	Sandstone	7.8	Non-Aggressive	Non-Aggressive
BH102	1.4-1.6	LAB DUPLICATE	7.9	Non-Aggressive	Non-Aggressive
BH104	0.04-0.3	Fill: Sandy Gravel	8.5	Non-Aggressive	Non-Aggressive
BH104	1.5-1.95	Fill: Silty Gravelly Sand	9	Non-Aggressive	Non-Aggressive
BH104	3.2-3.45	Fill: Silty Sand	8.2	Non-Aggressive	Non-Aggressive
BH105	0.25-0.4	Fill: Silty Gravelly Sand	8.8	Non-Aggressive	Non-Aggressive
BH105	0.5-0.95	Fill: Clayey Silty Sand	8.7	Non-Aggressive	Non-Aggressive
BH105	1.2-1.4	Sandy Clay	8	Non-Aggressive	Non-Aggressive
BH105	2.9-3.0	XW Sandstone	5.4	Mildly Aggressive	Non-Aggressive
BH106	7.9-8.0	Sandstone	6	Non-Aggressive	Non-Aggressive
BH106	10.9-11.0	Sandstone	6.2	Non-Aggressive	Non-Aggressive
BH106	10.9-11.0	LAB DUPLICATE	6.3	Non-Aggressive	Non-Aggressive
BH106	12.45-12.55	Sandstone	6.2	Non-Aggressive	Non-Aggressive
BH107	0-0.2	Fill: Silty Clay	6.8	Non-Aggressive	Non-Aggressive
BH107	1.3-1.5	Silty Clay	5.9	Non-Aggressive	Non-Aggressive
BH107	3.9-4.0	Sandstone	5.3	Mildly Aggressive	Non-Aggressive
BH107	5.9-6.0	Sandstone	5.3	Mildly Aggressive	Non-Aggressive
BH107	5.9-6.0	LAB DUPLICATE	5.3	Mildly Aggressive	Non-Aggressive
BH107	13.9-14.0	Sandstone	5.8	Non-Aggressive	Non-Aggressive
BH107	14.9-15.0	Sandstone	5.7	Non-Aggressive	Non-Aggressive
BH108	0.1-0.4	Fill: Sandy Silty Clay	4.9	Mildly Aggressive	Non-Aggressive
BH108	1.9-2.0	Sandstone	5.3	Mildly Aggressive	Non-Aggressive
BH108	2.9-3.0	Sandstone	5.4	Mildly Aggressive	Non-Aggressive
BH108	6.9-7.0	Sandstone	5.9	Non-Aggressive	Non-Aggressive
BH108	6.9-7.0	LAB DUPLICATE	5.9	Non-Aggressive	Non-Aggressive
BH108	7.9-8.0	Sandstone	5.8	Non-Aggressive	Non-Aggressive
BH108	9.9-10.0	Sandstone	5.7	Non-Aggressive	Non-Aggressive
BH109	0.01-0.4	Fill: Clayey Gravelly Sand	9	Non-Aggressive	Non-Aggressive
BH109	0.5-0.8	Fill: Sandy Clay	7.7	Non-Aggressive	Non-Aggressive
Total Number of Samples			34	-	-
Minimum Value			4.9	-	-
Maximum Value			9.8	-	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

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

JKEnvironments

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 Sulfate - Condition B	Classification for Steel Piles Chloride - Condition B
BH101	0.02-0.4	Fill: Silty Gravelly Sand	<10	120	Non-Aggressive	Non-Aggressive
BH101	0.5-0.85	Fill: Silty Sand	<10	21	Non-Aggressive	Non-Aggressive
BH101	1.7-1.95	XW Sandstone	<10	24	Non-Aggressive	Non-Aggressive
BH102	0.05-0.1	Fill: Silty Gravelly Sand	<10	<10	Non-Aggressive	Non-Aggressive
BH102	0.5-0.95	Fill: Silty Clay	10	56	Non-Aggressive	Non-Aggressive
BH102	1.4-1.6	Sandstone	10	32	Non-Aggressive	Non-Aggressive
BH102	1.4-1.6	LAB DUPLICATE	10	30	Non-Aggressive	Non-Aggressive
BH104	0.04-0.3	Fill: Sandy Gravel	25	1800	Non-Aggressive	Non-Aggressive
BH104	1.5-1.95	Fill: Silty Gravelly Sand	<10	100	Non-Aggressive	Non-Aggressive
BH104	3.2-3.45	Fill: Silty Sand	10	130	Non-Aggressive	Non-Aggressive
BH105	0.25-0.4	Fill: Silty Gravelly Sand	<10	44	Non-Aggressive	Non-Aggressive
BH105	0.5-0.95	Fill: Clayey Silty Sand	<10	53	Non-Aggressive	Non-Aggressive
BH105	1.2-1.4	Sandy Clay	<10	10	Non-Aggressive	Non-Aggressive
BH105	2.9-3.0	XW Sandstone	<10	64	Non-Aggressive	Non-Aggressive
BH106	7.9-8.0	Sandstone	<10	20	Non-Aggressive	Non-Aggressive
BH106	10.9-11.0	Sandstone	<10	<10	Non-Aggressive	Non-Aggressive
BH106	10.9-11.0	LAB DUPLICATE	<10	<10	Non-Aggressive	Non-Aggressive
BH106	12.45-12.55	Sandstone	10	<10	Non-Aggressive	Non-Aggressive
BH107	0-0.2	Fill: Silty Clay	<10	<10	Non-Aggressive	Non-Aggressive
BH107	1.3-1.5	Silty Clay	<10	21	Non-Aggressive	Non-Aggressive
BH107	3.9-4.0	Sandstone	<10	10	Non-Aggressive	Non-Aggressive
BH107	5.9-6.0	Sandstone	<10	10	Non-Aggressive	Non-Aggressive
BH107	5.9-6.0	LAB DUPLICATE	<10	20	Non-Aggressive	Non-Aggressive
BH107	13.9-14.0	Sandstone	20	<10	Non-Aggressive	Non-Aggressive
BH107	14.9-15.0	Sandstone	20	<10	Non-Aggressive	Non-Aggressive
BH108	0.1-0.4	Fill: Sandy Silty Clay	10	45	Non-Aggressive	Non-Aggressive
BH108	1.9-2.0	Sandstone	20	49	Non-Aggressive	Non-Aggressive
BH108	2.9-3.0	Sandstone	<10	<10	Non-Aggressive	Non-Aggressive
BH108	6.9-7.0	Sandstone	10	<10	Non-Aggressive	Non-Aggressive
BH108	6.9-7.0	LAB DUPLICATE	10	<10	Non-Aggressive	Non-Aggressive
BH108	7.9-8.0	Sandstone	20	<10	Non-Aggressive	Non-Aggressive
BH108	9.9-10.0	Sandstone	20	<10	Non-Aggressive	Non-Aggressive
BH109	0.01-0.4	Fill: Clayey Gravelly Sand	<10	35	Non-Aggressive	Non-Aggressive
BH109	0.5-0.8	Fill: Sandy Clay	<10	88	Non-Aggressive	Non-Aggressive
Total Number of Samples			34	34	-	-
Minimum Value			<PQL	<PQL	-	-
Maximum Value			25	1800	-	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

Sulfate Values	Classification for Concrete Piles	Chloride Values	Classification for Steel Piles
<5,000	Non-Aggressive	<5,000	Non-Aggressive
5,000 - 10,000	Mildly Aggressive	5,000 - 20,000	Non-Aggressive
10,000 - 20,000	Moderately Aggressive	20,000 - 50,000	Mildly Aggressive
>20,000	Severely Aggressive	>50,000	Moderately 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)					%	
BH102	0.05-0.1	Fill: Silty Gravelly Sand	23	0.3	5.5	0.3	29	1.0%	4.18:1
BH104	0.04-0.3	Fill: Sandy Gravel	100	1.8	46	2	153	1.3%	2.17:1
BH104	0.04-0.3	LAB DUPLICATE	100	1.9	49	2.2	153	1.4%	2.04:1
BH104	0.5-0.95	Fill: Silty Gravelly Sand	12	0.3	5	0.2	17	1.2%	2.4:1
BH104	1.5-1.95	Fill: Silty Gravelly Sand	33	0.7	14	0.3	48	0.6%	2.36:1
BH105	0.25-0.4	Fill: Silty Gravelly Sand	9.8	<0.1	1.6	<0.1	12	0.8%	6.13:1
BH105	0.25-0.4	LAB DUPLICATE	12	<0.1	1.7	<0.1	14	0.7%	7.06:1
BH105	0.5-0.95	Fill: Clayey Silty Sand	13	0.1	2.2	<0.1	15	0.7%	5.91:1
BH105	1.2-1.4	Sandy Clay	2.3	<0.1	0.8	<0.1	3.2	3.1%	2.88:1
BH105	2.9-3.0	XW Sandstone	1.5	0.1	0.4	<0.1	2	5.0%	3.75:1
BH106	0.03-0.3	Fill: Clayey Gravelly Sand	18	0.4	5.2	1.7	25	6.8%	3.46:1
BH106	7.9-8.0	Sandstone	0.1	<0.1	0.6	<0.1	<1	NA	0.17:1
BH107	0-0.2	Fill: Silty Clay	8.2	0.2	2.2	<0.1	11	0.9%	3.73:1
BH108	0.1-0.4	Fill: Sandy Silty Clay	2.4	1.1	1.6	0.2	5.2	3.8%	1.5:1
BH109	0.01-0.4	Fill: Clayey Gravelly Sand	13	0.2	4.7	0.1	18	0.6%	2.77:1
BH109	0.5-0.8	Fill: Sandy Clay	2.5	<0.1	1.9	<0.1	4.5	2.2%	1.32:1
Total Number of Samples			16	16	16	16	16	16	16
Minimum Value			0.10	<PQL	0.40	<PQL	1.0	0.6%	0.17 :1
Maximum Value			100.00	1.90	49.00	2.20	153.0	10.0%	7.06 :1

ESP Value	**Sodicity Rating**
< 5%	Non-Sodic
5% to 15%	Sodic
> 15%	Highly Sodic

JKEnvironments

TABLE F
SUMMARY OF GROUNDWATER LABORATORY RESULTS

Sample Reference	Field Measurements						Laboratory Results				Classification for Concrete Piles Soil Condition B	Classification for Steel Piles Soil Condition B
	SWL (m)	pH	EC (µS/cm)	Temp (°C)	Eh (mV)	DO (mg/L)	pH	EC (µS/cm)	Sulfate (mg/L)	Chloride (mg/L)		
MW101	3.58	5.8	316	20.9	-37.1	1.4	6.2	300	36	25	Non-Aggressive	Non-Aggressive
MW101 [LAB_DUP]	NA	NA	NA	NA	NA	NA	6.2	300	36	25	Non-Aggressive	Non-Aggressive
MW102	3.67	6.5	72	22	-44	3.6	7.0	69	4	4	Non-Aggressive	Non-Aggressive
MW105	6.03	5.1	660	24.9	-34.5	3.5	5.4	590	150	16	Mildly Aggressive	Non-Aggressive
MW106	9.17	4.1	379	23.4	-51.6	6.5	4.5	350	65	42	Moderately Aggressive	Non-Aggressive
MW107	9.9	4.3	231	16	-16.2	3.1	4.9	250	40	32	Mildly Aggressive	Non-Aggressive
MW109	7.07	4.9	246	19.2	-53.2	1.1	5.3	240	48	19	Mildly Aggressive	Non-Aggressive
Total Number of Samples	6	6	6	6	6	6	7	7	7	7	-	-
Minimum Value	3.58	4.1	72	16	-53.2	1.1	4.5	69	4	4	-	-
Maximum Value	9.9	6.5	660	24.9	-16.2	6.5	7.0	590	150	42	-	-

Exposure Classification for Concrete Piles

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts and clays) or all soils above groundwater.

pH	Sulfate (mg/L)	Chloride (mg/L)	Classification B
> 5.5	<1,000	<6,000	Non-Aggressive
4.5 - 5.5	1,000 - 3,000	6,000 - 12,000	Mildly Aggressive
4.0 - 4.5	3,000 - 10,000	12,000 - 30,000	Moderately Aggressive
< 4	>10,000	>30,000	Severely Aggressive

Exposure Classification for Steel Piles

Classification is also based on Soil condition 'B' - low permeability soils (e.g. silts and clays) or all soils above groundwater.

pH	Chloride (mg/L)	Classification B
> 5	<1,000	Non-Aggressive
4.0 - 5.0	1,000 - 10,000	Non-Aggressive
3.0 - 4.0	10,000 - 20,000	Mildly Aggressive
<3	>20,000	Moderately Aggressive

Appendix C: Lotsearch Environmental Risk and Planning Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 29 Sep 2021 14:52:25

Reference: LS024777 EP

Address: 97-115 River Road, Greenwich, NSW 2065

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 Finance, Services & Innovation	20/08/2021	20/08/2021	Quarterly	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	08/09/2021	08/09/2021	Monthly	1000m	0	1	3
Contaminated Land Records of Notice	Environment Protection Authority	06/09/2021	06/09/2021	Monthly	1000m	0	0	0
Former Gasworks	Environment Protection Authority	11/08/2021	11/10/2017	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	12/05/2021	07/03/2017	Annually	1000m	0	0	1
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	0	5
EPA PFAS Investigation Program	Environment Protection Authority	27/09/2021	28/04/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	28/09/2021	28/09/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	28/09/2021	28/09/2021	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	06/09/2021	06/09/2021	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	19/08/2021	19/08/2021	Quarterly	2000m	0	0	1
EPA Other Sites with Contamination Issues	Environment Protection Authority	02/02/2021	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	27/09/2021	27/09/2021	Monthly	1000m	0	0	11
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	27/09/2021	27/09/2021	Monthly	1000m	0	0	3
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	27/09/2021	27/09/2021	Monthly	1000m	1	4	7
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	0	1	3
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	5	5
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	97
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	16
Points of Interest	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	2	7	87
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	5
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	3
Major Easements	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	2	18
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	22/01/2021	11/12/2020	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	1000m	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000m	0	0	21

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	1	1	4
Geological Structures 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000m	2	3	8
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	19/08/2021	28/06/2021	Monthly	500m	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	2	3
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	28/09/2021	28/09/2021	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	28/09/2021	28/09/2021	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	28/09/2021	28/09/2021	Monthly	1000m	12	12	14
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	19/08/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	19/08/2021	13/08/2021	Monthly	1000m	1	10	108
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	1	1	4
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	19/08/2021	13/08/2021	Monthly	1000m	2	3	198
Bush Fire Prone Land	NSW Rural Fire Service	27/09/2021	23/08/2021	Weekly	1000m	2	2	2
Native Vegetation of the Sydney Metropolitan Area	NSW Office of Environment & Heritage	01/03/2017	16/12/2016	As required	1000m	4	11	41
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	24/02/2021	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	0	0	0
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	0	0	0
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	27/09/2021	27/09/2021	Weekly	10000m	-	-	-

Site Diagram

97-115 River Road, Greenwich, NSW 2065

Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area:	33873m²
Total Perimeter:	779m

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.

Scale:
0 25 50
Meters

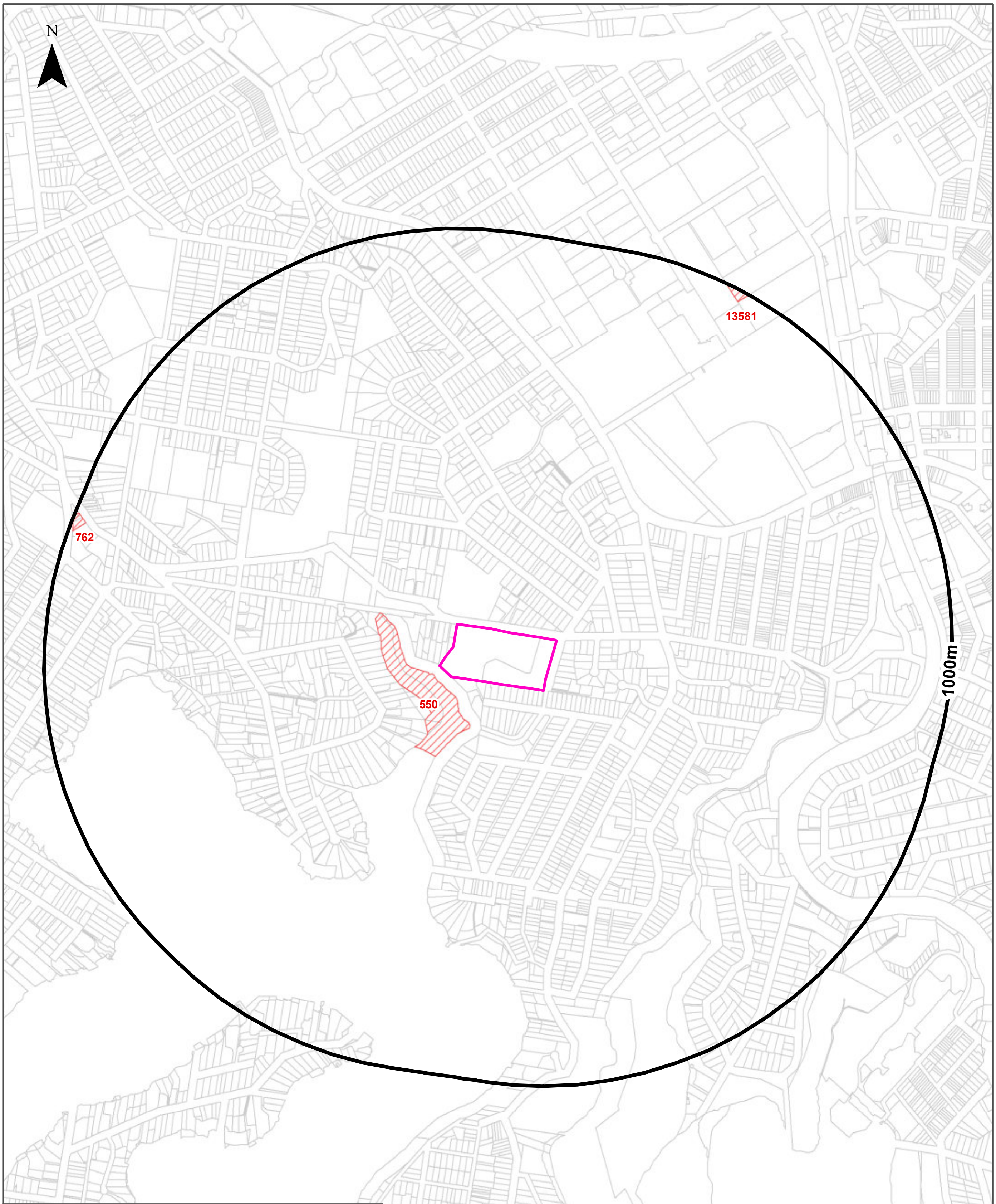
Data Source Aerial Imagery:
© Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Contaminated Land

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary
Buffer 1000m
Property Boundary
Contaminated Land List
Contaminated Land Record of Notice
Former Gasworks

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Contaminated Land

97-115 River Road, Greenwich, NSW 2065

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
550	Gore Creek Reserve - Drainage Line	St Vincents Road	Greenwich	Other Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	27m	South West
762	Caltex Service Station	5 Northwood ROAD	Longueville	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	965m	West
13581	Telstra Data Centre	4A Herbert STREET	ST LEONARDS	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	971m	North East

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

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

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land

97-115 River Road, Greenwich, NSW 2065

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

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

Contaminated Land Records of Notice Data Source: Environment Protection Authority

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

Former Gasworks

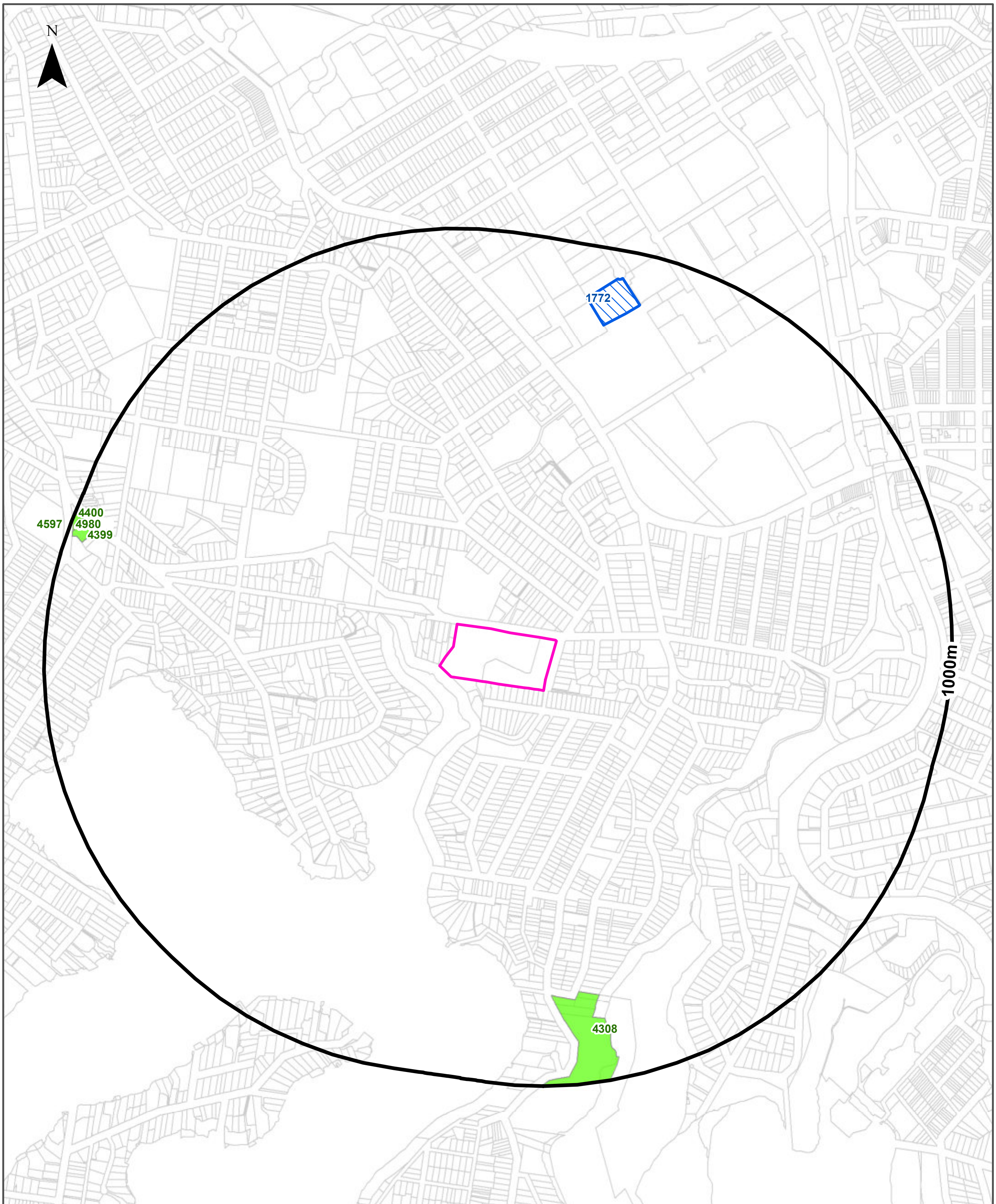
Former Gasworks within the dataset buffer:

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

Former Gasworks Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

97-115 River Road, Greenwich, NSW 2065



Legend

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

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Waste Management & Liquid Fuel Facilities

97-115 River Road, Greenwich, NSW 2065

National Waste Management Site Database

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

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist	Direction
1772	Sita Australia Pty Ltd	Artarmon Waste and Recycling Centre	Lanceley Place	Artarmon	Transfer Station			Operational		Premise Match	806m	North

Waste Management Facilities Data Source: Geoscience Australia

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
4308	Shell	Gore Bay	Manns Avenue	Greenwich	Fuel Terminal	Operational	Shell	11/06/2012	Premise Match	765m	South
4399	BP	BP Longueville	9 Northwood Road	Longueville	Petrol Station	Operational		25/07/2011	Premise Match	939m	West
4980	BP	BP Express Northwood	9 Northwood Road	Longueville	Petrol Station	Operational		25/07/2011	Premise Match	939m	West
4400	Caltex	Caltex Longueville	7 Northwood Road	Longueville	Petrol Station	Operational		25/07/2011	Premise Match	965m	West
4597	Caltex	Caltex Longueville	5-7 Northwood Road	Longueville	Petrol Station	Operational		25/07/2011	Premise Match	965m	West

National Liquid Fuel Facilities Data Source: Geoscience Australia

PFAS Investigation & Management Programs

97-115 River Road, Greenwich, NSW 2065

EPA PFAS Investigation Program

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

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

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation Program

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

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

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

Defence PFAS Management Program

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

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

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

Airservices Australia National PFAS Management Program

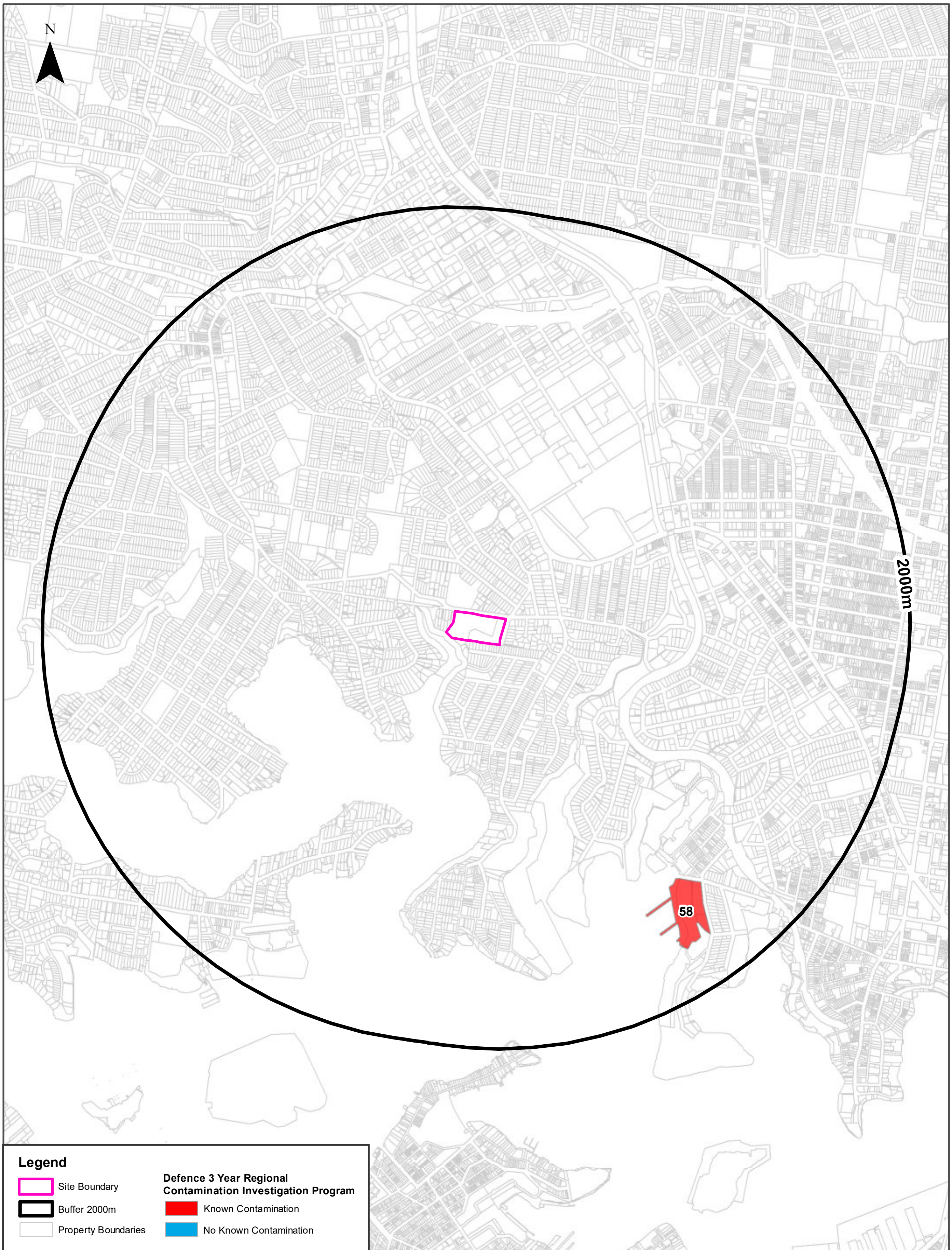
Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

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

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence 3 Year Regional Contamination Investigation Program

97-115 River Road, Greenwich, NSW 2065



Scale: 0 200 400 800 1,200 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Defence Sites

97-115 River Road, Greenwich, NSW 2065

Defence 3 Year Regional Contamination Investigation Program

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

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
58	HMAS Waterhen	Waverton, New South Wales	YES	Premise Match	1447m	South East

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

EPA Other Sites with Contamination Issues

97-115 River Road, Greenwich, NSW 2065

EPA Other Sites with Contamination Issues

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

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

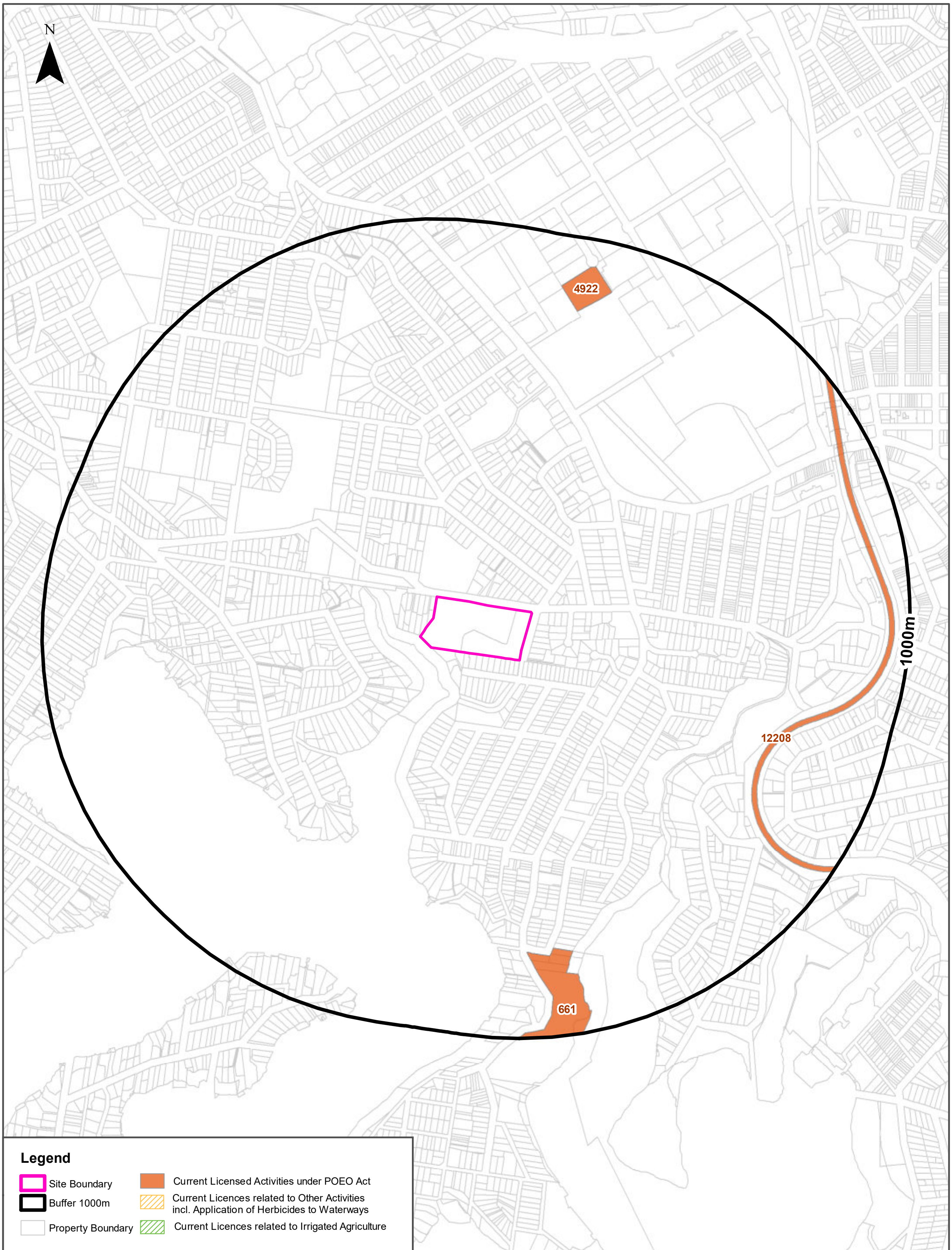
Sites within the dataset buffer:

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

EPA Other Sites with Contamination Issues: Environment Protection Authority

Current EPA Licensed Activities

97-115 River Road, Greenwich, NSW 2065



Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

EPA Activities

97-115 River Road, Greenwich, NSW 2065

Licensed Activities under the POEO Act 1997

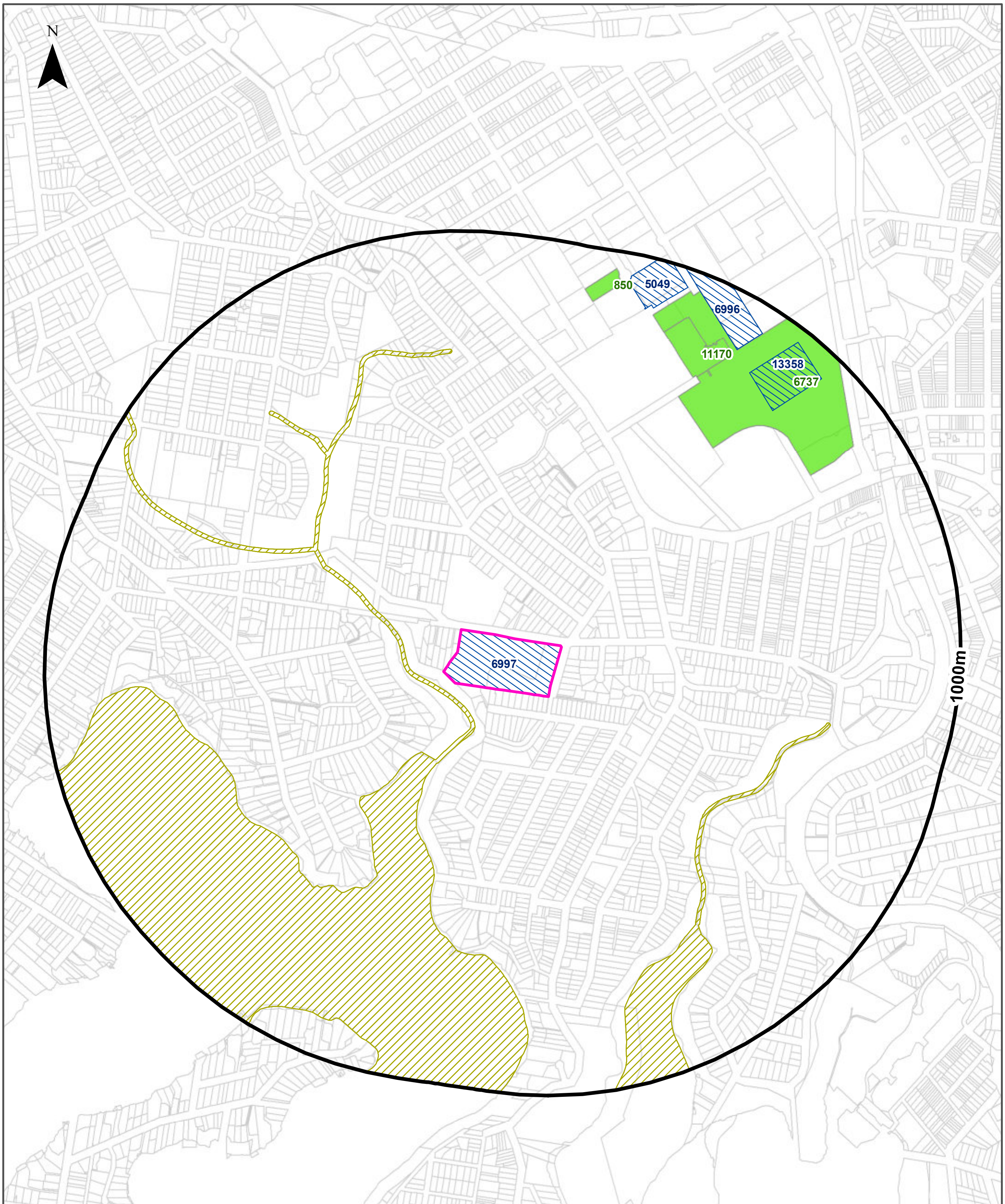
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
12208	SYDNEY TRAINS		SYDNEY TRAINS, HAYMARKET, NSW 1238		Railway systems activities	Network of Features	684m	East
661	VIVA ENERGY AUSTRALIA PTY LTD	GORE BAY TERMINAL	MANNS AVENUE	GREENWICH	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Premise Match	765m	South
661	VIVA ENERGY AUSTRALIA PTY LTD	GORE BAY TERMINAL	MANNS AVENUE	GREENWICH	Chemical storage waste generation	Premise Match	765m	South
661	VIVA ENERGY AUSTRALIA PTY LTD	GORE BAY TERMINAL	MANNS AVENUE	GREENWICH	Petroleum products storage	Premise Match	765m	South
661	VIVA ENERGY AUSTRALIA PTY LTD	GORE BAY TERMINAL	MANNS AVENUE	GREENWICH	Shipping in bulk	Premise Match	765m	South
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Composting	Premise Match	806m	North
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Premise Match	806m	North
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Waste storage - waste tyres	Premise Match	806m	North
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Recovery of general waste	Premise Match	806m	North
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Waste storage - other types of waste	Premise Match	806m	North
4922	SUEZ RECYCLING & RECOVERY PTY LTD	ARTARMON RESOURCE RECOVERY CENTRE	LANCELEY PLACE	ARTARMON	Non-thermal treatment of general waste	Premise Match	806m	North

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary
Buffer 1000m
Property Boundary
Delicensed Activities still Regulated by EPA
Former Licensed/Regulated Activities (revoked or surrendered)
Surrendered Licences related to Other Activities on Waterways incl. Application of Herbicides

Scale: 0 100 200 400 600 Meters	Property Boundary Data Source: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

EPA Activities

97-115 River Road, Greenwich, NSW 2065

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
6737	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	ROYAL NORTH SHORE HOSPITAL	PACIFIC HIGHWAY	ST LEONARDS	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	626m	North East
11170	RAMSAY HEALTH CARE AUSTRALIA PTY LIMITED	NORTH SHORE PRIVATE HOSPITAL	3 Westbourne Street	ST LEONARDS	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	749m	North East
850	HANSON CONSTRUCTION MATERIALS PTY LTD	HANSON CONSTRUCTION MATERIALS PTY LTD	6 LANCELEY PLACE	ARTARMON	Concrete works	Premise Match	866m	North

Delicensed Activities Data Source: Environment Protection Authority

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

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

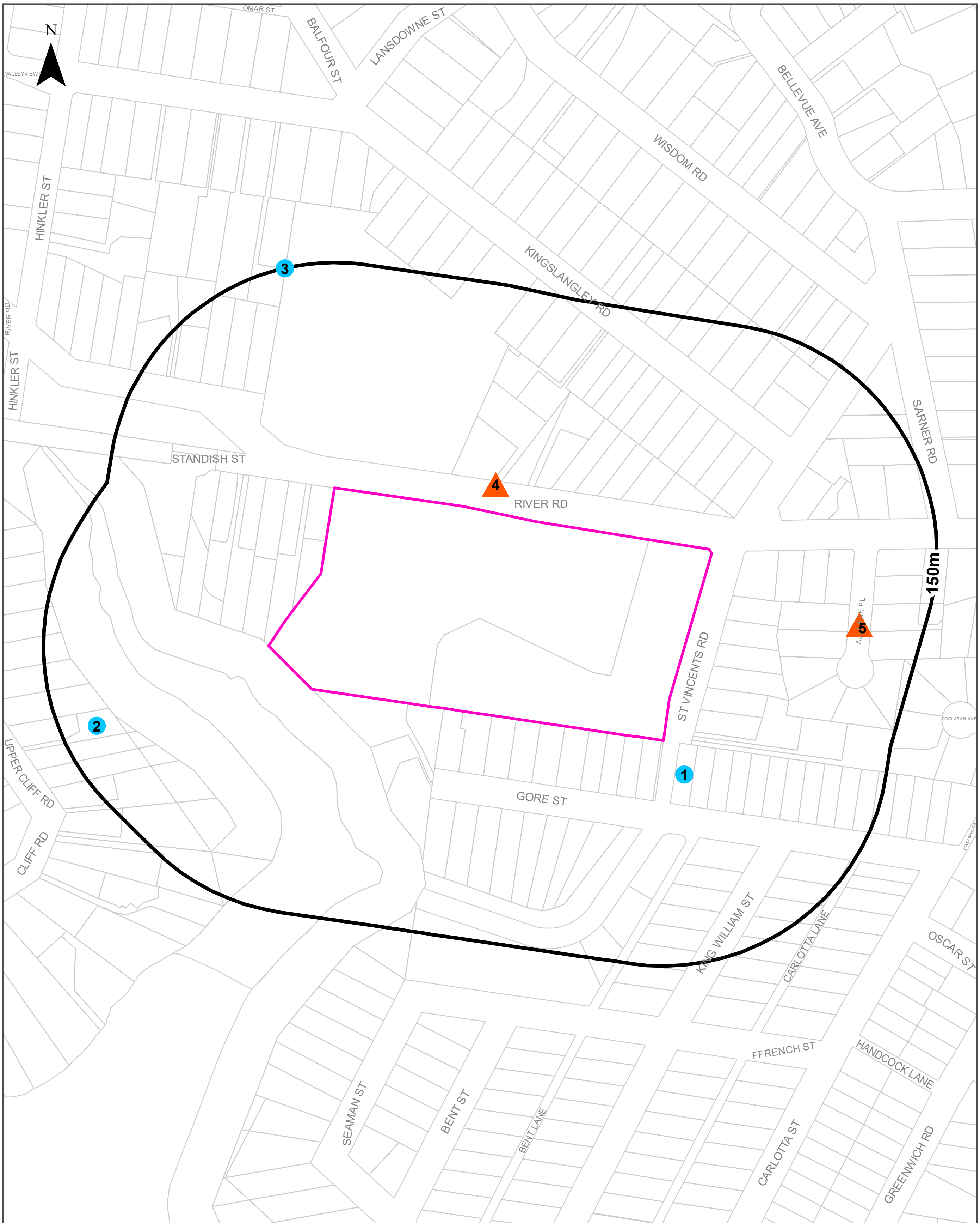
Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
6997	HOPE HEALTHCARE LIMITED	97 - 115 RIVER ROAD, GREENWICH, NSW 2065	Surrendered	07/09/2000	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	0m	On-site
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	30m	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	30m	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	30m	South West
13358	VENTIA UTILITY SERVICES PTY LIMITED	Royal North Shore Hospital - Acute Services Building, Royal North Shore Hospital, Reserve Road, ST LEONARDS, NSW 2065, ST LEONARDS	Surrendered	20/04/2011	Generation of electrical power from gas	Premise Match	794m	North East
6996	MOCKRIDGE BULMER PTY LTD	2/12 FREDERICK STREET, ST LEONARDS, NSW 2065	Surrendered	26/06/2000	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	864m	North East

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
5049	ROCK & DIRT PTY LTD	11 LANCELEY PLACE, ARTARMON, NSW 2064	Surrendered	10/08/2000	Waste Storage, Transfer, Separating or Processing; Crushing, grinding or separating	Premise Match	870m	North

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

97-115 River Road, Greenwich, NSW 2065



Legend

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

Scale: 0 40 80 120 160 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 29 September 2021

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018
Property Boundaries © NSW Department Finance, Services & Innovation 2021

Historical Business Directories

97-115 River Road, Greenwich, NSW 2065

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 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	ENGINEERS-GENERAL &/OR MANUFACTURING &/OR MECHANICAL	Smith, L. N., 31 Gore St., Greenwich	41258	1950	Premise Match	11m	South East
2	ACCOUNTANTS & AUDITORS	Shetliffe, D. F. R., 40 Upper Cliff Rd., Northwood	265701	1961	Premise Match	111m	West
3	BUILDERS & CONTRACTORS-(M.M.B.A.)	Lucas, T. J. Pty. Ltd 48a Kingslangley Rd. GREENWICH	277339	1961	Premise Match	149m	North West

Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 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
4	CLUBS & /OR SPORTING BODIES	Lane Cove Country Club Ltd., River Rd., Northwood. 2066	18079	1975	Road Match	0m
	HOSTELS (H630)	Stella Maris Hostel., River Rd., Greenwich	316853	1970	Road Match	0m
5	Builders & Contractors - (M.M.B.A.)	Crowther, P. J., Allawah Pl. Greenwich	54740	1965	Road Match	95m
	BUILDERS & CONTRACTORS-(M.M.B.A.)	Crowther, P. J Allawah Pl GREENWICH	277004	1961	Road Match	95m
	ACCOUNTANTS & AUDITORS	Moore, R. K., Allawah Pl., Greenwich	265446	1961	Road Match	95m

Dry Cleaners, Motor Garages & Service Stations

97-115 River Road, Greenwich, NSW 2065

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: 0 100 200 300 400 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 29 September 2021

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018
Property Boundaries © NSW Department Finance, Services & Innovation 2021

Historical Business Directories

97-115 River Road, Greenwich, NSW 2065

Dry Cleaners, Motor Garages & Service Stations 1948-1993 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.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES &/OR ENGINEERS.	Knodis S. D., 156 Pacific Hghwy., Greenwich	49540	1954	Premise Match	326m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Knodis S. D., 156 Pacific Hghwy., Greenwich	40241	1953	Premise Match	326m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Knodis S. D., 156 Pacific Hghwy., Greenwich	31847	1952	Premise Match	326m	North East
	MOTOR GARAGES &/OR ENGINEERS	Knodis, S. D., 156 Pacific Highway., Greenwich	83968	1950	Premise Match	326m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Knodis, S. D., 156 Pacific Hghwy., Greenwich	22532	1948-49	Premise Match	326m	North East
2	MOTOR GARAGES & ENGINEERS.	Hill Garage & Service Station., 180 Pacific Hghwy., Greenwich	29547	1962	Premise Match	402m	North East
	MOTOR GARAGES & ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., Greenwich	29548	1962	Premise Match	402m	North East
	MOTOR GARAGES & ENGINEERS	Hill Garage & Service Station, 180 Pacific Highway. GREENWICH	347368	1961	Premise Match	402m	North East
	MOTOR GARAGES & ENGINEERS	North Sydney Welding Service, 188 Pacific Highway. GREENWICH	347799	1961	Premise Match	402m	North East
	MOTOR GARAGES & ENGINEERS.	Hill Garage & Service Station., 180 Pacific Hghwy., Greenwich	14199	1959	Premise Match	402m	North East
	MOTOR GARAGES & ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., Greenwich	14200	1959	Premise Match	402m	North East
	MOTOR GARAGE/ENGINEERS.	Hill Garage & Service Station., 180 Pacific Hghwy., Grnwch.	4274	1958	Premise Match	402m	North East
	MOTOR GARAGE/ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., Grnwch	4664	1958	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Hill Garage & Service Station., 180 Pacific Hghwy., Rgnwch	57798	1956	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., N Grnwch	61205	1956	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Hill Garage & Service Station., 180 Pacific Hghwy., grnwch	49401	1954	Premise Match	402m	North East
	MOTOR SERVICE STATIONS-PETROL, ETC.	Hill Garage & Service Station., 188 Pacific Hghwy., Grnwch	54507	1954	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy, Greenwich	49767	1954	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Hill Garage & Service Station., 188 Pacific Hghwy., Grnwch	40121	1953	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., Grnwch	40432	1953	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Hill Garage & Service Station., 188 Pacific Hghwy., Grnwch	31745	1952	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	North Sydney Welding Service., 188 Pacific Hghwy., Grnwch	32011	1952	Premise Match	402m	North East
	MOTOR SERVICE STATIONS-PETROL, Etc.	Hill Garage (R. Harris, Propr.), 188 Pacific Highway., Greenwich	86056	1950	Premise Match	402m	North East

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
2	MOTOR GARAGES &/OR ENGINEERS	Hill Garage and Service Station, 188 Pacific Highway., Greenwich	83867	1950	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS	North Sydney Welding Service., 188 Pacific Highway., Greenwich	84144	1950	Premise Match	402m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Hill Garage and Service Station., 188 Pacific Hghwy., Greenwich	22447	1948-49	Premise Match	402m	North East
3	MOTOR GARAGES &/OR ENGINEERS.	Greenwich Motors., 122 Pacific H'way., Greenwich. 2065	59003	1975	Premise Match	409m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Greenwich Motors., 124 Pacific Hghwy., Greenwich	12262	1972	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	16733	1972	Premise Match	409m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Greenwich Motors., 124 Pacific Hghwy., Greenwich	56874	1971	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	2199	1971	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS(M6S6)	Greenwich Motors., 124 Pacific Highway., GREENWICH	337945	1970	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL,OIL,Etc.	Horsburghs Auto Centre., 126 Pacific Hghwy., GREENWICH	341216	1970	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS.	Greenwich Motors., 124 Pacific Hghwy, Greenwich	42297	1969	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy Greenwich	47861	1969	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS	Greenwich Motors., 124 Pacific Hghwy., Greenwich	25817	1968	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsbyghs Auto Centre., 126 Pacific Hghwy., Greenwich	31289	1968	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS.	Greenwich Motors., 124 Pacific Hghwy., Greenwich	10318	1967	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	15764	1967	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS.	Greenwich Motors., 124 Pacific Highway., Greenwich	56211	1966	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	1337	1966	Premise Match	409m	North East
	Motor Garages & Engineers	Greenwich Motors, 124 Pacific Highway. Greenwich	122741	1965	Premise Match	409m	North East
	Motor Service Stations - Petrol, Oil, Etc.	Horsburghs Auto Centre, 126 Pacific Highway. Greenwich	125746	1965	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS	Greenwich Motors., 124 Pacific Highway Greenwich	48009	1964	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	52031	1964	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS.	Greenwich Motors & Bodyworks., Rear 124 Pacific Hghwy., Greenwich	29546	1962	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	38248	1962	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS	Greenwich Motors & Bodyworks, Rear 124 Pacific Highway., GREENWICH	347280	1961	Premise Match	409m	North East
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Horsburghs Auto Centre, 126 Pacific Hghwy., GREENWICH	350708	1961	Premise Match	409m	North East
	MOTOR GARAGES & ENGINEERS.	Greenwich Motors & Barker Body Works., 124 Pacific Hghwy., Greenwich	14198	1959	Premise Match	409m	North East
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Horsburghs Auto Centre., 126 Pacific Hghwy., Greenwich	24222	1959	Premise Match	409m	North East

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
3	MOTOR GARAGE/ENGINEERS.	Greenwich Motors & Barker Body Works., 124 Pacific Hghwy., Greenwich	4208	1958	Premise Match	409m	North East
4	MOTOR GARAGE & SERVICE STATIONS.	Portview Motors (Caltex), 114 Pacific Hghwy, Greenwich. 2065	5416	1989	Premise Match	485m	North East
	MOTOR GARAGES & SERVICE STATIONS.	Portview Motors (Caltex), 114 Pacific Hghwy, Greenwich. 2065	59797	1988	Premise Match	485m	North East
	MOTOR GARAGES & SERVICE STATIONS.	Portview Motors (Caltex), 114 Pacific H'way., Greenwich. 2065	65279	1986	Premise Match	485m	North East
	MOTOR GARAGES & SERVICE STATIONS.	Portview Motors (Caltex)., 114 Pacific Hghwy, Greenwich. 2065	45389	1985	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Portview Motors (Caltex), 114 Pacific Hghwy, Greenwich. 2065	33961	1984	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Portview Motors (Caltex)., 114 Pacific H'way., Greenwich 2065	21410	1983	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Portview Motors (Caltex), 114 Pacific H'way., Greenwich. 2065.	57399	1982	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Portview Service Station., 114 Pacific Highway., St Leonards. 2065.	46175	1979	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Portview Service Station, 114 Pacific H'way, St. Leonards. 2065	50679	1978	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Portview Service Station., 114 Pacific H'way., St. Leonards 2065	34747	1976	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Portview Service Station, 114 Pacific H'way. St. Leonards.	59408	1975	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Port View Service Station., 114 Pacific Hghwy., Greenwich	12263	1972	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Port View Service Station., 114 Pacific Hghwy., Greenwich	56875	1971	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS(M6S6)	Port View Service Station, 114 Pacific Highway. GREENWICH	338438	1970	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Port View Service Station., 114 Pacific Hghwy, Greenwich	42298	1969	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS	Port View Service Station., 114 Pacific Hghwy., Greenwich	25818	1968	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Port View Service Station., 114 Pacific Hghwy., Greenwich	10319	1967	Premise Match	485m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Port View Service Station., 114 Pacific Hghwy., Greenwich	15765	1967	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Port View Service Station., 114 Pacific Hghway., Greenwich	56212	1966	Premise Match	485m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Port View Service Station., 114 Pacific Hghwy., Greenwich	1338	1966	Premise Match	485m	North East
	Motor Garages & Engineers	Port View Service Station, 114 Pacific Highway. Greenwich	122742	1965	Premise Match	485m	North East
	Motor Service Stations - Petrol, Oil, Etc.	Port View Service Station, 114 Pacific Highway. Greenwich	125747	1965	Premise Match	485m	North East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Port View Service Station., 114 Pacific Hghwy., Greenwich	52032	1964	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS	Port View Service Station., 114 Pacific Highway Greenwich	48010	1964	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	29545	1962	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Port View Service Station., 114 Pacific Hghwy., Greenwich	29549	1962	Premise Match	485m	North East

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
4	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Port View Service Station., 114 Pacific Hghwy., Greenwich	38247	1962	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS	Cogan's Service Station, 114 Pacific Highway. Greenwich	346909	1961	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS	Park View Service Station, 114 Pacific Highway., GREENWICH	347852	1961	Premise Match	485m	North East
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Port View Service Station, 114 Pacific Hghwy., GREENWICH	350974	1961	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	14197	1959	Premise Match	485m	North East
	MOTOR GARAGES & ENGINEERS.	Park View Service Station., 114 Pacific Hghwy., Greenwich	14201	1959	Premise Match	485m	North East
	MOTOR GARAGE/ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	853	1958	Premise Match	485m	North East
	MOTOR GARAGE/ENGINEERS.	Reilly L. V., 114 Pacific Hghwy., Greenwich	4841	1958	Premise Match	485m	North East
	MOTOR GARAGE/ENGINEERS.	Wadds Heck Service Station., 114 Pacific Hghwy., Grnwch	9224	1958	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	57453	1956	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Reilly L. V., 114 Pacific Hghwy., Greenwich	61369	1956	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	49080	1954	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Reilly L. V., 114 Pacific Hghwy., Greenwich	49925	1954	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	39831	1953	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	31492	1952	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS	Cogan's Service Station, 114 Pacific Highway., Greenwich	83602	1950	Premise Match	485m	North East
	MOTOR SERVICE STATIONS-PETROL, Etc.	Cogan's Service Station, 114 Pacific Highway., Greenwich	85879	1950	Premise Match	485m	North East
	MOTOR GARAGES &/OR ENGINEERS.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	65235	1948-49	Premise Match	485m	North East
	MOTOR SERVICE STATIONS-PETROL, ETC.	Cogan's Service Station., 114 Pacific Hghwy., Greenwich	23189	1948-49	Premise Match	485m	North East

Dry Cleaners, Motor Garages & Service Stations 1948-1993
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.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
5	DRY CLEANERS, PRESSERS &/OR DYERS.	Lindfield Laundry & Dry Cleaners., Pacific H'way., St. Leonards 2065	23654	1976	Road Match	378m
	DRY CLEANERS, PRESSERS &/OR DYERS.	Lindfield Laundry & Dry Cleaners, Pacific H'way. St. Leonards. 2065	24178	1975	Road Match	378m
	Motor Service Stations - Petrol, Oil, Etc.	Scholtz, P. B., Pacific Highway. Artarmon	125387	1965	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Koala Service Station., Cnr Pacific Hghwy & Jersey St., St. Leonards	38686	1962	Road Match	378m
	MOTOR GARAGES & ENGINEERS	Atlantic Service Station, Pacific Highway. ARTARMON	346549	1961	Road Match	378m
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Scholtz, P. B., Pacific Hghwy., ARTARMON	351064	1961	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Koala Service Station., Cnr Pacific Hghwy. & Jersey St., St. Leonards	24558	1959	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Horsburghs Auto Service., Pacific Hghwy., Greenwich	9594	1958	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Horsburghs Auto Service., Pacific Hghwy., Greenwich	61952	1956	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Scholtz P. B., Pacific Hghwy Artarmon	25	1956	Road Match	378m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Horsburghs Auto Service., Pacific Hghwy., Greenwich	54509	1954	Road Match	378m
	MOTOR GARAGES &/OR ENGINEERS.	St. Leonards Garage., 54-56 Pacific Hghwy., St. Leonards	40643	1953	Road Match	378m
	MOTOR GARAGES &/OR ENGINEERS.	St. Leonards Garage., 54-56 Pacific Hghwy., St. Leonards	32209	1952	Road Match	378m
6	MOTOR GARAGES &/OR ENGINEERS.	BP North Service Station., Northwood Rd Northwood	12770	1972	Road Match	439m
	MOTOR SERVICE STATIONS-PETROL,OIL,Etc.	Embassy Services of Auburn Pty. Ltd., Northwood Rd., NORTHWOOD	341027	1970	Road Match	439m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Embassy Services Of Auburn Pty. Ltd., Northwood Rd Northwood	50567	1969	Road Match	439m

Aerial Imagery 2021

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 2016

97-115 River Road, Greenwich, NSW 2065

Legend

- Site Boundary
- Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 2011

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 2005

97-115 River Road, Greenwich, NSW 2065

Scale:
0 40 80 120 160
Meters

Data Source Aerial Imagery:
© Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Aerial Imagery 2000

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 1994

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 September 2021

Aerial Imagery 1991

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 150m

Scale:

0 40 80 120 160

Meters

Data Sources: Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Aerial Imagery 1986

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 September 2021

Aerial Imagery 1982

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 1978

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 September 2021

Aerial Imagery 1970

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 150m

Scale: 0 40 80 120 160 Meters

Data Sources: Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Aerial Imagery 1965

97-115 River Road, Greenwich, NSW 2065

Scale:
0 40 80 120 160
Meters

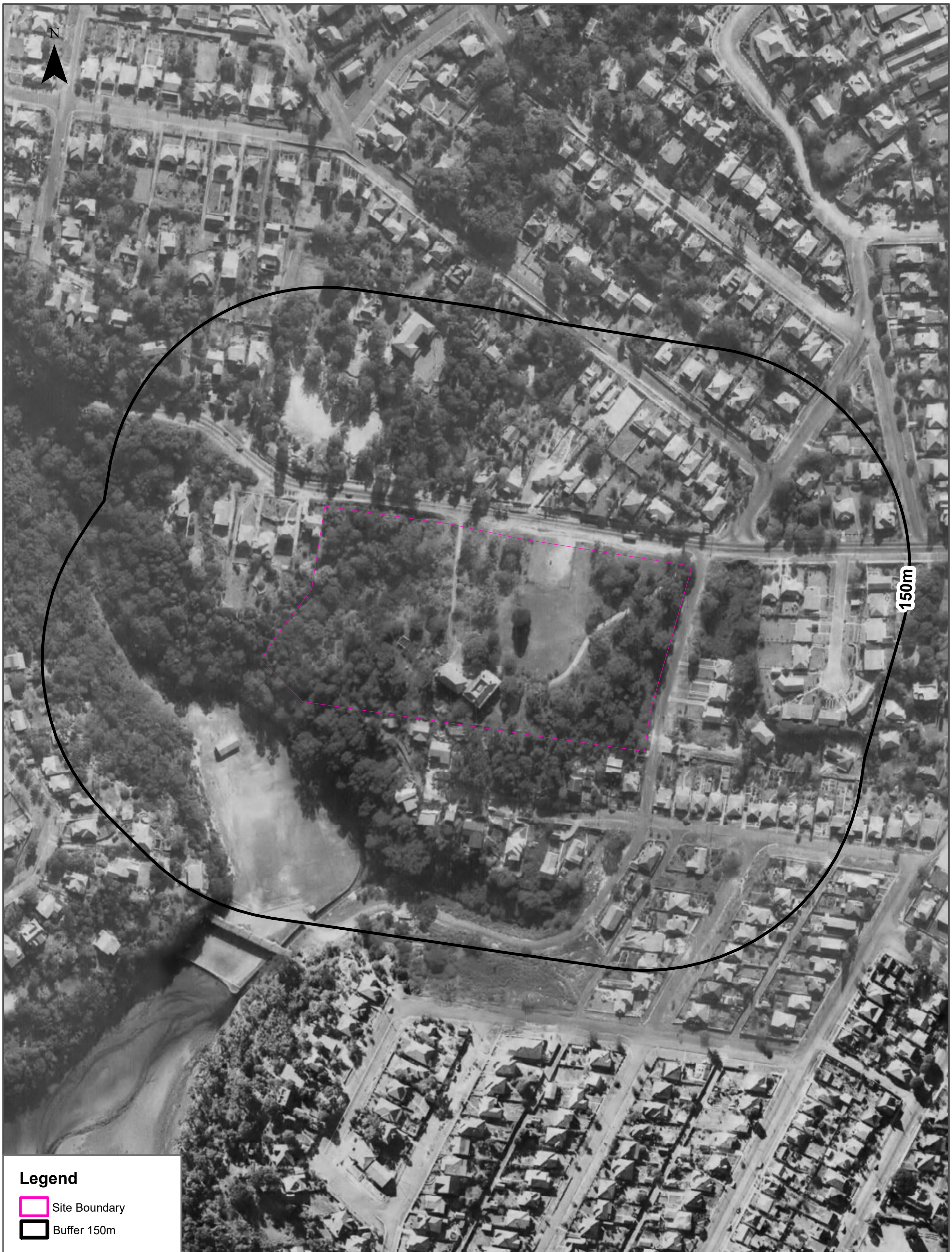
Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 28 September 2021

Aerial Imagery 1961

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary

Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 1955, 1956

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 1951

97-115 River Road, Greenwich, NSW 2065

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 September 2021

Aerial Imagery 1943

97-115 River Road, Greenwich, NSW 2065

Legend

- Site Boundary
- Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Aerial Imagery 1930

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 150m

Scale: 0 40 80 120 160 Meters	Data Sources: Aerial Imagery: © Geoscience Australia	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Topographic Map 2015

97-115 River Road, Greenwich, NSW 2065

Scale: 0 160 320 480 640 Meters

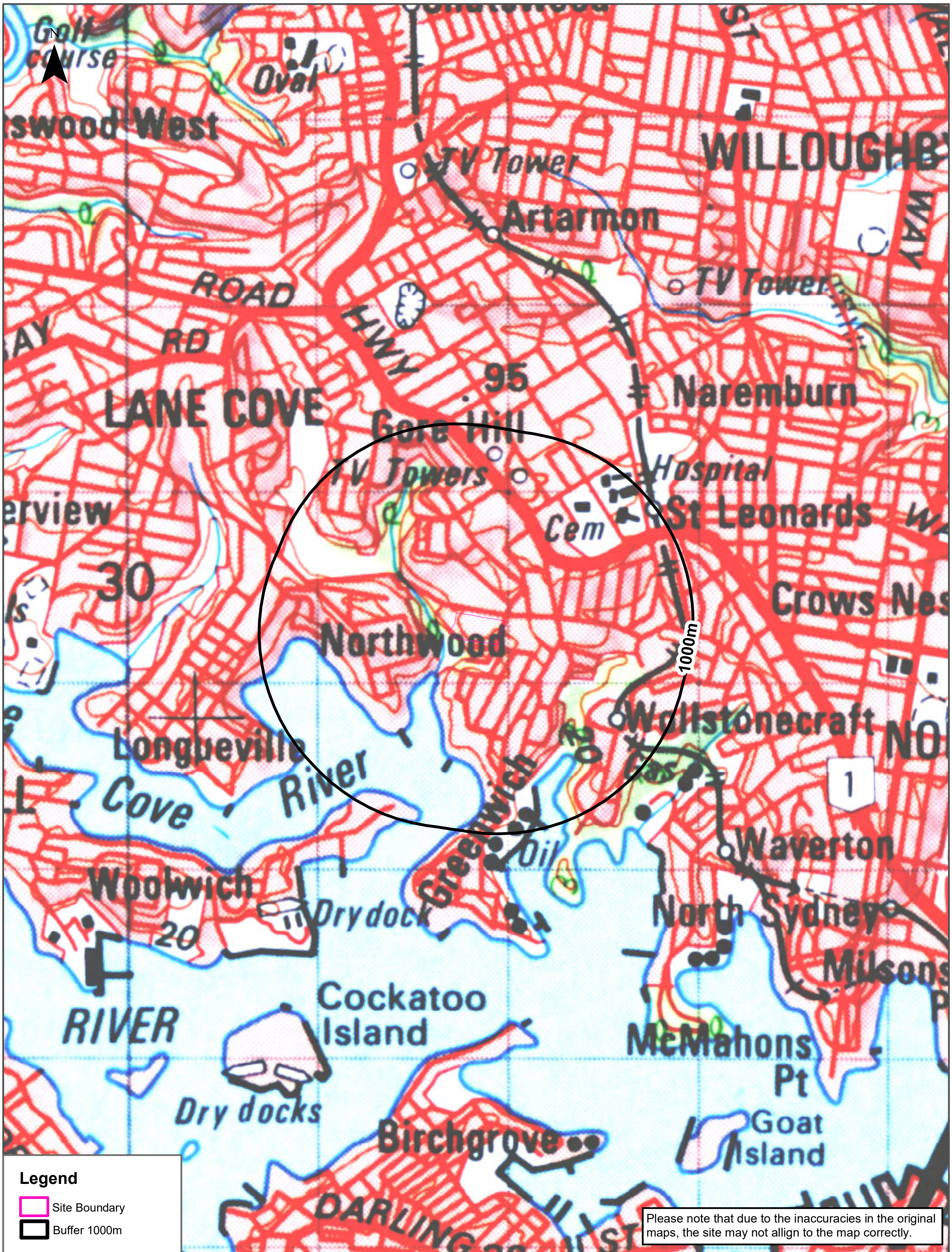
Data Sources: Topographic Map Data
© NSW Land and Property Information

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Historical Map 1975

97-115 River Road, Greenwich, NSW 2065



Scale: 0 320 640 960 1,280 Meters	Data Sources: NATMAP 1:100,000 Topographic Maps Geoscience Australia	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Historical Map c.1936

97-115 River Road, Greenwich, NSW 2065

Legend

Site Boundary

Buffer 1000m

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

Scale: 0 320 640 960 1,280 Meters	Data Sources: Australia 1:63360 Produced by Australian Section Imperial General Staff	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

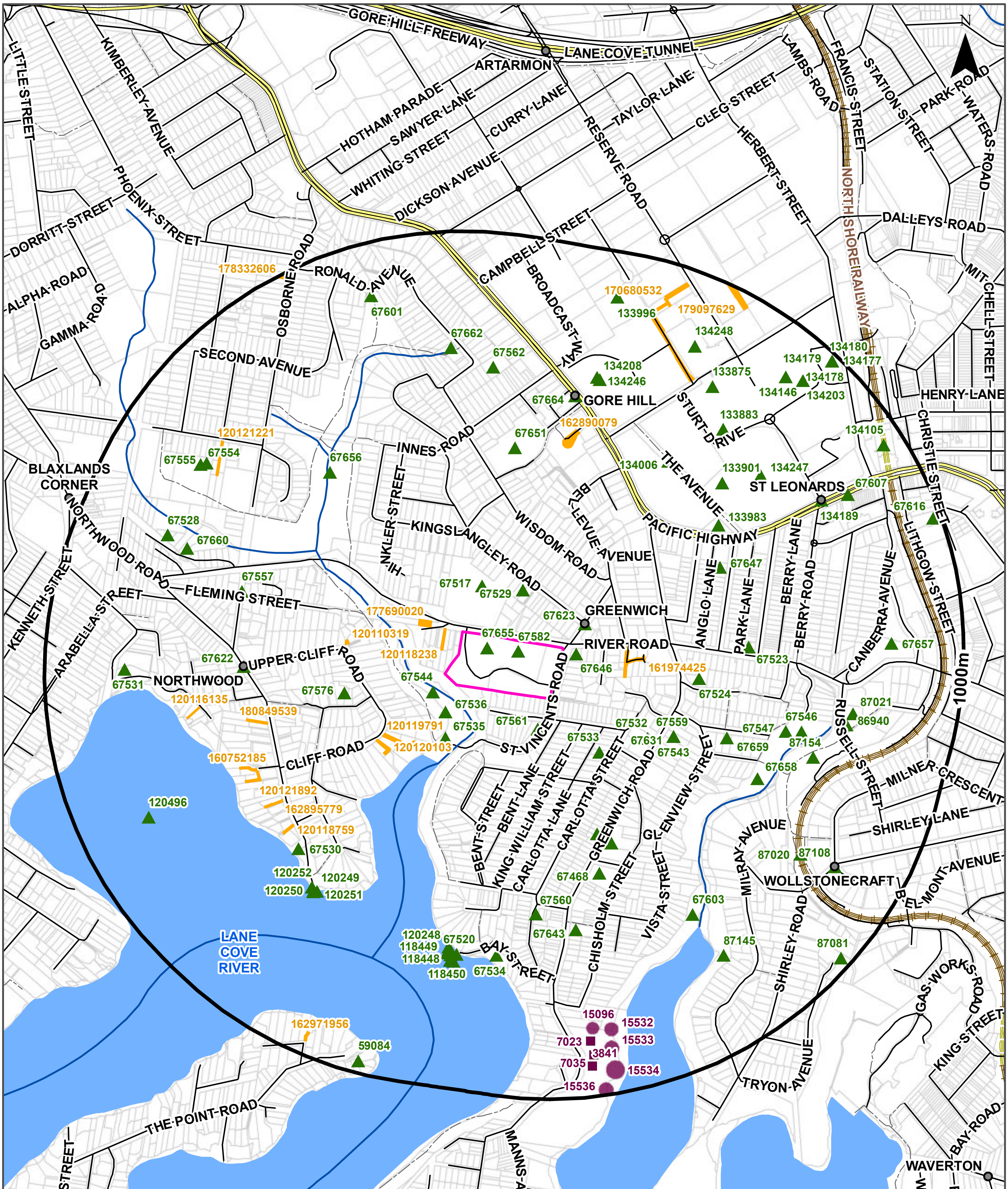
Historical Map c.1917

97-115 River Road, Greenwich, NSW 2065

Scale: 0 320 640 960 1,280 Meters	Data Sources: Australia 1:63360 Produced by Australian Section Imperial General Staff	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Topographic Features

97-115 River Road, Greenwich, NSW 2065



Site Boundary	Easement
Buffer 1000m	NPWS Reserve
Property Boundary	State Forest
Place Name	Tank Area
Point of Interest	Water Area
Tank Point	

Watercourse, Pipeline, Major Road, Road, Pathway/Track/Lane, Heavy Rail, Light Rail, Underground Rail, Runway, Major Electricity Transmission Line

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021

Coordinate System: GDA 1994 MGA Zone 56

Date: 29 September 2021

Topographic Features

97-115 River Road, Greenwich, NSW 2065

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
67582	Historic Site	PALLISTER	0m	On-site
67655	General Hospital	GREENWICH HOSPITAL	0m	On-site
67646	Park	ST VINCENTS RD PLAYGROUND	34m	East
67544	Park	PLAYGROUND	54m	West
67536	Sports Field	BOB CAMPBELL OVAL	73m	South West
67561	Park	GORE CREEK RESERVE	79m	South East
67623	Suburb	GREENWICH	83m	North East
67517	Primary School	GREENWICH PUBLIC SCHOOL	120m	North
67529	Park	HENNINGHAM PLAYGROUND	127m	North
67535	Picnic Area	GORE CREEK RESERVE	135m	South West
67533	Place Of Worship	UNITING CHURCH	181m	South East
67576	Historic Site	NORTHWOOD HOUSE AND COTTAGE	255m	West
67532	Place Of Worship	THE CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS	262m	South East
67543	Community Facility	GREENWICH MEMORIAL COMMUNITY CENTRE	322m	South East
67559	Child Care Centre	KU GREENWICH COMMUNITY PRESCHOOL	322m	South East
67631	Library	GREENWICH LIBRARY	322m	South East
67524	Community Home	GLENWOOD NURSING HOME	347m	East
67644	Post Office	GREENWICH POST OFFICE	357m	South East
67518	Primary School	GREENWICH PUBLIC SCHOOL	391m	South East
67647	Park	PORTVIEW RESERVE	441m	North East
67659	Place Of Worship	ANGLICAN CHURCH	452m	East
67468	Retirement Village	CLANCY TERRACE	453m	South East
67523	Park	PROPSTING PLAYGROUND	464m	East
67651	Retirement Village	WATERBROOK AT GREENWICH	473m	North
133983	Primary School	INTERNATIONAL CHINESE SCHOOL ST LEONARDS	495m	North East
67622	Suburb	NORTHWOOD	503m	West
67656	Park	LANE COVE BUSHLAND PARK	517m	North West
134145	Cemetery	GORE HILL CEMETERY	536m	North East
134006	Historic Site	GORE HILL MEMORIAL CEMETERY	536m	North East
67560	Park	CARLOTTA ST PLAYGROUND	539m	South
67557	Park	ENDEAVOUR PLAYGROUND	548m	West

Map Id	Feature Type	Label	Distance	Direction
67658	Park	GREENDALE PARK	554m	South East
67530	Park	LLOYD REES PARK	568m	South West
133901	Sports Court	BASKETBALL	574m	North East
67643	Place Of Worship	PRESBYTERIAN CHURCH	580m	South
67547	Community Facility	GREENWICH WOLLSTONECRAFT SCOUT HALL	591m	East
120252	Wharf	NORTHWOOD WHARF	620m	South West
120249	Wharf	NORTHWOOD WHARF	622m	South West
120250	Wharf	NORTHWOOD WHARF	624m	South West
67664	Urban Place	GORE HILL	626m	North
120251	Wharf	NORTHWOOD WHARF	627m	South West
67546	Park	GREENDALE PARK	629m	East
67603	Park	HOLLOWAY PARK	645m	South East
120248	Wharf	Wharf	650m	South
67534	Park	BAYVIEW PARK	653m	South
134247	Sports Field	GORE HILL PARK	656m	North East
118449	Wharf	BAY STREET WHARF	659m	South
67562	Park	BRICKHILL PLAYGROUND	665m	North
67520	Wharf	BAY STREET WHARF	665m	South
118457	Wharf	BAY STREET WHARF	666m	South
118448	Wharf	BAY STREET WHARF	668m	South
87154	Park	SMOOTHEY PARK	672m	East
134208	High School	BRADFIELD COLLEGE	676m	North
118450	Wharf	BAY STREET WHARF	677m	South
133883	Special School	ROYAL NORTH SHORE HOSPITAL SCHOOL	678m	North East
134246	TAFE College	ST LEONARDS TAFE COLLEGE	681m	North
118451	Wharf	BAY STREET WHARF	682m	South
118456	Wharf	BAY STREET WHARF	683m	South
67662	Park	RONALD PARK	709m	North
67660	Club	LANE COVE COUNTRY CLUB	716m	West
86940	Club	WOLLSTONECRAFT BOWLING AND RECREATION CLUB	733m	East
87020	Railway Station	WOLLSTONECRAFT RAILWAY STATION	736m	South East
87021	Sports Field	BOWLING GREEN	741m	East
134189	Suburb	ST LEONARDS	744m	North East
133875	Post Office	ROYAL NORTH SHORE HOSPITAL POST OFFICE	753m	North East
67555	Sports Court	TENNIS	765m	North West
87145	Park	MILRAY RESERVE	773m	South East
67528	Sports Court	TENNIS COURTS	774m	West

Map Id	Feature Type	Label	Distance	Direction
67554	Park	OSBORNE PARK	776m	North West
67531	Park	WOODFORD BAY RESERVE	800m	West
67607	Transport Interchange	ST LEONARDS BUS INTERCHANGE	808m	North East
67657	Park	NEWLANDS PARK	819m	East
120496	Bay Like	WOODFORD BAY	822m	South West
134248	General Hospital	NORTH SHORE PRIVATE HOSPITAL	823m	North East
87108	Suburb	WOLLSTONECRAFT	824m	South East
67601	Park	LANE COVE BUSHLAND PARK	869m	North
134146	General Hospital	ROYAL NORTH SHORE HOSPITAL	877m	North East
133996	Rubbish Depot	ARTARMON RESOURCE RECOVERY CENTRE	887m	North
134203	Helipad	Helipad	897m	North East
134105	Railway Station	ST LEONARDS RAILWAY STATION	949m	North East
59084	Headland	ONIONS POINT	970m	South
87081	Embassy	CONSULATE-GENERAL OF MONGOLIA	972m	South East
67616	Club	NORTHS RUGBY CLUB	980m	East
134179	Community Medical Centre	SYDNEY DIALYSIS CENTRE	983m	North East
134178	Community Medical Centre	NORTHERN SYDNEY CENTRAL COAST ACUTE CARE FACILITY	983m	North East
134180	Community Medical Centre	ROYAL NORTH SHORE COMMUNITY HEALTH CENTRE	983m	North East
134177	Community Medical Centre	NORTHERN SYDNEY AREA COMMUNITY HEALTH	983m	North East

Topographic Features

97-115 River Road, Greenwich, NSW 2065

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
15096	Petroleum	Operational		01/11/2012	813m	South
15532	Petroleum	Operational		13/06/2001	821m	South
15533	Petroleum	Operational		13/06/2001	867m	South
15534	Petroleum	Operational		13/06/2001	917m	South
15536	Petroleum	Operational		13/06/2001	967m	South

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
7023	Undefined	Feature on Previous LPI Tank Point Supply		13/06/2001	860m	South
7035	Undefined	Feature on Previous LPI Tank Point Supply		13/06/2001	896m	South
3841	Undefined	Feature on Previous LPI Tank Point Supply		13/06/2001	922m	South

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
120118238	Primary	Undefined		39m	North West
177690020	Primary	Right of way		80m	North West
161974425	Primary	Right of way	Variable	157m	East
120119791	Primary	Undefined		175m	South West
120120103	Primary	Undefined		230m	South West
120110319	Primary	Undefined		252m	West
180849539	Primary	Right of way	3.05 m	460m	West

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
162890079	Primary	Right of way	VAR	496m	North
162895779	Primary	Right of way	276m and VAR	514m	South West
120121892	Primary	Undefined		526m	South West
160752185	Primary	Right of way	3.5 and Var.	528m	West
120118759	Primary	Undefined		535m	South West
120116135	Primary	Undefined		618m	West
120121221	Primary	Undefined		725m	North West
170680532	Primary	Right of way	Var	738m	North East
162971956	Primary	Right of way		942m	South West
179097629	Primary	Right of way	12m & var	959m	North East
178332606	Primary	Right of way	3m	984m	North West

Topographic Features

97-115 River Road, Greenwich, NSW 2065

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)

National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

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

Elevation Contours (m AHD)

97-115 River Road, Greenwich, NSW 2065

Legend

- Elevation Contour (m AHD)
- Site Boundary
- Buffer 1000m
- Property Boundary

Accuracy & Currency: This contour data can be up to 0.4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Hydrogeology & Groundwater

97-115 River Road, Greenwich, NSW 2065

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)

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

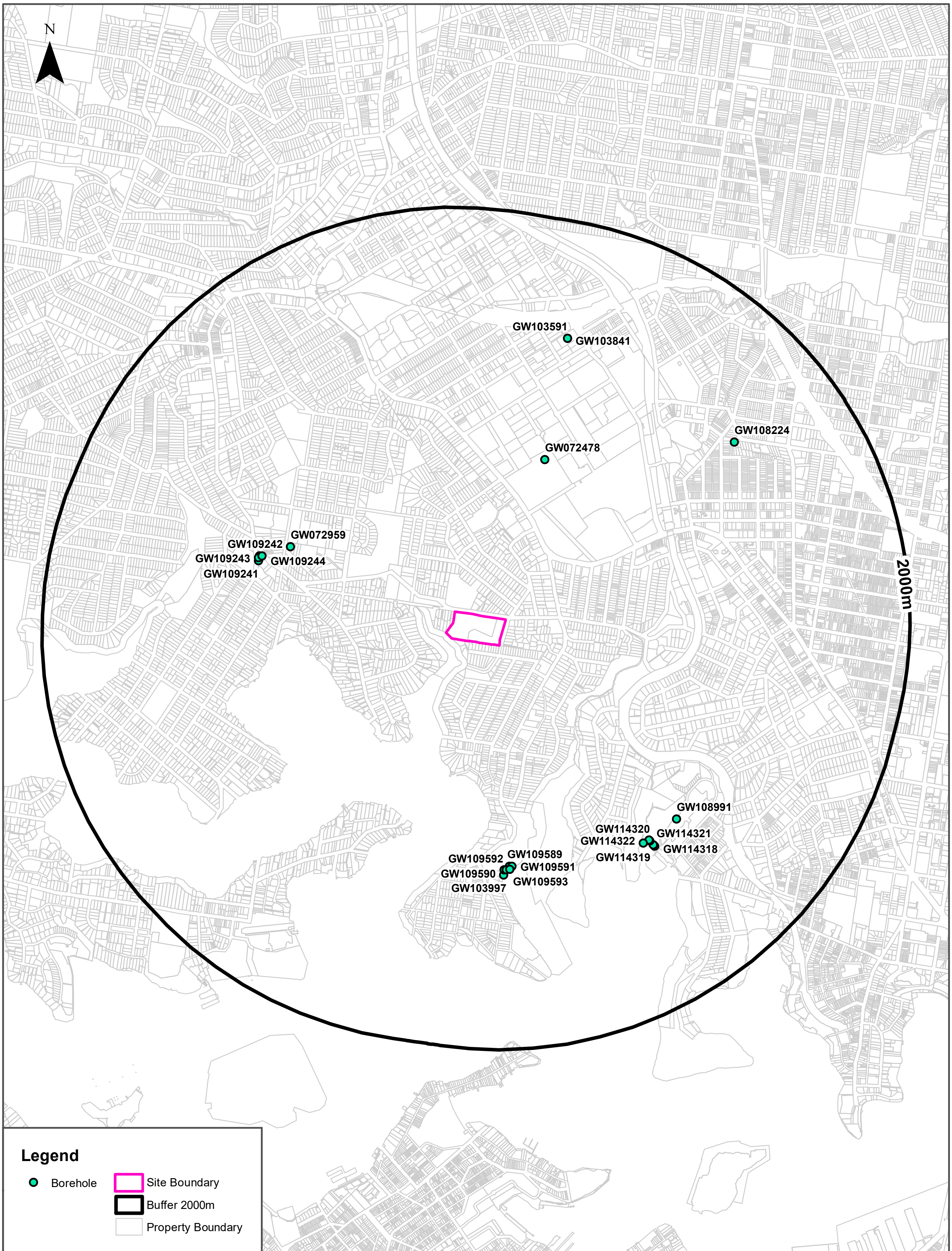
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

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

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

Groundwater Boreholes

97-115 River Road, Greenwich, NSW 2065



Scale: 0 100 200 400 600 800 1,000 1,200 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Hydrogeology & Groundwater

97-115 River Road, Greenwich, NSW 2065

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW072478		Bore			Domestic		10/01/1995	180.50	180.50	270	48.00	0.700		816m	North
GW072959	10BL156425, 10BL602137, 10CA109539	Bore open thru rock	Private	Irrigation, Monitoring Bore, Recreation (groundwater)	Irrigation, Monitoring Bore		03/02/1995	24.50	24.50	0-500 ppm				873m	North West
GW109244	10BL602428	Bore	Private	Monitoring Bore	Monitoring Bore		20/08/2008	4.50	4.50					985m	West
GW109241	10BL602428	Well	Private	Monitoring Bore	Monitoring Bore		20/08/2008	4.50	4.50					993m	West
GW109242	10BL602428	Bore	Private	Monitoring Bore	Monitoring Bore		20/08/2008	4.50	4.50					998m	West
GW109243	10BL602428	Bore	Private	Monitoring Bore	Monitoring Bore		20/08/2008	4.50	4.50					998m	West
GW109589	10BL163745	Bore	Private	Monitoring Bore	Monitoring Bore		30/04/2003	2.90	2.90					1095m	South
GW109591	10BL163745	Bore	Private	Monitoring Bore	Monitoring Bore		05/09/2003	2.00	2.00					1096m	South
GW109593	10BL163745	Bore	Private	Monitoring Bore	Monitoring Bore		02/05/2003	4.00	4.00					1109m	South
GW109590	10BL163745	Bore	Private	Monitoring Bore	Monitoring Bore		30/04/2003	4.40	4.40					1111m	South
GW109592	10BL163745	Bore	Private	Monitoring Bore	Monitoring Bore		05/09/2003	4.50	4.50					1111m	South
GW103997	10BL158770	Bore		Monitoring Bore	Monitoring Bore		26/08/1998	4.50	4.50					1137m	South
GW114322	10BL604924	Bore	Private	Monitoring Bore	Monitoring Bore	North Shore Gas	03/09/1996	10.00	10.00					1211m	South East
GW114321	10BL604924	Bore	Private	Monitoring Bore	Monitoring Bore	North Shore Gas	11/09/1996	11.90	11.90					1215m	South East
GW114320	10BL604924	Bore	Private	Monitoring Bore	Monitoring Bore	North Shore Gas	12/09/1996	5.00	5.00					1222m	South East
GW108991	10BL165659, 10WA109008	Bore	Private	Domestic	Domestic		08/07/2008	168.00		300	13.00	0.120		1229m	South East
GW114319	10BL604924	Bore	Private	Monitoring Bore	Monitoring Bore	North Shore Gas	12/09/1996	5.00	5.00					1249m	South East
GW114318	10BL604924	Bore	Private	Monitoring Bore	Monitoring Bore	North Shore Gas	12/09/1996	10.00	10.00					1258m	South East
GW103591	10BL159969	Bore	Private	Monitoring Bore	Monitoring Bore		11/01/2001	5.80	5.80					1425m	North
GW103841	10BL159969	Bore		Monitoring Bore	Monitoring Bore		11/01/2001	5.80	5.80					1425m	North
GW108224	10BL600442, 10WA109080	Bore	Private	Domestic	Domestic		05/09/2006	132.40	132.40		35.00	0.300		1434m	North East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Hydrogeology & Groundwater

97-115 River Road, Greenwich, NSW 2065

Driller's Logs

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

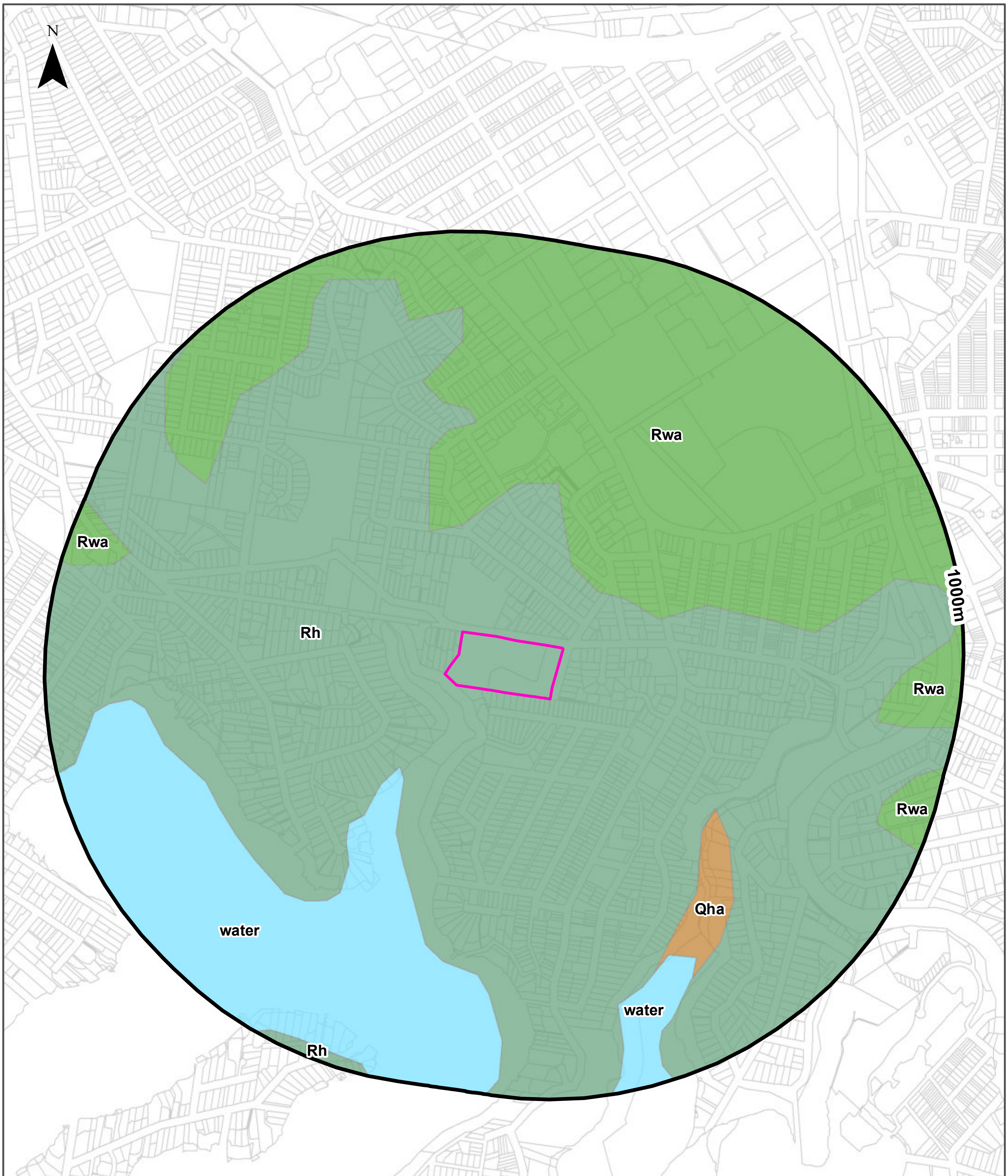
Groundwater No	Drillers Log	Distance	Direction
GW072478	0.00m-2.50m CONCRETE OVERBURDEN 2.50m-5.10m MOIST CLAY 5.10m-28.70m L/G MED. GRAIN SANDSTONE 28.70m-30.10m LIGHT GREY MED. GRAIN S/STONE QUARTZ MATRIX 30.10m-35.90m L/GREY GRAIN SANDSTONE 35.90m-37.20m L/GREY MED GRAIN S/STONE QUARTZ MATRIX 37.20m-45.30m L/GREY MED GRAIN S/STONE 45.30m-54.30m DARK GREY SHALE 54.30m-72.40m L/GREY CEMENTED S/STONE 72.40m-75.40m DARK GREY SHALE 75.40m-109.70m L/GREY MED GRAIN S/STONE 109.70m-110.60m QUARTZ LAYER 110.60m-121.80m L/GREY MED GRAIN S/STONE 121.80m-123.30m DARK GREY SHALE 123.30m-135.40m L/GREY MED GRAIN S/STONE 135.40m-138.00m L/GREY MED GRAIN S/STONE QUARTZ MATRIX 138.00m-139.80m WATER BEARING QUARTZ 139.80m-143.80m L/GREY MED GRAIN S/STONE QUARTZ MATRIX 143.80m-144.40m WATER BEARING QUARTZ 144.40m-154.10m L/GREY CEMENTED SANDSTONE 154.10m-163.70m L/GREY MED GRAIN S/STONE QUARTZ MATRIX 163.70m-166.90m QUARTZ LAYER 166.90m-168.70m GREY MED GRAIN S/STONE 168.70m-180.50m L/GREY MED GRAIN SANDSTONE	816m	North
GW072959	0.00m-0.80m Sandy Loam 0.80m-6.90m 6.90m-9.20m 9.20m-16.60m L/grey Med Grain Sandstone 16.60m-18.10m Light Grey Med Grain Sandstone Fractured Watr Bearing Zones 18.10m-21.10m L/grey Med Grain Sandstone 21.10m-22.30m L/grey Med Grain Sandstone Fractured Water Bearing Zones 22.30m-24.50m Light Grey Marine Clay	873m	North West
GW109244	0.00m-1.00m CONCRETE,FILL,CLAY,SANDY,BROWN YELLOW 1.00m-2.00m WEATHERED SANDSTONE RED ORANGE 2.00m-4.50m WEATHERED SANDSTONE ,RED WHITE,DAMP,ODOUR	985m	West
GW109241	0.00m-1.00m CONCRETE,CLAY,WEATHERED SANDSTONE 1.00m-2.00m AS ABOVE,RED BROWN,(INCREASED DENSITY TO 1.5m) 2.00m-3.00m AS ABOVE,WHITE ORANGE,DAMP 3.00m-4.50m AS ABOVE,GREY WHITE,DAMP,BLACK LAYER 3.5, 3.8m	993m	West
GW109242	0.00m-1.00m CONCRETE,CLAY,BROWN YELLOW 1.00m-2.00m WEATHERED SANDSTONE,WHITE,BROWN 2.00m-3.00m AS ABOVE,RED BROWN, DAMP 3.00m-4.50m AS ABOVE,WHITE GREY	998m	West
GW109243	0.00m-0.50m CONCRETE,CLAY,BROWN GREY 0.50m-2.00m WEATHERED SANDSTONE,RED BROWN,DRY 2.00m-3.00m AS ABOVE,WHITE,YELLOW, DAMP 3.00m-4.50m WEATHERED SANDSTONE,BROWN,WET,DENSE	998m	West
GW109589	0.00m-0.30m CONCRETE 0.30m-0.50m DARK GREY AND BLACK SANDY LOAM/GRAVEL 0.50m-1.20m DARK GREY AND BLACK SANDY LOAM 1.20m-2.90m DARK GREY SANDY CLAY	1095m	South
GW109591	0.00m-0.30m CONCRETE 0.30m-0.60m BLACK AND DARK GREY LOAMY SAND WITH GRAVEL 0.60m-2.00m MIXTURE OF GREY AND LIGHT BROWN SANDY LOAM	1096m	South
GW109593	0.00m-0.20m CONCRETE 0.20m-0.60m DARK GREY AND BLACK SANDY LOAM WITH GRAVEL 0.60m-1.80m DARK GREY AND BLACK SANDY LOAM 1.80m-4.00m DARK GREY AND BLACK SANDY CLAY/GRAVEL	1109m	South
GW109592	0.00m-0.20m CONCRETE 0.20m-0.50m BLACK AND DARK GREY LOAMY SAND/GRAVEL 0.50m-1.10m BLACK AND DARK GREY SANDY LOAM 1.10m-4.50m BLACK SANDY AND SILTY LOAM	1111m	South
GW109590	0.00m-0.20m CONCRETE 0.20m-0.70m DARK GREY AND BLACK SANDY LOAM WITH SOME GRAVEL 0.70m-1.20m DARK GREY AND BLACK SANDY LOAM 1.20m-4.40m DARK GREY TO BLACK SANDY CLAY	1111m	South

Groundwater No	Drillers Log	Distance	Direction
GW103997	0.00m-0.20m CONCRETE 0.20m-1.00m FILL: SANDY,DARK 1.00m-2.00m SANDY CLAY 2.00m-2.90m SANDY SILT/DARK GREY 2.90m-4.50m SANDY SILT:DARK GREY	1137m	South
GW103591	0.00m-2.00m ROAD BASE 2.00m-4.00m CLAY 4.00m-5.80m SANDY CLAY	1425m	North
GW103841	0.00m-0.20m ROAD BASE 0.20m-4.00m STIFF CLAY 4.00m-5.80m SANDY CLAY	1425m	North
GW108224	0.00m-0.60m clay, sandy 0.60m-2.80m sandstone, weathered 2.80m-3.10m clay 3.10m-25.50m sandstone, weathered 25.50m-27.00m sandstone, grey quartz 27.00m-29.00m shale 29.00m-35.00m sandstone, quartz grey 35.00m-41.00m shale 41.00m-52.00m sandstone, grey 52.00m-54.00m sandstone, quartz grey 54.00m-61.00m sandstone, grey 61.00m-65.00m shale 65.00m-81.00m sandstone, grey 81.00m-84.00m sandstone, grey quartz siltstone 84.00m-98.00m sandstone, grey 98.00m-100.00m sandstone, grey quartz 100.00m-106.50m sandstone, grey 106.50m-109.00m sandstone, dark brown 109.00m-110.50m sandstone, grey quartz 110.50m-112.00m siltstone 112.00m-132.40m sandstone, grey	1434m	North East

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp

Geology

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary
Buffer 1000m
Property Boundary
Fault
Dyke
Fold
Marker Bed
Trend Line
Metamorphic Boundary
Shear Zone
Structure
Thrust Fault
Lineament

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Geology

97-115 River Road, Greenwich, NSW 2065

Geological Units 1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dist	Dir
Rh	Medium to coarse grained quartz sandstone, very minor shale and laminate lenses				Triassic		Sydney	0m	On-site
Rwa	Black to dark grey shale and laminate	Ashfield Shale	Wianamatta Group		Triassic		Sydney	166m	North East
water							Sydney	248m	South West
Qha	Silty to peaty quartz sand, silt, and clay. Ferruginous and humic cementation in places. Common shell layers				Quaternary		Sydney	493m	South East

Geological Structures 1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Distance	Direction
N/A	No records in buffer				

Geological Data Source : NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

97-115 River Road, Greenwich, NSW 2065

Naturally Occurring Asbestos Potential

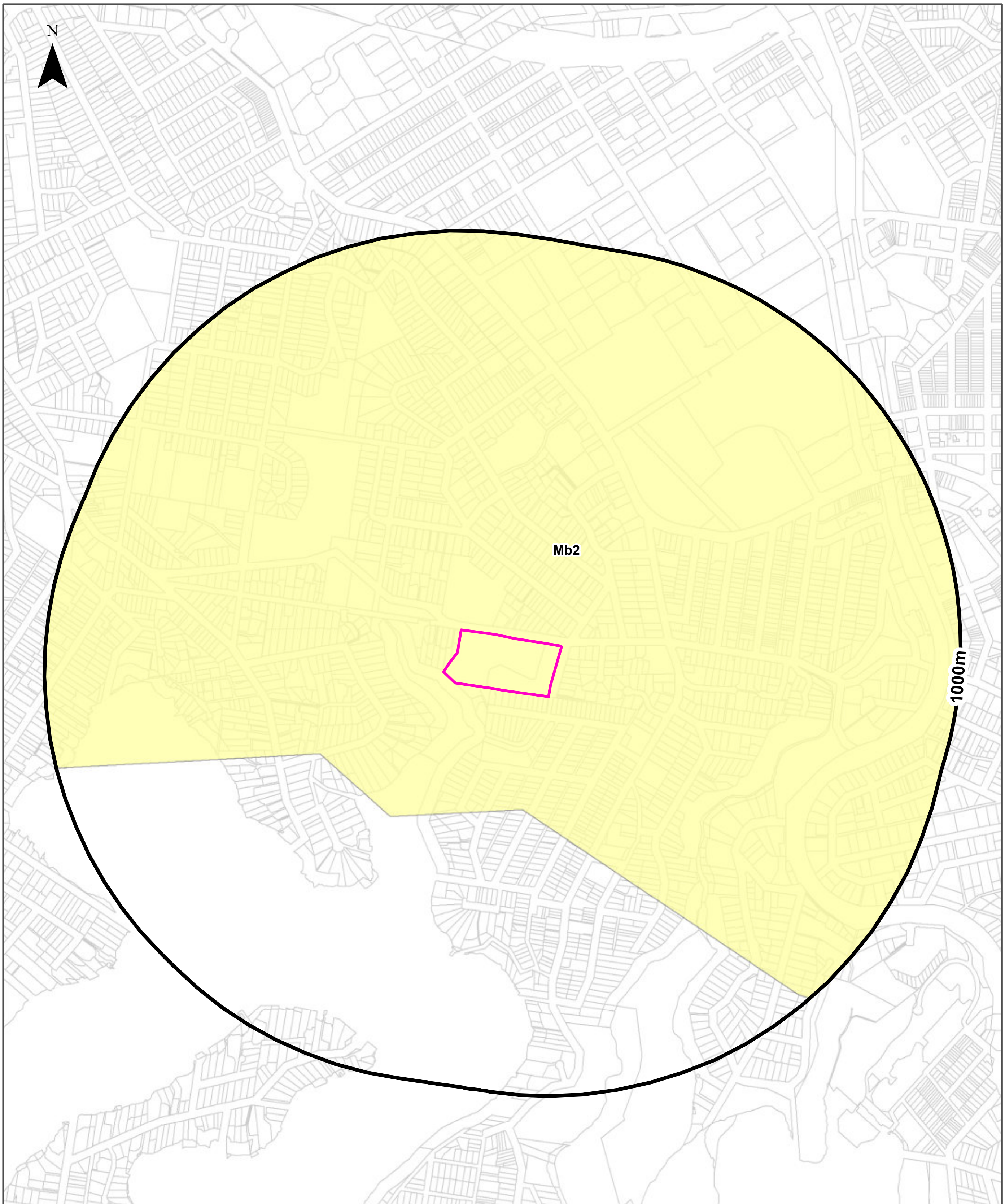
Naturally Occurring Asbestos Potential within the dataset buffer:

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: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary
Buffer 1000m
Property Boundary

Australian Soil Classification Orders

Anthroposol	Dermosol	Kandosol	Podosol	Tenosol	No Data
Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol	
Chromosol	Hydrosol	Organosol	Sodosol	Lake	

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021

Coordinate System: GDA 1994 MGA Zone 56

Date: 29 September 2021

Soils

97-115 River Road, Greenwich, NSW 2065

Atlas of Australian Soils

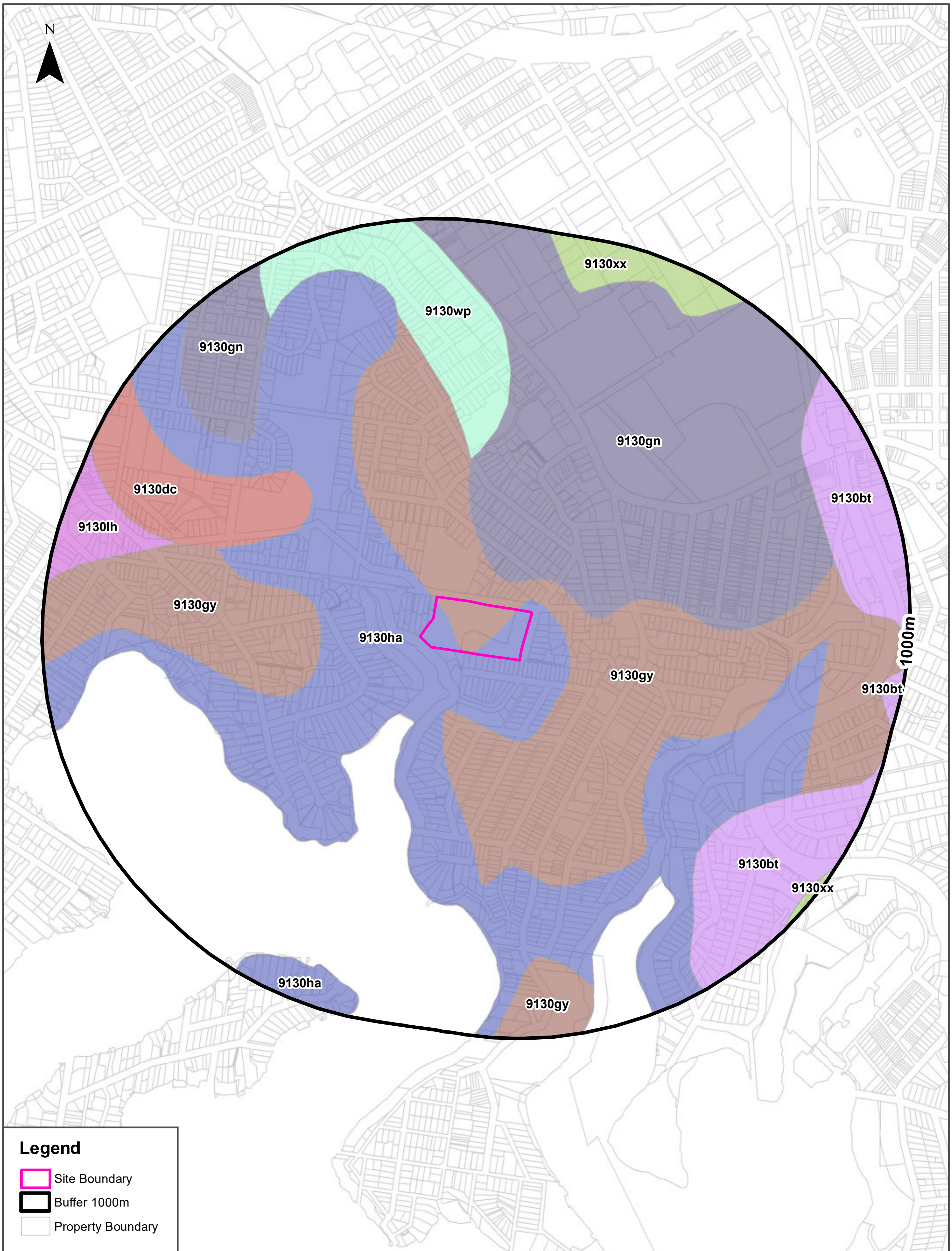
Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
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.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO

Soil Landscapes of Central and Eastern NSW

97-115 River Road, Greenwich, NSW 2065



Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Soils

97-115 River Road, Greenwich, NSW 2065

Soil Landscapes of Central and Eastern NSW

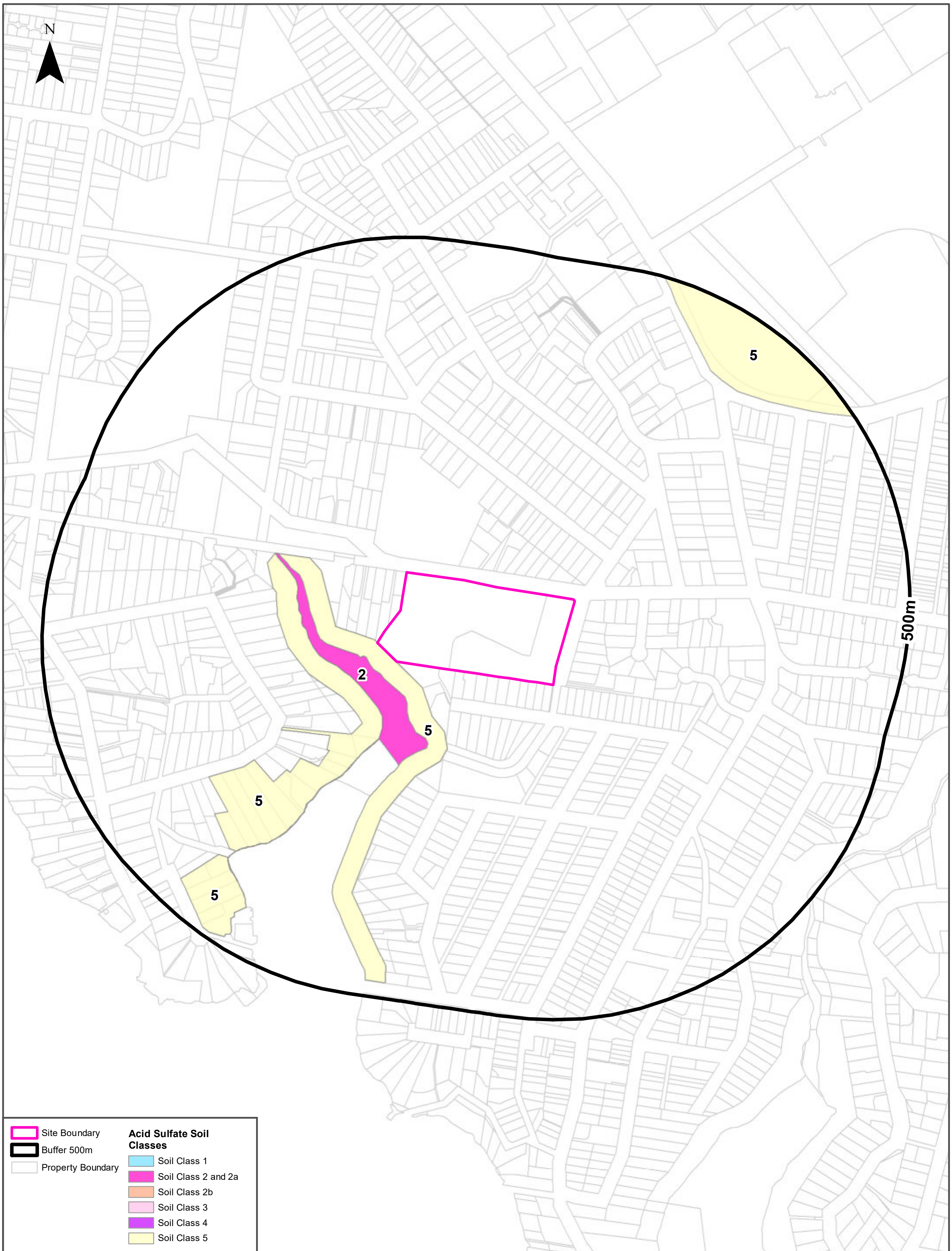
Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9130ha	Hawkesbury	0m	On-site
9130gy	Gymea	0m	On-site
9130gn	Glenorie	70m	North East
9130wp	West Pennant Hills	373m	North
9130dc	Deep Creek	404m	North West
9130bt	Blacktown	681m	South East
9130lh	Lucas Heights	691m	West
9130xx	Disturbed Terrain	853m	North East

Soil Landscapes of Central and Eastern NSW: NSW Department of Planning, Industry and Environment

Acid Sulfate Soils

97-115 River Road, Greenwich, NSW 2065



Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Acid Sulfate Soils

97-115 River Road, Greenwich, NSW 2065

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

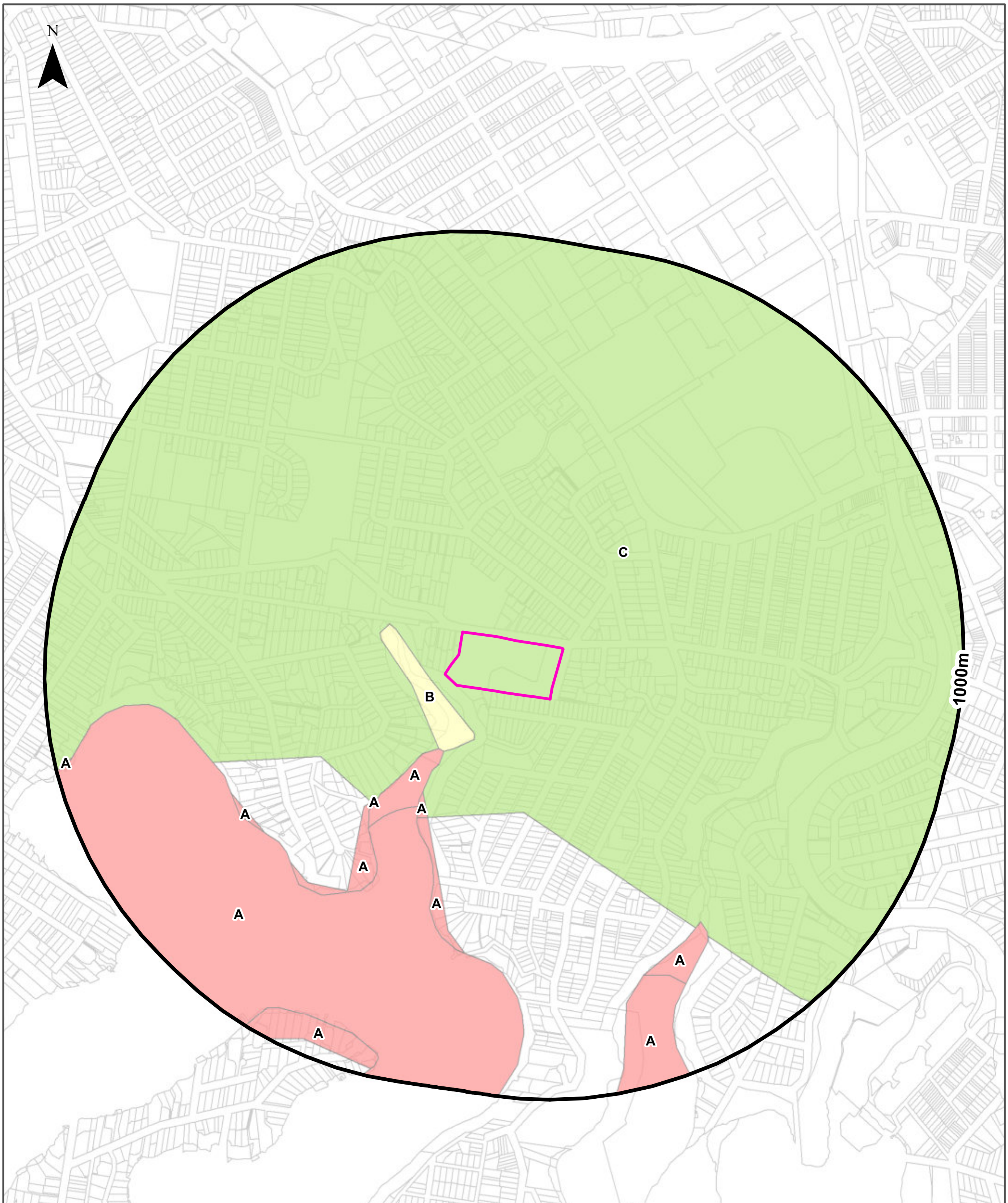
Soil Class	Description	EPI Name
N/A		

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

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

97-115 River Road, Greenwich, NSW 2065



Legend

Site Boundary
Buffer 1000m
Property Boundary

Probability of occurrence of Acid Sulfate Soils

A. High (>70%)
B. Low (6-70%)
C. Extremely Low (1-5%)
D. No Chance (0%)
No Data

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021

Coordinate System: GDA 1994 MGA Zone 56

Date: 29September 2021

Acid Sulfate Soils

97-115 River Road, Greenwich, NSW 2065

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site
B	Low Probability of occurrence. 6-70% chance of occurrence.	38m	West
A	High Probability of occurrence. >70% chance of occurrence.	953m	West

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

Dryland Salinity

97-115 River Road, Greenwich, NSW 2065

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

97-115 River Road, Greenwich, NSW 2065

Mining Subsidence Districts

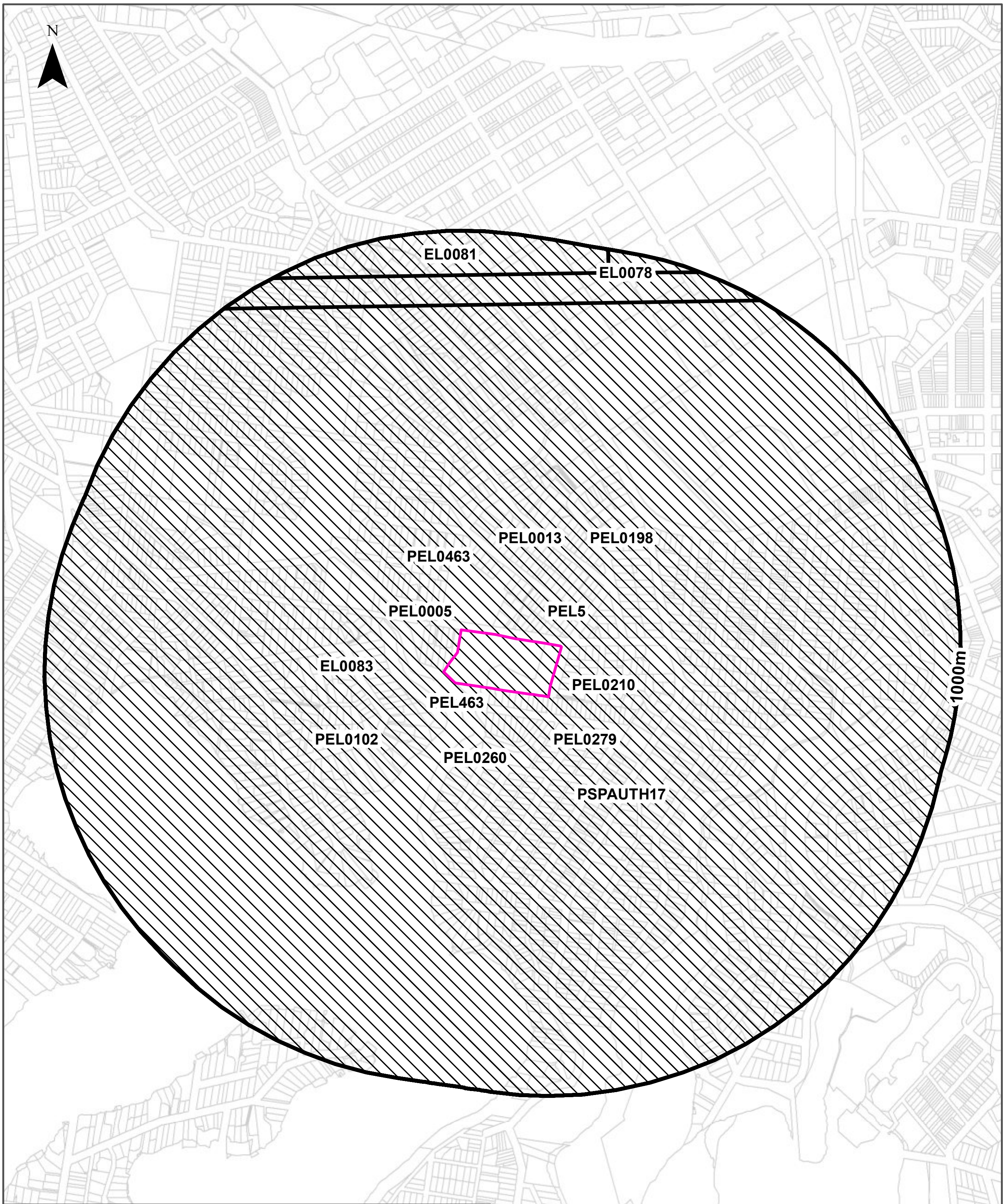
Mining Subsidence Districts within the dataset buffer:

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

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

Mining & Exploration Titles

97-115 River Road, Greenwich, NSW 2065



Legend

- Site Boundary
- Buffer 1000m
- Property Boundary
- Current Mining & Exploration Titles
- Current Mining & Exploration Title Applications
- Historical Mining & Exploration Titles

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Mining

97-115 River Road, Greenwich, NSW 2065

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

97-115 River Road, Greenwich, NSW 2065

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0279	THE ELECTRICITY COMMISSION OF NSW (TRADING AS PACIFIC POWER)	17/04/1990	11/11/1993	PETROLEUM	Petroleum	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.	9/09/1981	8/03/1993	PETROLEUM	Petroleum	0m	On-site
PEL463	DART ENERGY (APOLLO) PTY LTD			MINERALS		0m	On-site
PEL5	AGL UPSTREAM INVESTMENTS PTY LIMITED			MINERALS		0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	8/03/2007	7/03/2008	PETROLEUM	Petroleum	0m	On-site
PEL0005	AGL UPSTREAM INVESTMENTS PTY LIMITED	11/11/1993	4/03/2015	PETROLEUM	Petroleum	0m	On-site
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL0463	DART ENERGY (APOLLO) PTY LTD	22/10/2008	6/03/2015	PETROLEUM	Petroleum	0m	On-site
EL0083	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		0m	On-site
EL0081	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		888m	North
EL0078	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		942m	North

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

State Environmental Planning Policy

97-115 River Road, Greenwich, NSW 2065

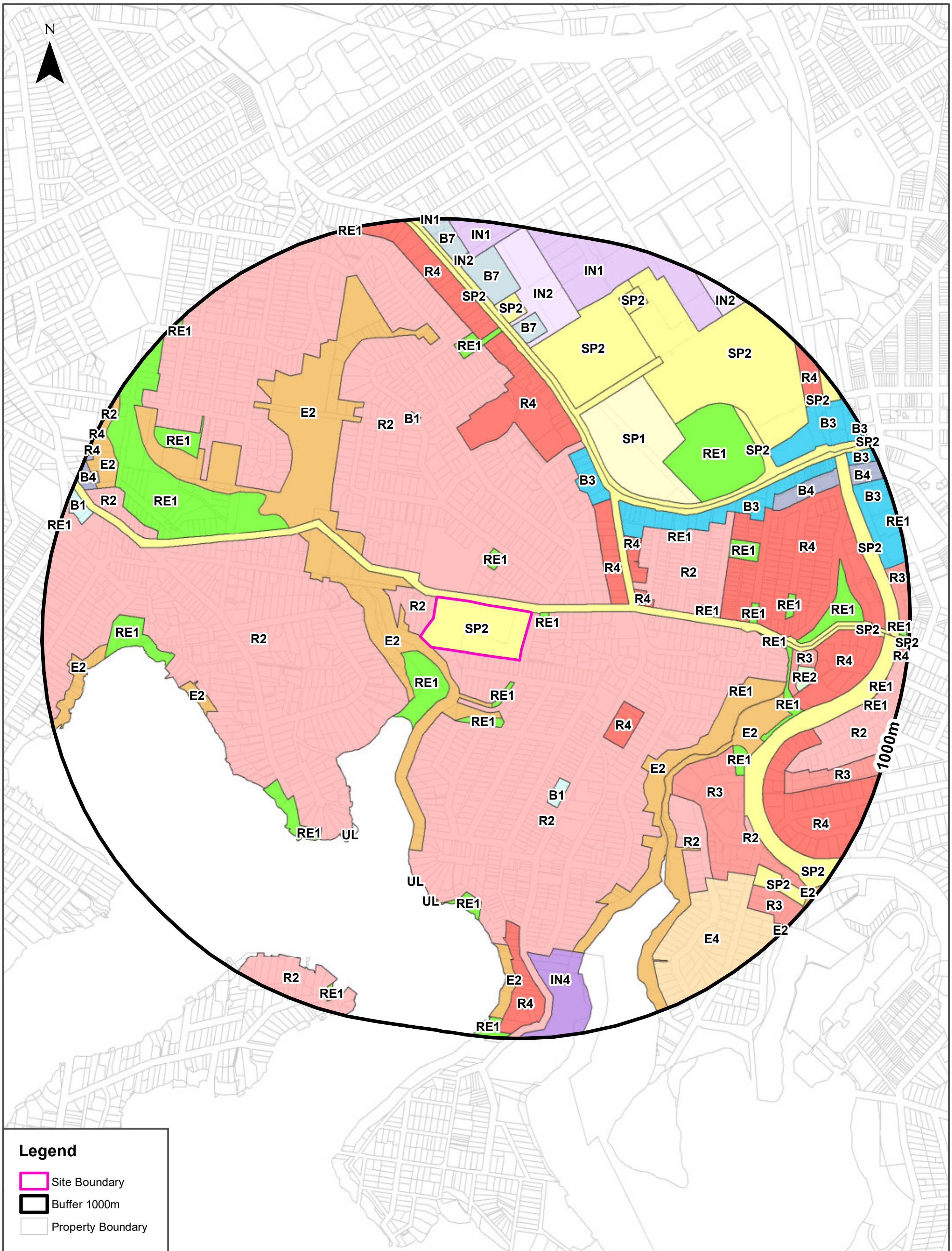
State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

EPI Planning Zones

97-115 River Road, Greenwich, NSW 2065



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021 Planning: NSW Crown Copyright - Planning & Environment	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Environmental Planning Instrument

97-115 River Road, Greenwich, NSW 2065

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
SP2	Infrastructure	Health Services Facilities	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		0m	On-site
SP2	Infrastructure	Road	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		0m	North East
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		0m	West
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		0m	West
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		0m	South East
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		20m	North West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		21m	East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		28m	South West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		60m	South
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		93m	North
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		110m	West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		157m	South
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		210m	North East
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		226m	North West
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		276m	East
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	30/10/2020	30/10/2020	30/10/2020	Amendment No 25	276m	East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		278m	North East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		292m	South East
B3	Commercial Core		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		318m	North East
B3	Commercial Core		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		326m	North East
B1	Neighbourhood Centre		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		327m	South East
SP2	Infrastructure	Classified Road	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		394m	North East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		396m	North
SP1	Special Activities	Cemetery	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		409m	North East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		419m	North East
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		422m	South East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		431m	North West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		441m	East

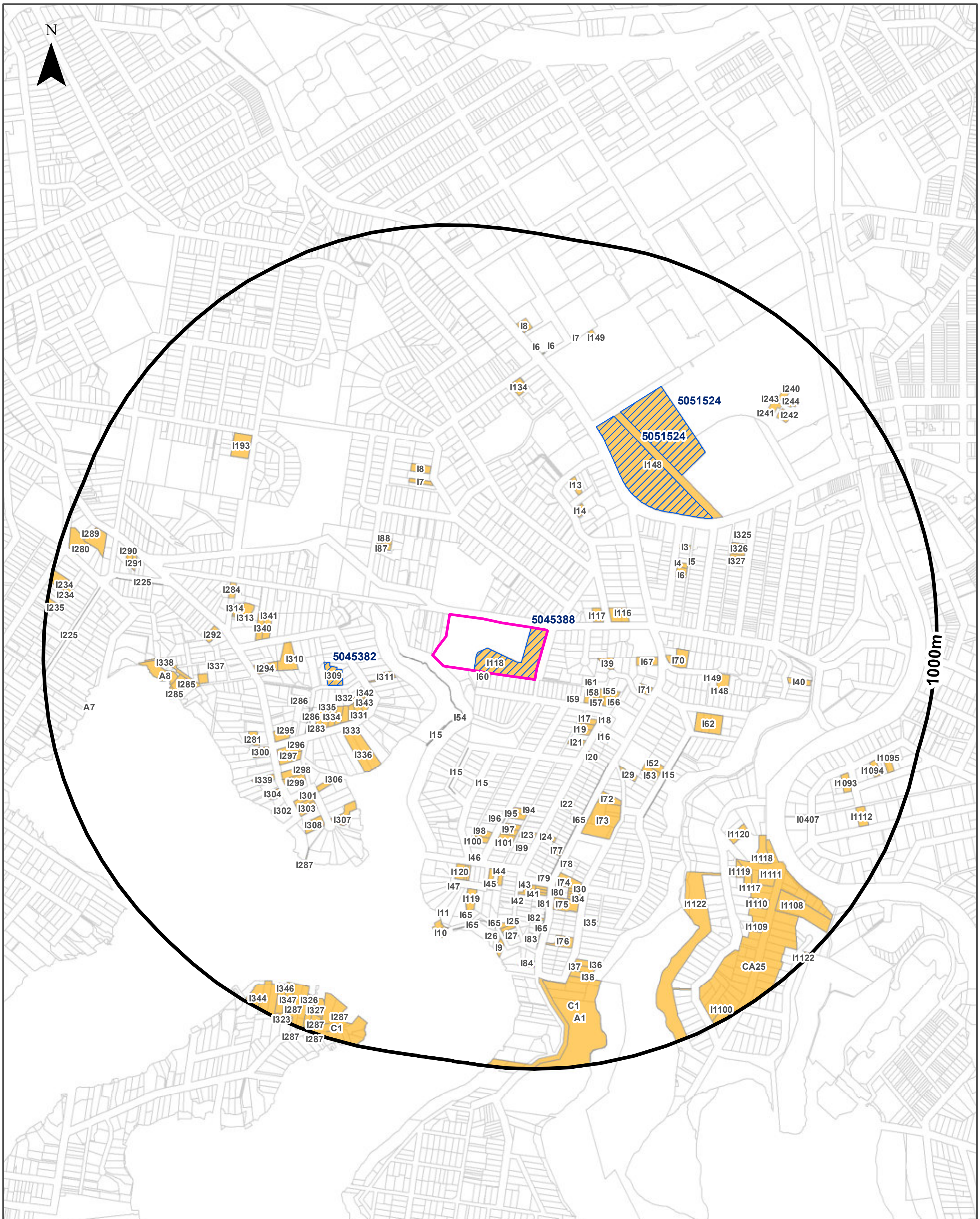
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
B1	Neighbourhood Centre		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		461m	North
E2	Environmental Conservation		North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	Amendment No 30	492m	South East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	30/10/2020	30/10/2020	30/10/2020	Amendment No 25	497m	East
R3	Medium Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		508m	South East
UL	Unzoned Land		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		509m	South West
RE1	Public Recreation		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		526m	North East
R2	Low Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		532m	South East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		535m	South West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	30/10/2020	30/10/2020	30/10/2020	Amendment No 25	540m	East
SP2	Infrastructure	Educational Establishment	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		550m	North East
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		572m	West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	23/08/2013	23/08/2013	30/10/2020	Amendment No 12	574m	East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	30/10/2020	30/10/2020	30/10/2020	Amendment No 25	574m	East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		593m	East
RE1	Public Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		606m	South East
UL	Unzoned Land		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		609m	South
SP2	Infrastructure	Hospital	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		626m	North East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		626m	South
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		633m	North
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		651m	South
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		651m	West
SP2	Infrastructure	Railway	North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	Amendment No 30	651m	East
UL	Unzoned Land		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		654m	South
RE1	Public Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		667m	East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	30/10/2020	30/10/2020	30/10/2020	Amendment No 25	669m	East
SP2	Infrastructure	Classified Road	North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	Amendment No 30	675m	East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		687m	North
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		687m	South
IN2	Light Industrial		Willoughby Local Environmental Plan 2012	20/10/2017	20/10/2017	05/03/2021	Amendment No 10	688m	North
B4	Mixed Use		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		693m	North East
R3	Medium Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		695m	East
B7	Business Park		Willoughby Local Environmental Plan 2012	05/05/2017	05/05/2017	05/03/2021	Amendment No 9	699m	North
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		704m	East
R4	High Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		713m	South East

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE2	Private Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		717m	East
R4	High Density Residential		North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	Amendment No 30	722m	East
R2	Low Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		723m	South East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		732m	North West
R2	Low Density Residential		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		743m	West
SP2	Infrastructure	Telecommunications	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		743m	North
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		750m	South
B3	Commercial Core		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		754m	North East
E4	Environmental Living		North Sydney Local Environmental Plan 2013	23/05/2014	23/05/2014	30/06/2021	Amendment No 3	755m	South East
R3	Medium Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		758m	East
R2	Low Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		758m	East
IN4	Working Waterfront		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		765m	South
B7	Business Park		Willoughby Local Environmental Plan 2012	20/10/2017	20/10/2017	05/03/2021	Amendment No 10	786m	North
IN1	General Industrial		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		806m	North
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		826m	West
SP2	Infrastructure	Health Services Facilities	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		829m	South East
SP2	Infrastructure	Electricity Transmission & Distribution	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		829m	North East
R3	Medium Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		855m	South East
SP2	Infrastructure	Railway	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		875m	East
IN2	Light Industrial		Willoughby Local Environmental Plan 2012	20/10/2017	20/10/2017	05/03/2021	Amendment No 10	877m	North
B7	Business Park		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		890m	North
R2	Low Density Residential		Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	12/08/2013		891m	South West
E2	Environmental Conservation		Lane Cove Local Environmental Plan 2009	24/07/2015	24/07/2015	30/10/2020	Amendment No 14	900m	North West
R4	High Density Residential		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		905m	North East
B3	Commercial Core		Lane Cove Local Environmental Plan 2009	01/12/2017	01/12/2017	30/10/2020	Amendment No 22	909m	East
B4	Mixed Use		Lane Cove Local Environmental Plan 2009	01/12/2017	01/12/2017	30/10/2020	Amendment No 22	912m	East
B1	Neighbourhood Centre		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		924m	West
RE1	Public Recreation		Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	12/08/2013		924m	South
SP2	Infrastructure	Railway	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		929m	North East
IN2	Light Industrial		Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	05/03/2021		932m	North East
RE1	Public Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		933m	East
R3	Medium Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		939m	East
B4	Mixed Use		Lane Cove Local Environmental Plan 2009	20/05/2020	20/05/2020	30/10/2020	Amendment No 29	940m	West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		945m	South
RE1	Public Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		969m	East
RE1	Public Recreation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		972m	East
SP2	Infrastructure	Classified Road	North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	Amendment No 30	973m	East
R4	High Density Residential		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		973m	East
E2	Environmental Conservation		North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021		974m	South East
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	20/05/2020	20/05/2020	30/10/2020	Amendment No 29	983m	North West
B3	Commercial Core		North Sydney Local Environmental Plan 2013	15/05/2020	15/05/2020	30/06/2021	Amendment No 28	984m	North East
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	23/08/2013	23/08/2013	30/10/2020	Amendment No 12	992m	North
R4	High Density Residential		Lane Cove Local Environmental Plan 2009	31/07/2015	31/07/2015	30/10/2020	Amendment No 17	995m	North West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		995m	West
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		999m	North
RE1	Public Recreation		Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	30/10/2020		1000m	East

Heritage Items

97-115 River Road, Greenwich, NSW 2065



Legend	Site Boundary	Commonwealth Heritage List	State Heritage Items
Property Boundary	Buffer 1000m	National Heritage List	EPI Heritage Items

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021 Heritage - NSW Crown Copyright - Planning & Environment	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Heritage

97-115 River Road, Greenwich, NSW 2065

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

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

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
5045388	Pallister	95 River Road Greenwich	LANE COVE	02/04/1999	00574	1571	0m	On-site
5045382	Northwood House & Cottage	1 Private Road Northwood	LANE COVE	02/04/1999	00440	1132	236m	West
5051524	Gore Hill Memorial Cemetery	Pacific Highway, Gore Hill	WILLOUGHBY	25/05/2001	01491	2121	409m	North East
5051524	Gore Hill Memorial Cemetery	Pacific Highway, Gore Hill	WILLOUGHBY	25/05/2001	01491	2121	528m	North East

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage

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
I60	Sandstone swimming pool (associated with Pallister, 95 River Road), 51 Gore Street	Item - General	State	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	0m	On-site
I118	Pallister, 95 River Road	Item - General	State	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	0m	On-site
I54	Gore Creek Reserve, Gore Street	Item - Landscape	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	27m	South West
I311	House, 40A Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	111m	West
I117	House, 92 River Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	120m	East
I59	Rockleigh, 11 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	132m	South East
I39	House, 5 Coolabah Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	142m	East
I58	Ione, 9 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	144m	South East
I15	Streetscape elements (drain, embankment walls, sandstone retaining walls, rocky outcrop, steps), Be*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	150m	South West
I17	Tewhare, 5 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	155m	South East
I57	Banksia, 7 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	156m	South East
I18	Marathon, 7 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	158m	South East
I19	Greenwich Uniting Church, 9 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	162m	South East
I116	Hazelhurst, 90 River Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	165m	East
I61	House, 5 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	169m	South East
I21	House, 13 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	175m	South East
I55	House, 3 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	181m	South East
I56	House, 1 Gore Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	193m	South East
I342	Stone fences, 33 Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	195m	West
I343	Stone fences, 33 Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	195m	South West
I15	Streetscape elements (drain, embankment walls, sandstone retaining walls, rocky outcrop, steps), Be*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	198m	South

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I16	House, 2 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	213m	South East
I87	House, 1 Hinkler Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	224m	North West
I331	Stone fences, 35 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	227m	South West
I20	House, 12 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	229m	South East
I88	House, 3 Hinkler Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	234m	North West
I309	Northwood House and Cottage, 1 Private Road	Item - General	State	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	237m	West
I67	House, 35 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	238m	East
I282	House, 37 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	242m	South West
I332	Stone Fence	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	252m	South West
I71	House, 45 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	262m	East
I333	Stone fences, 41 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	265m	South West
I336	House, 62 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	272m	South West
I15	Streetscape elements (drain, embankment walls, sandstone retaining walls, rocky outcrop, steps), Be*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	274m	South
I334	Stone fences, 43 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	279m	South West
I65	Streetscape elements (sandstone gutters, steps, outcrops and kerbing), Greenwich Road, Bay Street a*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	286m	South East
I335	Stone fence	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	294m	South West
I14	House, 14 Bellevue Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	301m	North East
I283	House, 47 Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	308m	West
I29	House, 2 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	309m	South East
I70	Glenwood Nursing Home, 34-40 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	309m	East
I22	House, 32 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	314m	South East
I94	House, 36 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	332m	South

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I72	House, 70 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	334m	South East
I7	House, 4 Balfour Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	334m	North West
I286	Streetscape elements (rocky outcrops, stone steps, sandstone kerbing), Lower Cliff Road, Private Ro*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	335m	West
I286	Streetscape elements (rocky outcrops, stone steps, sandstone kerbing), Lower Cliff Road, Private Ro*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	343m	West
I95	House, 38 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	346m	South
I310	Burdoe, 5 Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	348m	West
I73	Greenwich Infants School, 72A Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	351m	South East
I15	Streetscape elements (drain, embankment walls, sandstone retaining walls, rocky outcrop, steps), Be*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	354m	South
I52	House, 19 Glenview Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	354m	South East
I53	House, 21 Glenview Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	355m	South East
I13	House, 8 Bellevue Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	356m	North East
I6	House, 14 Anglo Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	358m	East
I5	House, 12 Anglo Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	364m	East
I8	House, 8 Balfour Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	365m	North
I4	House, 10 Anglo Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	371m	North East
I96	House, 42 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	375m	South
I97	House, 44 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	389m	South
I23	House, 45 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	390m	South
I306	House, 3 Point Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	391m	South West
I24	House, 50 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	394m	South
I294	House, 70 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	399m	West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I98	House, 45 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	400m	South
I3	House, 2 Anglo Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	400m	North East
I296	House and garden, 88 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	400m	South West
I99	House, 46 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	404m	South
I295	House, 86 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	407m	South West
I148	Gore Hill Memorial Cemetery	Item - General	State	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	409m	North East
I307	House and garden, 8 Point Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	414m	South West
I297	House and garden, 90 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	416m	South West
I101	House, 48 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	418m	South
I15	Streetscape elements (drain, embankment walls, sandstone retaining walls, rocky outcrop, steps), Be*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	418m	South East
I100	House, 47 King William Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	419m	South
I341	Streetscape element (sandstone wall), 4 Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	423m	West
I62	St. Giles Anglican Church, 6-12 Greendale Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	423m	East
I77	House, 111 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	431m	South
I149	House and garage, 20 Wilona Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	433m	East
I78	House, 113 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	436m	South
I340	Streetscape element (sandstone wall), 2 Upper Cliff Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	441m	West
I298	House and garden, 94 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	441m	South West
I148	House, 18 Wilona Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	447m	East
I299	House and garden, 96 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	449m	South West
I301	House and sandstone fence, 100 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	473m	South West
I313	Wyndarra, 4b Wyndarra Place	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	475m	West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I302	House and sandstone fence, 102 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	477m	South West
I303	House and stone retaining wall, 104 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	480m	South West
I300	House, 97 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	483m	South West
I281	House, 1A Birriwa Place	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	492m	West
I45	House, 6 Ford Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	South
I44	House, 2 Ford Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	South
I46	Wyncourt, 14 Ford Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	South
I47	House, 16 Ford Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	South
I120	House, 11 Robertson Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	South
I327	House, 7 Park Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	496m	East
I308	House and garden, 16 Point Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	497m	South West
I74	House, 82 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	499m	South
I314	House, 6 Wyndarra Place	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	502m	West
I339	House, 109 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	510m	South West
I326	House, 5 Park Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	510m	East
I325	Sandringham, 3 Park Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	519m	East
I43	House, 6/8 Evelyn Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	524m	South
I304	House, 113 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	524m	South West
I42	House, 4 Evelyn Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	526m	South
I41	House, 2 Evelyn Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	527m	South
I79	House, 125 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	528m	South
I284	Endeavour Playground, Fleming Street (south side)	Item - Landscape	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	530m	West
I30	House, 13 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	534m	South
I80	House, 127 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	536m	South

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I31	House, 15 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	542m	South
I81	House, 129 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	543m	South
I292	House, 45 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	546m	West
I32	House, 17 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	549m	South
I33	House, 19 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	555m	South
I119	House, 10 Robertson Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	555m	South
I75	John Taylor Memorial Church, 86A Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	560m	South
I34	House, 21 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	562m	South
I337	House, 4 James Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	581m	West
I134	Mandalay, 2/4 Ulonga Avenue	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	581m	North
I287	Northwood Wharf	Item - General	Local	Lane Cove Local Environmental Plan 2009	15/12/2017	15/12/2017	15/12/2017	582m	South West
I65	Streetscape elements (sandstone gutters, steps, outcrops and kerbing), Greenwich Road, Bay Street a*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	596m	South
I338	Kellys Esplanade (Streetscape element)	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	603m	West
I82	House, 143 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	608m	South
I65	Streetscape elements (sandstone gutters, steps, outcrops and kerbing), Greenwich Road, Bay Street a*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	616m	South
I25	Bedford, 73 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	618m	South
I65	Streetscape elements (sandstone gutters, steps, outcrops and kerbing), Greenwich Road, Bay Street a*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	625m	South
I35	House, 34 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	626m	South
I1122	Wollstonecraft foreshore reserves	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	627m	South East
I40	House, 8 Eastview Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	627m	East
I26	Florence, 75 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	628m	South

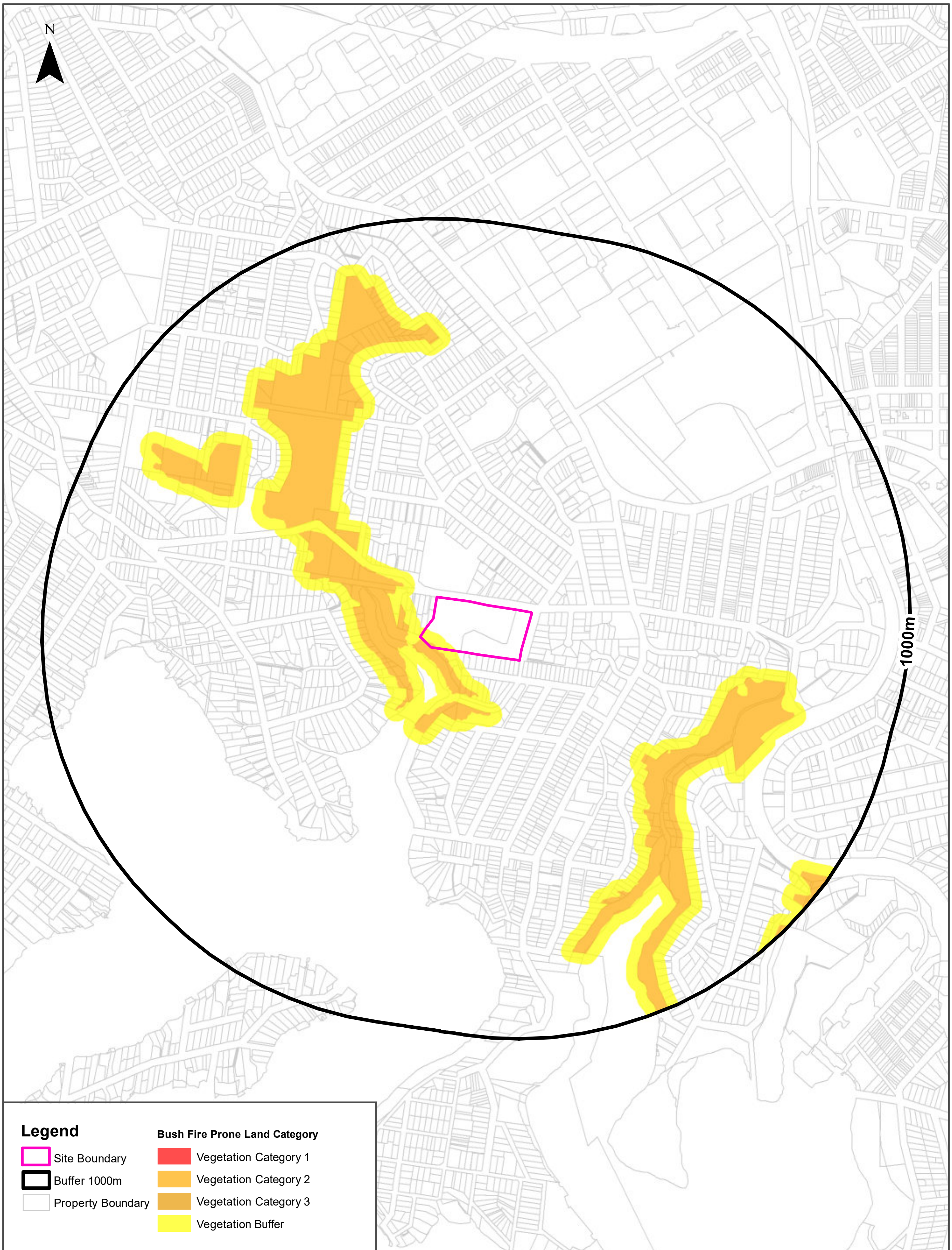
Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I285	Convict Stockade, Kelly's Esplanade, Woodford Bay	Item - Landscape	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	630m	West
I65	Streetscape elements (sandstone gutters, steps, outcrops and kerbing), Greenwich Road, Bay Street a*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	632m	South
I1120	'Tullamore'	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	639m	South East
I11	Greenwich 12' Flying Squadron, Bay Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	645m	South
I27	House, 79 Carlotta Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	646m	South
I193	House and garden, 6 Richardson Street East	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	654m	North West
I83	House, 153 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	656m	South
A8	Convict Stockade, 2 and 4 Kelly's Esplanade, Woodford Bay	Item - Archaeological	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	656m	West
I76	House, 100 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	657m	South
I10	Bay Street Wharf, Bay Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	661m	South
I285	Convict Stockade, Kelly's Esplanade, Woodford Bay	Item - Landscape	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	662m	West
I9	House, 8 Bay Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	669m	South
I1119	House	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	691m	South East
CA25	Wollstonecraft	Conservation Area - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	691m	South East
I6	Gateway entry pylons	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	697m	North
I1118	'The Briars'	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	700m	South East
I6	Gateway entry pylons	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	711m	North
I225	Streetscape elements (sandstone walls, kerbing and steps, including in Longueville Sailing Club and*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	716m	West
I84	House, 163 Greenwich Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	718m	South
I36	House, 48 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	724m	South
I1117	House	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	724m	South East
I37	House, 50 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	738m	South

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I8	Communications tower (excluding all ancillary buildings and structures and tower attachments)	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	743m	North
I7	Footings of the former transmission tower	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	750m	North
I38	House, 52 Chisholm Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	751m	South
I149	Former stables	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	753m	North
I1111	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	756m	South East
C1	Greenwich Conservation Area, Greenwich	Conservation Area - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	765m	South
A1	Fells Shale Oil Refinery, 124 Gother Avenue	Item - Archaeological	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	765m	South
I1110	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	784m	South East
I0407	North Sydney bus shelters	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	785m	South East
I241	Pavilion Wing Building, Block 1A (including original interiors)	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	790m	North East
I291	House, 23 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	796m	West
I242	Resident Medical Officers (RMO) Building-known as Vanderfield Building (including original interior*	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	804m	North East
I290	House, 21 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	807m	West
I1093	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	822m	East
I1108	Carpenter House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	829m	South East
I1109	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	834m	South East
I240	Pavilion Wing Building, Block 1B (including original interiors)	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	840m	North East
I243	Anstro,Body Protein Building (including original interiors)	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	843m	North East
I244	Orthotics Building (including original interiors)	Item - General	Local	Willoughby Local Environmental Plan 2012	21/12/2012	31/01/2013	06/11/2020	846m	North East
I225	Streetscape elements (sandstone walls, kerbing and steps, including in Longueville Sailing Club and*	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	872m	West
A7	Kirk's Factory, Woodford/ Arabella Streets	Item - Archaeological	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	879m	West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I289	Kailora, 15 Northwood Road	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	884m	West
I1094	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	884m	East
I1112	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	886m	South East
C1	Hunters Hill Conservation Area No 2 - The Peninsula	Conservation Area - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	891m	South West
I327	House, 'Yarrawa'	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	910m	South West
I326	House, formerly 'Athaliah'	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	911m	South West
I347	House, formerly 'Wonga' and 'Fairhaven'	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	912m	South West
I1095	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	912m	East
I346	House	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	914m	South West
I280	Minembah, 1 Woodford Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	924m	West
I234	House, 18 Kenneth Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	30/08/2013	30/08/2013	15/12/2017	939m	West
I234	House, 18 Kenneth Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	946m	West
I287	Stone walls	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	964m	South West
I1100	House	Item - General	Local	North Sydney Local Environmental Plan 2013	02/08/2013	13/09/2013	30/06/2021	966m	South East
I235	Hazelwood, 22 Kenneth Street	Item - General	Local	Lane Cove Local Environmental Plan 2009	19/02/2010	19/02/2010	15/12/2017	970m	West
I287	Stone walls	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	973m	South West
I344	House, 'Arden Lea'	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	975m	South West
I287	Stone walls	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	979m	South West
I323	House, 'Otranto'	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	981m	South West
I287	Stone walls	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	981m	South West
I1122	Wollstonecraft foreshore reserves	Item - Landscape	Local	North Sydney Local Environmental Plan 2013	30/06/2021	30/06/2021	30/06/2021	982m	South East
I287	Stone walls	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	995m	South West
I325	House	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	996m	South West
I324	House	Item - General	Local	Hunters Hill Local Environmental Plan 2012	01/02/2013	12/08/2013	20/11/2015	999m	South West

Natural Hazards - Bush Fire Prone Land

97-115 River Road, Greenwich, NSW 2065



Legend

- Site Boundary
- Buffer 1000m
- Property Boundary

Bush Fire Prone Land Category

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

Scale: 0 100 200 400 600 Meters	Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2021. Property Boundaries: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 29 September 2021

Natural Hazards

97-115 River Road, Greenwich, NSW 2065

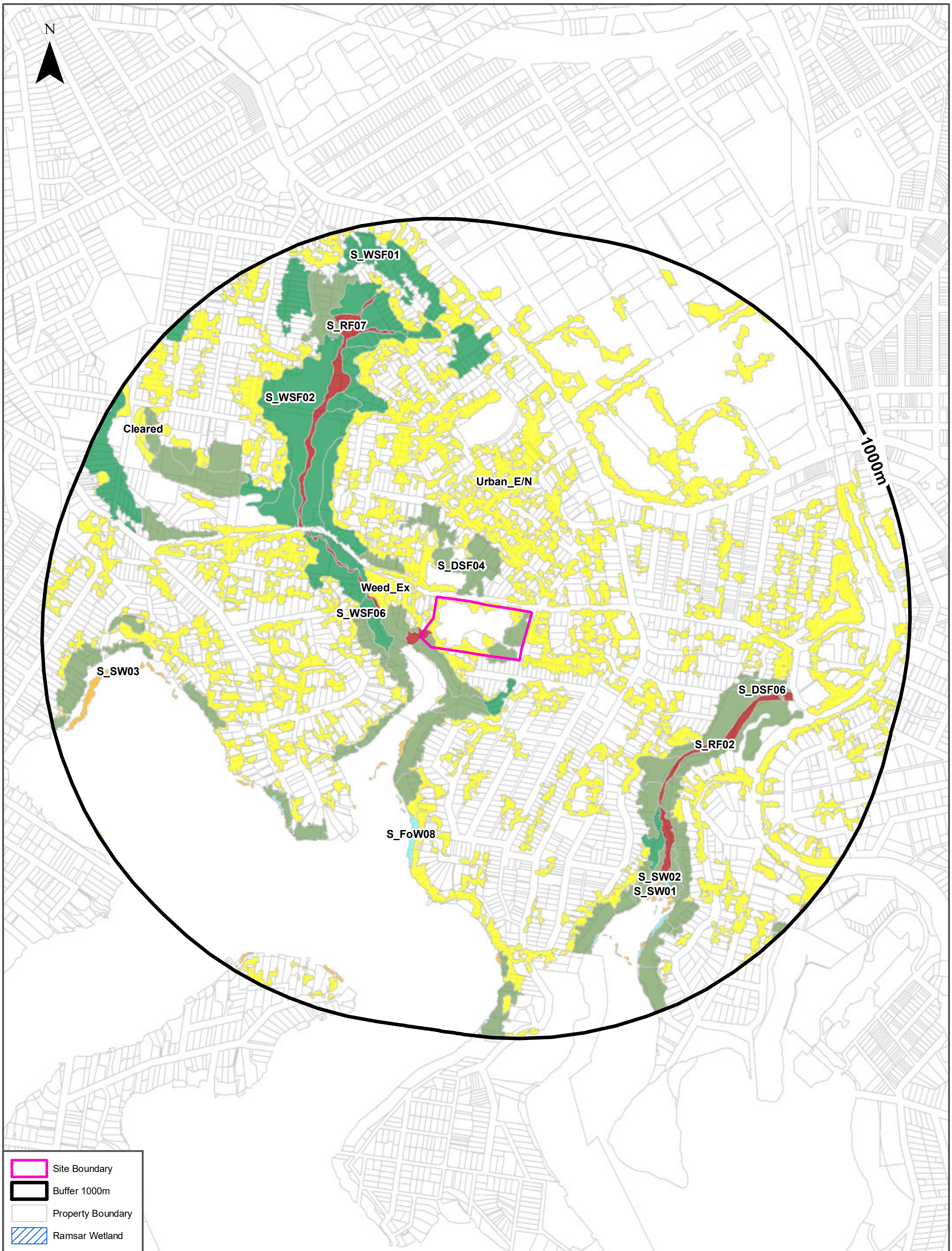
Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Category 2	0m	On-site
Vegetation Buffer	0m	On-site

Ecological Constraints - Vegetation & Ramsar Wetlands

97-115 River Road, Greenwich, NSW 2065



Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 29 September 2021

Ecological Constraints

97-115 River Road, Greenwich, NSW 2065

Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Map Unit Name	Threatened Ecological Community NSW	Threatened Ecological Community EPBC Act	Understorey	Disturbance	Disturbance Index	Dominant Species	Dist	Dir
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			21: Ferns dominant	20: Previously cleared 1943	3: High	E.pilularis/A.costata/C.gummifera E.resinifera	0m	On-site
Urban_E/N	Urban_E/N: Urban Exotic/Native			00: Not assessed	00: Not assessed	0: Not assessed	Urban Exotic/Native	0m	On-site
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	1: Low	E.pilularis/A.costata/C.gummifera E.resinifera	0m	On-site
S_RF02	S_RF02: Coastal Sandstone Gallery Rainforest			17: Pittosporum dominant	13: Weeds	3: High	B.integrifolia/F.rubiginosa/Kunzea sppeucalypts	0m	On-site
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	2: Moderate	E.piperita/A.costataE.pilularis	11m	West
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			24: Urban and hard surface	24: Urban mixed use	4: Very high	E.pilularis/A.costata/C.gummifera E.resinifera	12m	North
S_WSF01	S_WSF01: Blue Gum High Forest	Blue Gum High Forest		10: Mesic/rainforest	20: Previously cleared 1943	3: High	E.saligna/S.glomuliferaE.pilularis	50m	South
Weed_Ex	Weed_Ex: Weeds and Exotics			00: Not assessed	00: Not assessed	0: Not assessed	Exotic Species >90%cover	54m	North West
S_WSF06	S_WSF06: Coastal Shale-Sandstone Forest			17: Pittosporum dominant	13: Weeds	2: Moderate	E.pilularis/A.costata/C.gummifera E.resinifera	71m	West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	3: High	E.pilularis/A.costata/C.gummifera E.resinifera	95m	South
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			11: Semi sheltered dry/mesic	13: Weeds	2: Moderate	E.piperita/A.costataE.pilularis	97m	West
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			11: Semi sheltered dry/mesic	13: Weeds	2: Moderate	E.pilularis/A.costata/C.gummifera E.resinifera	104m	North West
S_RF02	S_RF02: Coastal Sandstone Gallery Rainforest			10: Mesic/rainforest	13: Weeds	3: High	C.apetalum/T.laurina/C.serratifolia	114m	West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	3: High	B.integrifolia/F.rubiginosa/Kunzea sppeucalypts	162m	South West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	2: Moderate	E.pilularis/A.costata/C.gummifera E.resinifera	165m	South West
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			11: Semi sheltered dry/mesic	13: Weeds	2: Moderate	E.pilularis/A.costata/C.gummifera E.resinifera	179m	West
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			10: Mesic/rainforest	13: Weeds	3: High	E.pilularis/A.costata/C.gummifera E.resinifera	182m	North West
S_SW01	S_SW01: Estuarine Mangrove Forest			00: Not assessed	00: Not assessed	0: Not assessed	Mangroves	211m	South West
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			10: Mesic/rainforest	13: Weeds	1: Low	E.piperita/A.costataE.pilularis	219m	North West
S_SW03	S_SW03: Seagrass Meadows			00: Not assessed	00: Not assessed	0: Not assessed	Seagrass (DPI)	329m	South West
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			10: Mesic/rainforest	13: Weeds	1: Low	E.pilularis/A.costata/C.gummifera E.resinifera	346m	North West

Map ID	Map Unit Name	Threatened Ecological Community NSW	Threatened Ecological Community EPBC Act	Understorey	Disturbance	Disturbance Index	Dominant Species	Dist	Dir
S_RF07	S_RF07: Coastal Escarpment Littoral Rainforest	Littoral Rainforest	Littoral Rainforest and Coastal Vine Thickets (possible)	10: Mesic/rainforest	13: Weeds	2: Moderate	A.smithii/G.ferdinandii/P.undulatum	399m	North West
S_FoW08	S_FoW08: Estuarine Swamp Oak Forest	Swamp Oak Floodplain Forest		31: Saltmarsh	13: Weeds	3: High	C.glauca	437m	South
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	3: High	E.piperita/A.costataE.pilularis	452m	South East
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			10: Mesic/rainforest	14: Canopy gaps	2: Moderate	E.piperita/A.costataE.pilularis	495m	North West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	19: Clearing/Part clearing	4: Very high	E.piperita/A.costataE.pilularis	503m	South East
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			11: Semi sheltered dry/mesic	13: Weeds	1: Low	E.pilularis/A.costata/C.gummifera E.resinifera	506m	North West
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			17: Pittosporum dominant	13: Weeds	3: High	E.piperita/A.costataE.pilularis	531m	South East
S_FoW08	S_FoW08: Estuarine Swamp Oak Forest	Swamp Oak Floodplain Forest		00: Not assessed	00: Not assessed	0: Not assessed	C.glauca	570m	South West
S_WSF01	S_WSF01: Blue Gum High Forest	Blue Gum High Forest		24: Urban and hard surface	24: Urban mixed use	4: Very high	E.saligna/S.glomuliferaE.pilularis	579m	North
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			11: Semi sheltered dry/mesic	24: Urban mixed use	3: High	E.pilularis/A.costata/C.gummifera E.resinifera	600m	West
S_FoW08	S_FoW08: Estuarine Swamp Oak Forest	Swamp Oak Floodplain Forest		12: Dry xeric shrubs	99: No visible disturbance	5: No visible disturbance	C.glauca	679m	South East
S_SW02	S_SW02: Estuarine Saltmarsh	Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh (possible)	00: Not assessed	00: Not assessed	0: Not assessed	S.repens/S.quinqueflora/S.virginicusJ.krausii	679m	South East
S_WSF01	S_WSF01: Blue Gum High Forest	Blue Gum High Forest		10: Mesic/rainforest	13: Weeds	2: Moderate	E.saligna/S.glomuliferaE.pilularis	682m	North
S_WSF02	S_WSF02: Coastal Enriched Sandstone Moist Forest			10: Mesic/rainforest	13: Weeds	1: Low	E.pilularis/S.glomuliferaA.costata/E.resinifera	689m	North
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			35: Casuarina glauca near waters edge	23: Plantings	2: Moderate	E.piperita/A.costataE.pilularis	708m	West
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			11: Semi sheltered dry/mesic	13: Weeds	3: High	E.pilularis/A.costata/C.gummifera E.resinifera	724m	North West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	13: Weeds	3: High	A.costataE.resinifera/E.piperita/E.pilularis	768m	South
S_DSF04	S_DSF04: Coastal Enriched Sandstone Dry Forest			12: Dry xeric shrubs	15: Regrowth	2: Moderate	E.piperita/A.costataE.pilularis	825m	North West
Cleared	Cleared			00: Not assessed	00: Not assessed	0: Not assessed	Cleared	856m	North West
S_DSF06	S_DSF06: Coastal Sandstone Foreshores Forest			17: Pittosporum dominant	15: Regrowth	3: High	E.piperita/A.costataE.pilularis	986m	South East

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

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

Ecological Constraints

97-115 River Road, Greenwich, NSW 2065

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints

97-115 River Road, Greenwich, NSW 2065

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

97-115 River Road, Greenwich, NSW 2065

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anous stolidus	Common Noddy	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna carneipes	Flesh-footed Shearwater	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Ardenna grisea	Sooty Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Listed	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Endangered	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Vulnerable	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered Population, Vulnerable	Category 3	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus banksii banksii	Red-tailed Black-Cockatoo (coastal subspecies)	Critically Endangered	Category 2	Not Listed	
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Certhionyx variegatus	Pied Honeyeater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Charadrius leschenaultii	Greater Sand-plover	Vulnerable	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Chlidonias leucopterus	White-winged Black Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Diomedea exulans	Wandering Albatross	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Erythrotriorchis radiatus	Red Goshawk	Critically Endangered	Category 2	Vulnerable	
Animalia	Aves	Esacus magnirostris	Beach Stone-curlew	Critically Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Eudyptula minor	Little Penguin	Endangered Population	Not Sensitive	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Gelochelidon nilotica	Gull-billed Tern	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus longirostris	Pied Oystercatcher	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Manorina melanotis	Black-eared Miner	Critically Endangered	Not Sensitive	Endangered	
Animalia	Aves	Menura alberti	Albert's Lyrebird	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Nettapus coromandelianus	Cotton Pygmy-Goose	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius minutus	Little Curlew	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Onychoprion fuscata	Sooty Tern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Philomachus pugnax	Ruff	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	Endangered	Category 3	Vulnerable	
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Vulnerable	Category 3	Vulnerable	
Animalia	Aves	Pterodroma leucoptera leucoptera	Gould's Petrel	Vulnerable	Not Sensitive	Endangered	
Animalia	Aves	Pterodroma solandri	Providence Petrel	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus regina	Rose-crowned Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stercorarius longicaudus	Long-tailed Jaeger	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Stercorarius parasiticus	Arctic Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stercorarius pomarinus	Pomarine Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sterna hirundo	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Sternula albifrons	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Sula dactylatra	Masked Booby	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Thalassarche chrysostoma	Grey-headed Albatross	Not Listed	Not Sensitive	Endangered	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Tringa brevipes	Grey-tailed Tattler	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Tringa incana	Wandering Tattler	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto longimembris	Eastern Grass Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Xenus cinereus	Terek Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Insecta	Petalura gigantea	Giant Dragonfly	Endangered	Not Sensitive	Not Listed	
Animalia	Mammalia	Aepyprymnus rufescens	Rufous Bettong	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Arctocephalus forsteri	New Zealand Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Arctocephalus pusillus doriferus	Australian Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Dasyurus viverrinus	Eastern Quoll	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Eubalaena australis	Southern Right Whale	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Megaptera novaeangliae	Humpback Whale	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Perameles nasuta	Long-nosed Bandicoot	Endangered Population	Not Sensitive	Not Listed	
Animalia	Mammalia	Petauroides volans	Greater Glider	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	Petaurus australis	Yellow-bellied Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pseudomys gracilicaudatus	Eastern Chestnut Mouse	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Pseudomys novaehollandiae	New Holland Mouse	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	Aspidites ramsayi	Woma	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Dermochelys coriacea	Leatherback Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Myuchelys bellii	Western Sawshelled Turtle, Bell's Turtle	Endangered	Not Sensitive	Vulnerable	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Uvidicolus sphyrurus	Border Thick-tailed Gecko	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Varanus rosenbergi	Rosenberg's Goanna	Vulnerable	Not Sensitive	Not Listed	
Fungi	Flora	Camarophyllopsis kearneyi		Endangered	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe anomala var. ianthinomarginata		Vulnerable	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe aurantipes		Vulnerable	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe austropratensis		Endangered	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe collucera		Endangered	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe griseoramosa		Endangered	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe lanecovensis		Endangered	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe reesiae		Vulnerable	Not Sensitive	Not Listed	
Fungi	Flora	Hygrocybe rubronivea		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia gordonii		Endangered	Not Sensitive	Endangered	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia terminalis subsp. Eastern Sydney	Sunshine wattle	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Allocasuarina portuensis	Nielsen Park She-oak	Endangered	Category 3	Endangered	
Plantae	Flora	Amperea xiphoclada var. pedicellata		Presumed Extinct	Not Sensitive	Extinct	
Plantae	Flora	Asterolasia buxifolia		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Caladenia tessellata	Thick Lip Spider Orchid	Endangered	Category 2	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	Chamaesyce psammogeton	Sand Spurge	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Darwinia biflora		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Deyeuxia appressa		Endangered	Not Sensitive	Endangered	
Plantae	Flora	Dichanthium setosum	Bluegrass	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Doryanthes palmeri	Giant Spear Lily	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Epacris purpurascens var. purpurascens		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Epacris sparsa	Sparse Heath	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus camfieldii	Camfield's Stringybark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus fracta	Broken Back Ironbark	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus pulverulenta	Silver-leafed Gum	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Genoplesium baueri	Bauer's Midge Orchid	Endangered	Category 2	Endangered	
Plantae	Flora	Grammitis stenophylla	Narrow-leaf Finger Fern	Endangered	Category 3	Not Listed	
Plantae	Flora	Grevillea beadleana	Beadle's Grevillea	Endangered	Category 3	Endangered	
Plantae	Flora	Grevillea caleyi	Caley's Grevillea	Critically Endangered	Category 3	Critically Endangered	
Plantae	Flora	Grevillea hilliana	White Yiel Yiel	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Haloragodendron lucasii		Endangered	Not Sensitive	Endangered	
Plantae	Flora	Hibbertia puberula		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Hibbertia spanantha	Julian's Hibbertia	Critically Endangered	Category 2	Critically Endangered	
Plantae	Flora	Hibbertia superans		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
Plantae	Flora	Lasiopetalum joyceae		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Leptospermum deanei		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Melaleuca biconvexa	Biconvex Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Microtis angusii	Angus's Onion Orchid	Endangered	Category 2	Endangered	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Endangered	Category 3	Endangered	
Plantae	Flora	Persoonia laxa		Presumed Extinct	Not Sensitive	Extinct	
Plantae	Flora	Pimelea curviflora var. curviflora		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Pomaderris prunifolia	Plum-leaf Pomaderris	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Prasophyllum fuscum	Slaty Leek Orchid	Critically Endangered	Category 2	Vulnerable	
Plantae	Flora	Prostanthera marifolia	Seaforth Mintbush	Critically Endangered	Category 3	Critically Endangered	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Sarcochilus hartmannii	Hartman's Sarcochilus	Vulnerable	Category 2	Vulnerable	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Tetratheca glandulosa		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Tetratheca juncea	Black-eyed Susan	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Thesium australe	Austral Toadflax	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Triplarina imbricata	Creek Triplarina	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Wahlenbergia multicaulis	Tadgell's Bluebell	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Wilsonia backhousei	Narrow-leafed Wilsonia	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Zannichellia palustris		Endangered	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   - (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
     - (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
     - (ii) content which is derived from content described in paragraph (i);
   - (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   - (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   - (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   - (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   - (f) Lotsearch has not undertaken any physical inspection of the property;
   - (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   - (h) the Report does not include any information relating to the actual state or condition of the Property;
   - (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   - (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   - (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   - (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:
    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or
    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.

Appendix D: Background on Salinity

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.

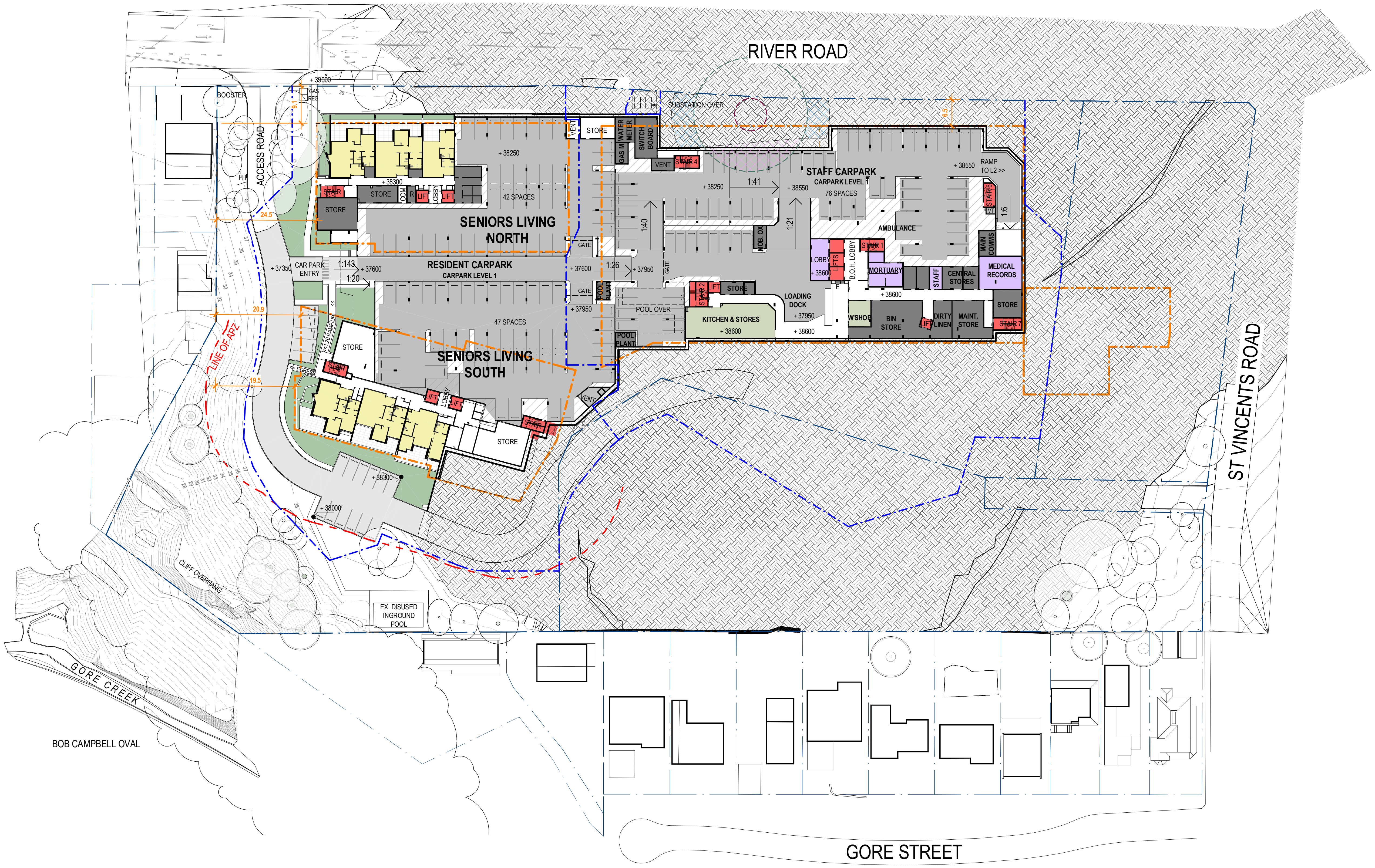
The proposed development controls that relate to soils and groundwater issues are summarised below:

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.

Appendix E: Proposed Development Plans



PRELIMINARY ISSUE

NOT FOR CONSTRUCTION

0m 10m 20m 30m 40m 50m

1 : 500 @ A1

REV	DATE	DETAILS	INITIALS
P19	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P18	2022.03.28	SSD UPDATE	NAH
P17	2022.03.25	ISSUE TO CONSULTANTS	AMac
P16	2022.03.18	ISSUE TO CONSULTANTS	AMac
P15	2022.03.16	SSD UPDATE	NAH
P14	2022.03.11	ISSUE TO CONSULTANTS	AMac
P13	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P19
DATE: 01/11/21

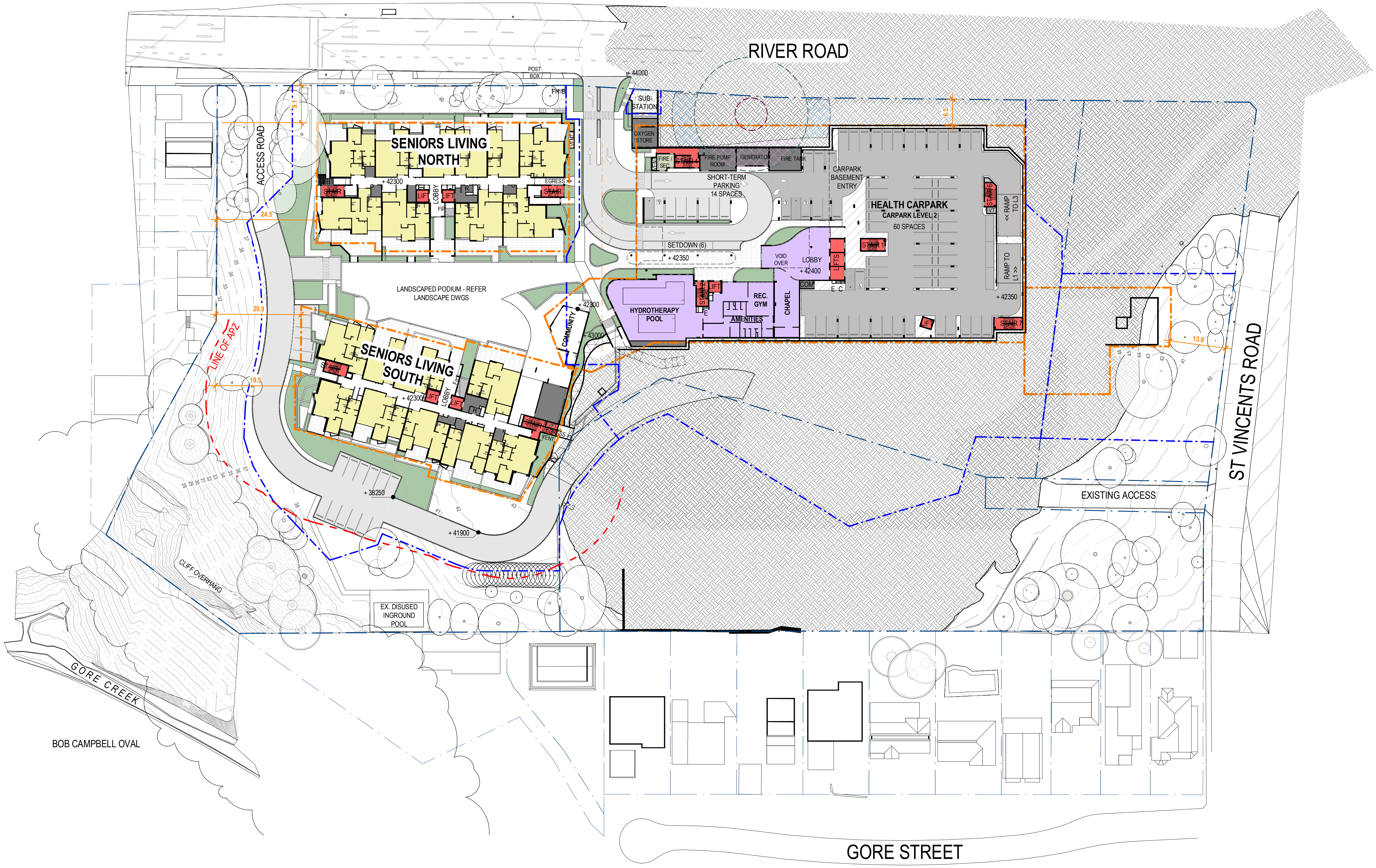
DRAWING No: DD-SW-0200

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 1 (BASEMENT)

DRAWN: NAH CHECKED: SCALE: 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:23:45 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt



PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

0m 10m 20m 30m 40m 50m

1 : 500 @ A1

REV	DATE	DETAILS	INITIALS
P19	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P18	2022.03.28	SSD UPDATE	NAH
P17	2022.03.25	ISSUE TO CONSULTANTS	AMac
P16	2022.03.18	ISSUE TO CONSULTANTS	AMac
P15	2022.03.16	SSD UPDATE	NAH
P14	2022.03.11	ISSUE TO CONSULTANTS	AMac
P13	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P19
DATE: 01/11/21

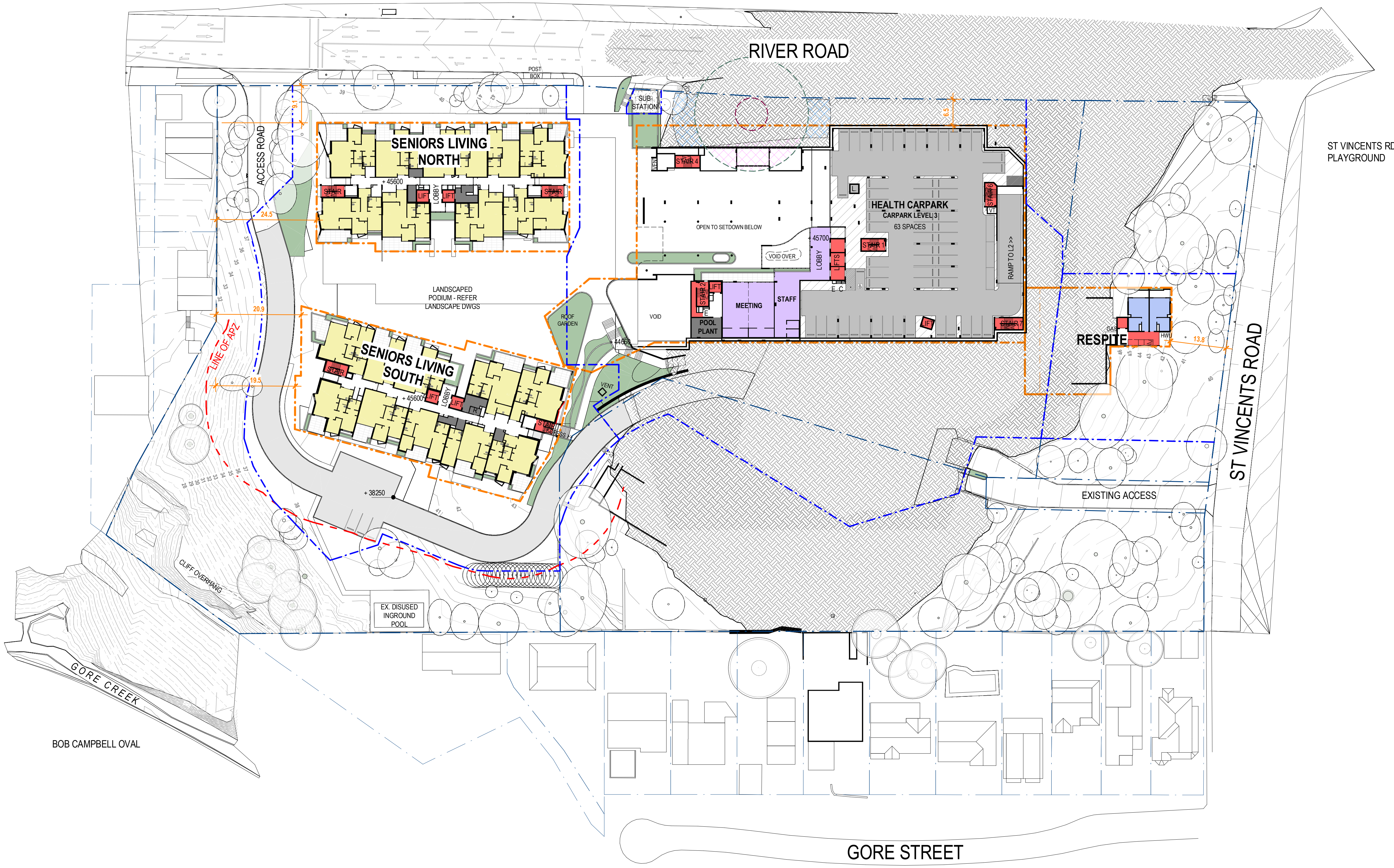
DRAWING No: DD-SW-0201

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 2 (SETDOWN)

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:24:37 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt



1 : 100 @ A1

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DATE	DETAILS	INITIALS
P19	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P18	2022.03.28	SSD UPDATE	NAH
P17	2022.03.25	ISSUE TO CONSULTANTS	AMac
P16	2022.03.18	ISSUE TO CONSULTANTS	AMac
P15	2022.03.16	SSD UPDATE	NAH
P14	2022.03.11	ISSUE TO CONSULTANTS	AMac
P13	2022.03.04	ISSUE TO CONSULTANTS	AMac

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P19
DATE: 11/04/21

DRAWING No: DD-SW-0202

DRAWING TITLE:
SITE LEVEL PLAN - LEVEL 3 (MEZZANINE)

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037)   1/04/2022 5:25:38 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

0m 10m 20m 30m 40m 50m

1 : 500 @ A1

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P18
DATE: 01/11/21

DRAWING No: DD-SW-0203

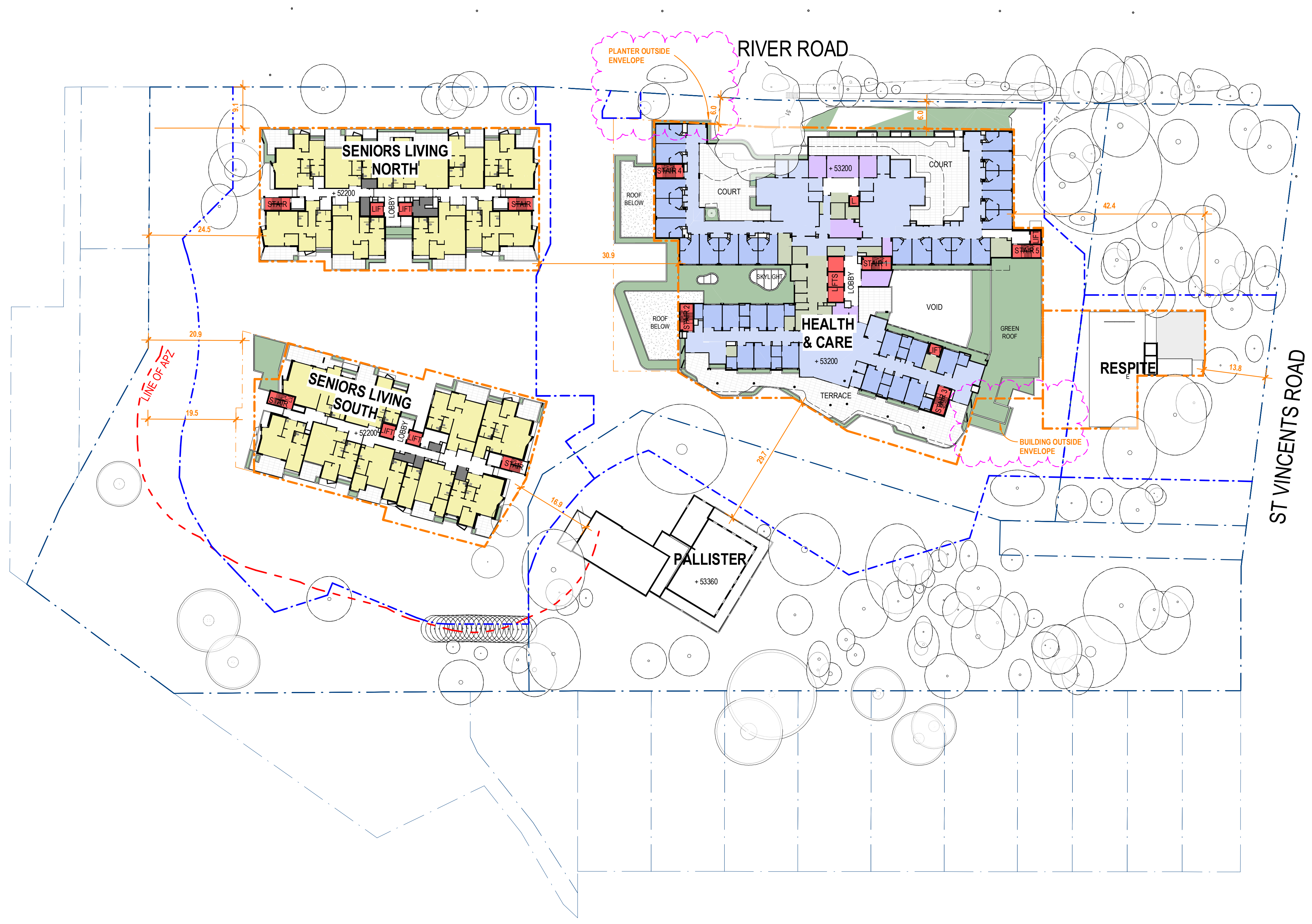
DRAWING TITLE: SITE LEVEL PLAN - LEVEL 4 (PLAZA)

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037)

1/04/2022 5:26:38 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt



PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

0m 10m 20m 30m 40m 50m

1 : 500 @ A1

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

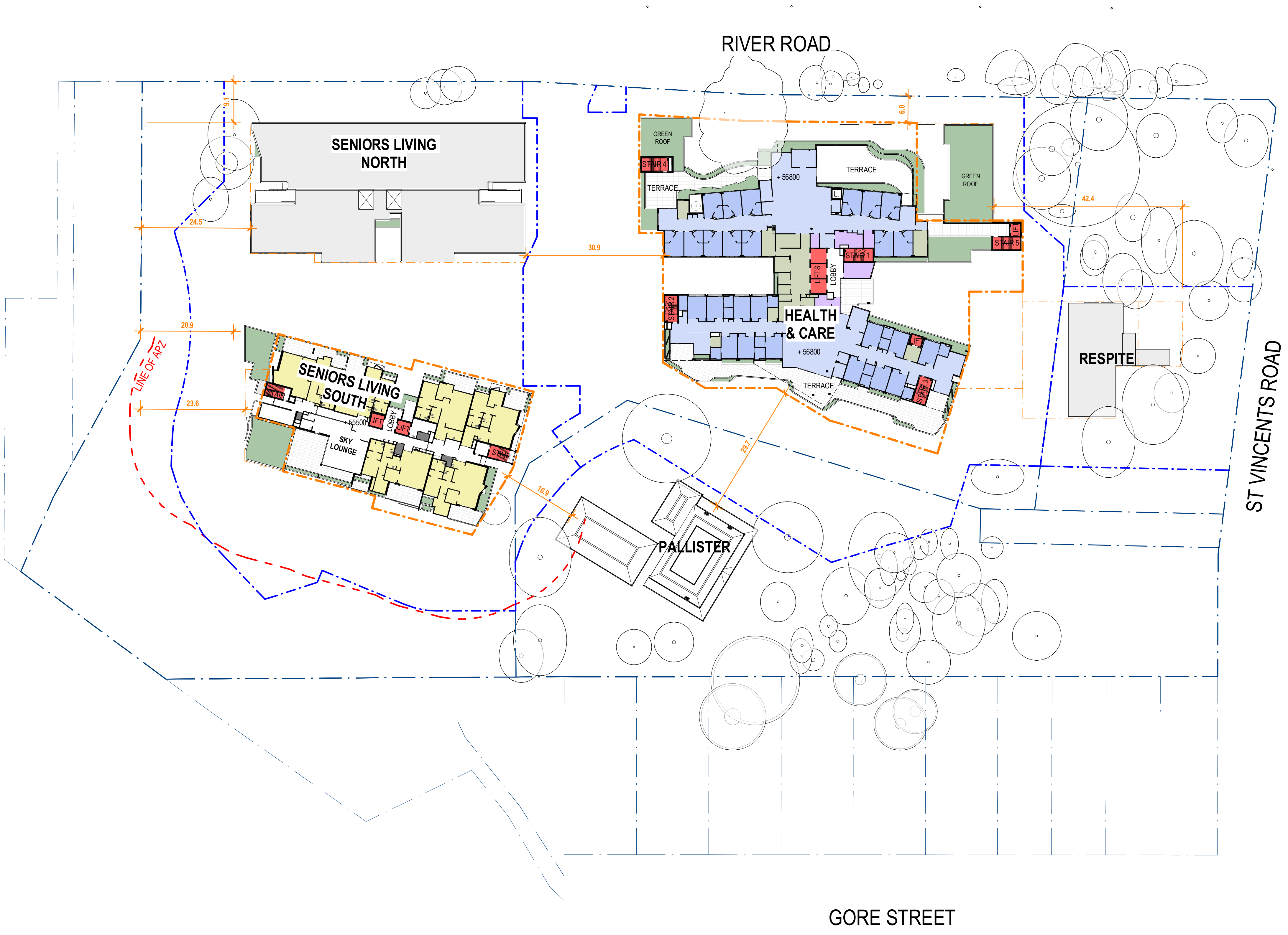
REVISION: P18
DATE: 01/11/21

DRAWING No: **DD-SW-0204**

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 5

DRAWN: NAH CHECKED: SCALE: 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:27:19 PM



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

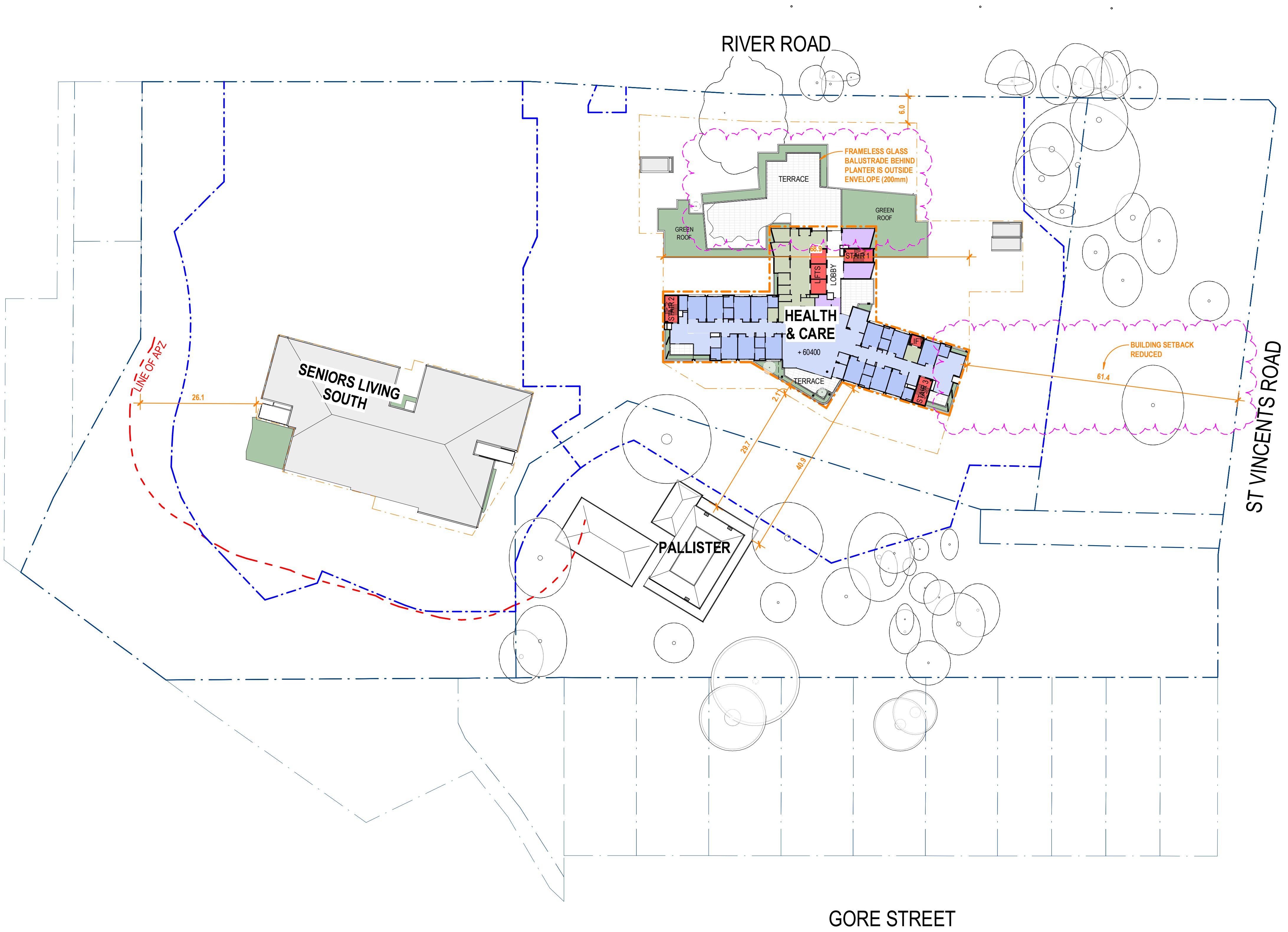
REVISION: P18
DATE: 01/11/21
DRAWING No: DD-SW-0205

DRAWING TITLE:
SITE LEVEL PLAN - LEVEL 6

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037)

1/04/2022 5:28:00 PM



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

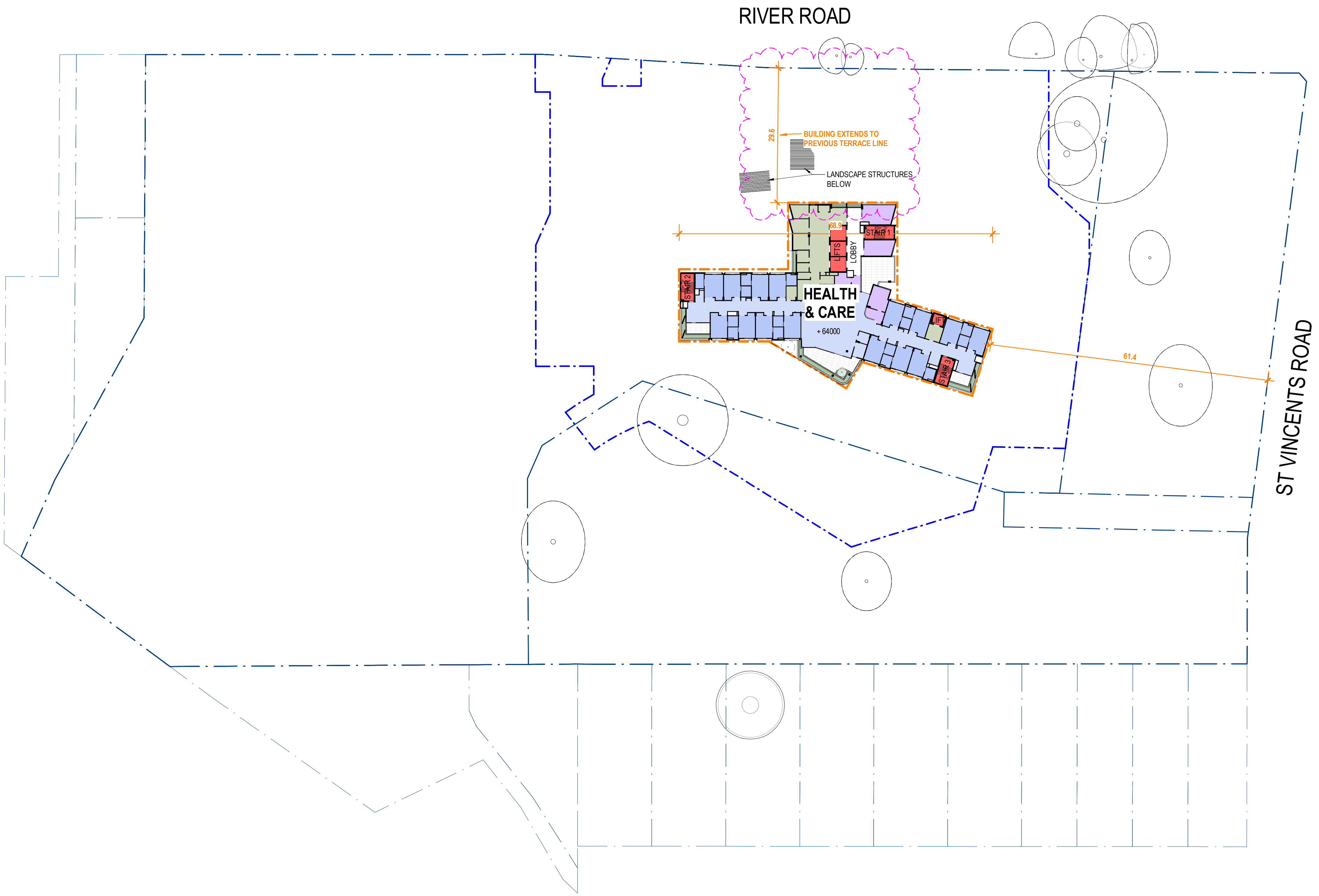
PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REVISION: P18
DATE: 01/11/21
DRAWING No: DD-SW-0206
DRAWING TITLE: SITE LEVEL PLAN - LEVEL 7

DRAWN: NAH CHECKED: SCALE: 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:28:36 PM



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

PRELIMINARY ISSUE

NOT FOR CONSTRUCTION

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P18
DATE: 01/11/21

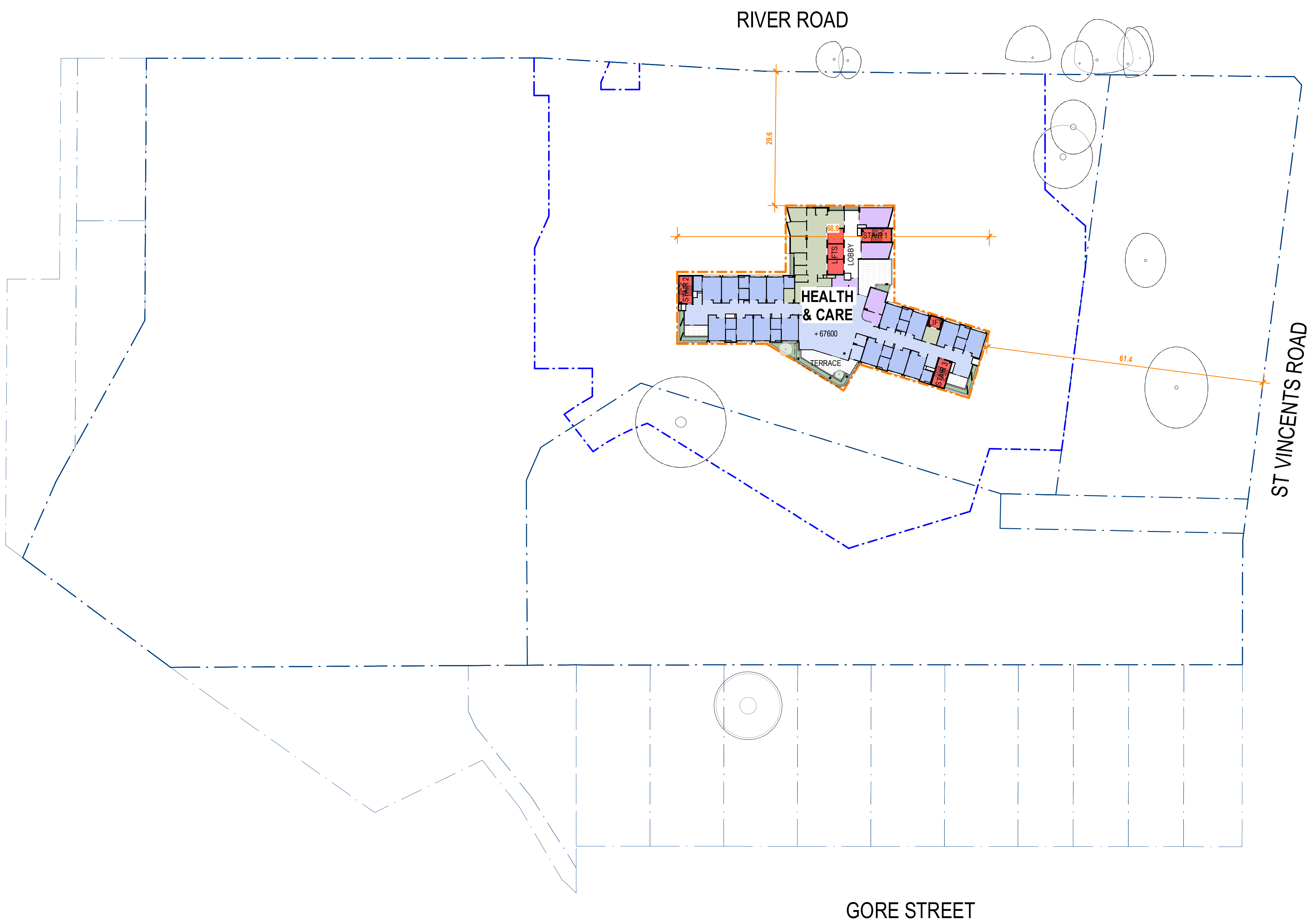
DRAWING No: DD-SW-0207

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 8

DRAWN: NAH CHECKED: SCALE: 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037)

1/04/2022 5:28:57 PM



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

REV	DATE	DETAILS	INITIALS
P18	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P17	2022.03.28	SSD UPDATE	NAH
P16	2022.03.25	ISSUE TO CONSULTANTS	AMac
P15	2022.03.18	ISSUE TO CONSULTANTS	AMac
P14	2022.03.16	SSD UPDATE	NAH
P13	2022.03.11	ISSUE TO CONSULTANTS	AMac
P12	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P18
DATE: 01/11/21

DRAWING No: DD-SW-0208

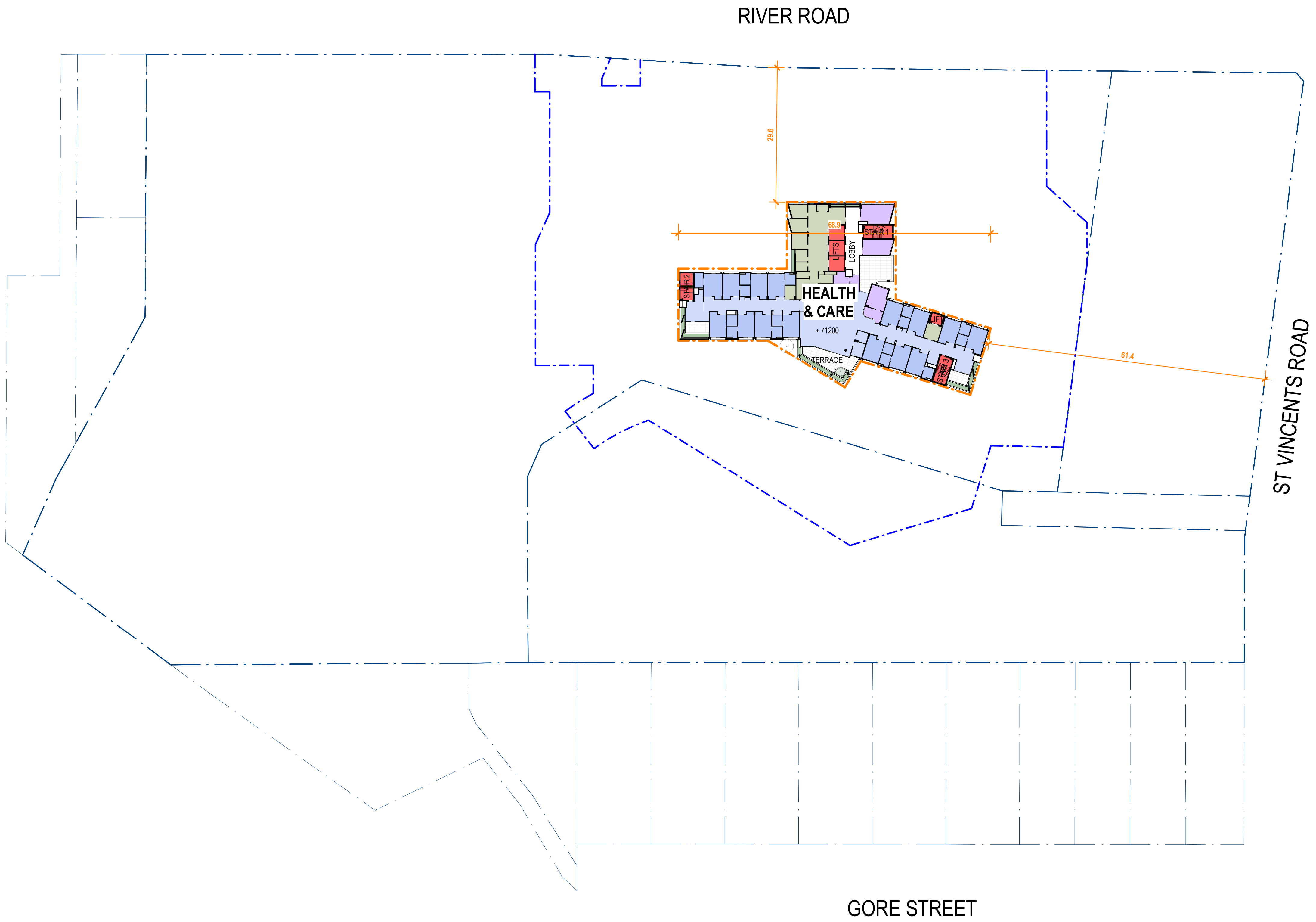
DRAWING TITLE:
SITE LEVEL PLAN - LEVEL 9

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037)

1/04/2022 6:30:20 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

REV	DATE	DETAILS	INITIALS
P16	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P15	2022.03.28	SSD UPDATE	NAH
P14	2022.03.25	ISSUE TO CONSULTANTS	AMac
P13	2022.03.18	ISSUE TO CONSULTANTS	AMac
P12	2022.03.16	SSD UPDATE	NAH
P11	2022.03.11	ISSUE TO CONSULTANTS	AMac
P10	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

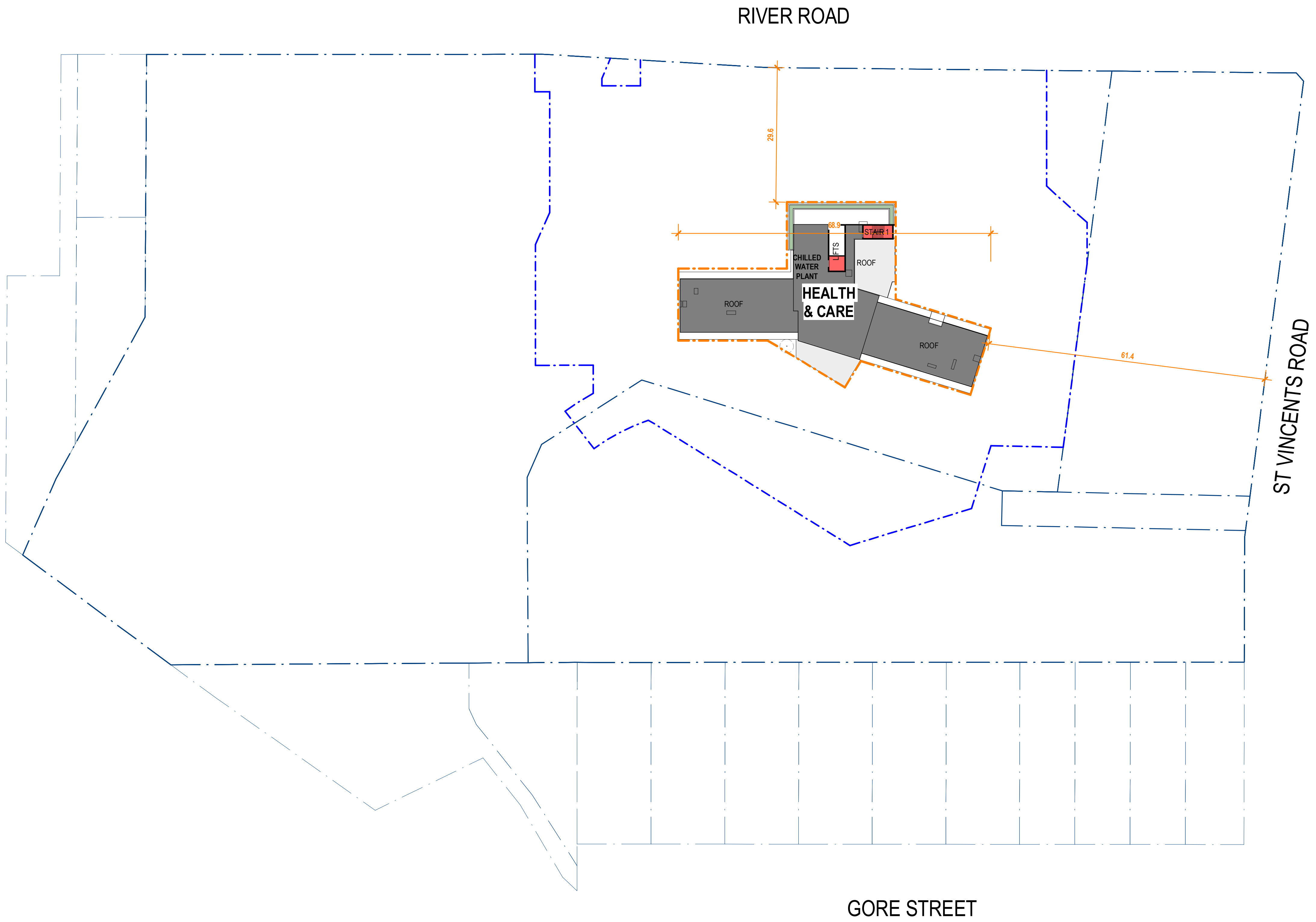
REVISION: P16
DATE: 01/11/21

DRAWING No: DD-SW-0209

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 10

DRAWN: NAH **CHECKED:** **SCALE:** 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:33:14 PM



0m 10m 20m 30m 40m 50m

1 : 500 @ A1

© COPYRIGHT

REV	DATE	DETAILS	INITIALS
P16	2022.04.01	FINAL DRAFT LODGEMENT ISSUE	AMac
P15	2022.03.28	SSD UPDATE	NAH
P14	2022.03.25	ISSUE TO CONSULTANTS	AMac
P13	2022.03.18	ISSUE TO CONSULTANTS	AMac
P12	2022.03.16	SSD UPDATE	NAH
P11	2022.03.11	ISSUE TO CONSULTANTS	AMac
P10	2022.03.04	ISSUE TO CONSULTANTS	AMac

NORTH

SITE PLAN LEGEND

- SITE BOUNDARY
- PLANNING ENVELOPE
- STAGING LINE

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

SYDNEY
(02) 9261 8333
STUDIO 3, LEVEL 3
35 BUCKINGHAM STREET
SURRY HILLS 2010, NSW
www.bickertonmasters.com.au

CLIENT: HammondCare Champion Life

PROJECT: 01605
GREENWICH HOSPITAL REDEVELOPMENT
RIVER RD, GREENWICH

REVISION: P16
DATE: 04/09/21

DRAWING No: DD-SW-0210

DRAWING TITLE: SITE LEVEL PLAN - LEVEL 11

DRAWN: NAH CHECKED: SCALE: 1 : 500 @A1

NSW NOMINATED ARCHITECT: ANDREW MASTERS (9037) 1/04/2022 5:34:06 PM

C:_Revit Projects\SW-AR-GREENWICH_andrewmacNRYHN.rvt

Appendix F: Borehole Logs

JKGeotechnics

BOREHOLE LOG

Borehole No.
101

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~42.1 m
Date: 6/10/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	Field Tests	RL (m AHD)	Depth (m)	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING		42	0	-	ASPHALTIC CONCRETE: 20mm.t	M			APPEARS MODERATELY COMPACTED
					FILL: Silty gravelly sand, fine to medium grained, grey, fine to medium grained, igneous gravel, trace of brick fragments.				SCREEN: 5.2kg 0.02-0.4m NO FCF
	N > 9 9,9/ 100mm REFUSAL	41	1		FILL: Silty sand, fine to medium grained, brown, trace of sandstone gravel, clay nodules, glass, plastic and earthenware fragments.				SCREEN: 6.7kg 0.4-1.4m NO FCF
	N = 11 3,5,6								SCREEN: 1.4-1.7m NO FCF
				-	Extremely Weathered sandstone: silty clayey SAND, fine to medium grained, yellow brown.	XW	(D - VD)		HAWKESBURY SANDSTONE
		40	2		SANDSTONE: fine to medium grained, yellow brown and orange brown.	DW	L - M		LOW TO MODERATE 'TC' BIT RESISTANCE
		39	3						
ON 20/10/21		38	4						
		37	5		REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 7.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.2m TO 7.5m. CASING 0m TO 1.2m. 2mm SAND FILTER PACK 1.0m TO 7.5m. BENTONITE SEAL 0.25m TO 1.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
		36	6						

SAMPLES: ES, U50, DB, DS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
101

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~42.1 m
Date: 6/10/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS – DESCRIPTION: Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness (Specific / General)	Formation
		38			START CORING AT 4.37m					ROCK STRENGTH BASED ON TACTILE ASSESSMENT	
100% RETURN		37	5		SANDSTONE: medium grained, yellow brown and orange brown, bedded at 0-25°.	HW - MW	(L - M)			(4.95m) Be, 0°, P, R, Fe Ct	Hawkesbury Sandstone
		36	6		SANDSTONE: fine to medium grained, light grey.	FR	(M - H)			(5.77m) CS, 0°, 5 mm.t	
		35	7								
		34, 33, 32	8, 9, 10		END OF BOREHOLE AT 7.50 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
102

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~37.7 m
Date: 6/10/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	Samples (ES / U50 / DB / DS)	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				0			ASPHALTIC CONCRETE: 50mm.t				
						-	FILL: Silty gravely sand, fine to medium grained, brown, fine to medium grained igneous gravel, trace of concrete fragments and slag.	M			APPEARS POORLY TO MODERATELY COMPACTED
		N = 7 2,4,3	37				FILL: Silty clay, low to medium plasticity, grey and brown, trace of igneous, ironstone and siltstone gravel, and slag.	w<PL			SCREEN: 7.60kg 0.05-0.5m NO FCF
				1							SCREEN: 9.5kg 0.5-1.2m NO FCF
						-	SANDSTONE: fine to medium grained, orange brown.	DW	(L - M)		HAWKESBURY SANDSTONE LOW TO MODERATE 'TC' BIT RESISTANCE
			36								
				2			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 6.1m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.2m TO 6.1m. CASING 0m TO 1.2m. 2mm SAND FILTER PACK 1.0m TO 6.1m. BENTONITE SEAL 0.25m TO 1.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
			35								
				3							
			34								
				4							
			33								
				5							
			32								
				6							
			31								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
102

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 | **Core Size:** NMLC | **R.L. Surface:** ~37.7 m
Date: 6/10/21 | **Inclination:** VERTICAL | **Datum:** AHD
Plant Type: JK205 | **Bearing:** N/A | **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ (VL-0.1, L-0.3, M-1, H-3, VH-10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS DESCRIPTION: Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness — Specific / General	Formation
		36	2		START CORING AT 2.05m					ROCK STRENGTH BASED ON TACTILE ASSESSMENT	
100% RETURN; ON COMPLETION 20/10/21		35, 34	3, 4		SANDSTONE: medium grained, light grey and yellow brown, bedded at 0-20°.	MW	(L - M)				Hawkesbury Sandstone
		33, 32	5, 6		SANDSTONE: fine to medium grained, light grey, trace of dark grey laminae, bedded at 0-30°.	FR	(M)			(4.58m) Be, 10°, P, R, Cn (5.27m) CS, 0 - 10°, 75 mm.t	Hawkesbury Sandstone
		31, 30	7		END OF BOREHOLE AT 6.12 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **103**

1/1

PFASDUP5: 0.03-0.4m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** SPIRAL AUGER **R.L. Surface:** ≈ 38.8m

Date: 6/10/2021 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION			0		-	ASPHALTIC CONCRETE: 30mm.t				
						FILL: Silty gravelly sand, fine to medium grained, brown, fine to medium grained, sub-angular, igneous gravel, trace of ironstone gravel, ceramic fragments and concrete.	M			SCREEN: 7.4kg 0.03-0.05m NO FCF
		N = 16 3,3,13			CL-CI	Sandy CLAY: low to medium plasticity, orange brown, fine to medium grained, trace of ironstone gravel.	w<PL			
			1		CI-CH	Silty CLAY: medium to high plasticity, grey and brown, trace of ironstone gravel.				
					CL-CI	Sandy CLAY: low to medium plasticity, grey and brown, fine to medium grained, trace of ironstone gravel.				HYDROCARBON ODOUR
						END OF BOREHOLE AT 1.5m				REFUSAL ON INFERRED BEDROCK
			2							
			3							
			4							
			5							
			6							
			7							

JKGeotechnics

BOREHOLE LOG

Borehole No.
104

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~41.6 m
Date: 1/10/21 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES ES / U50 / DB / DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				0		-	ASPHALTIC CONCRETE: 40mm.t				
							FILL: Sandy gravel, fine to medium grained, dark grey, fine to medium grained, sub-angular, igneous gravel, trace of ironstone and sandstone gravel, and slag.	M			APPEARS POORLY TO MODERATELY COMPACTED SCREEN: 4.45kg 0.04-0.3m NO FCF
		N = 9 2,5,4	41				FILL: Silty gravelly sand, fine to medium grained, yellow brown, fine to medium grained sandstone gravel, trace of metal and glass fragments, slag and ash.				SCREEN: 4.7kg 0.3-1.3m NO FCF
			40	1							SCREEN: 4.8kg 1.3-2.3m NO FCF
		N = 10 3,3,7	39	2							SCREEN: 5.45kg 2.3-3.2m NO FCF
		N > 10 4,6,4/ 100mm REFUSAL		3			FILL: Silty sand, fine to medium grained, brown, trace of igneous, sandstone and siltstone gravel, glass fragments and ash.				
			38				REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 5.97m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.2m TO 5.97m. CASING 0m TO 1.2m. 2mm SAND FILTER PACK 1.0m TO 5.97m. BENTONITE SEAL 0.25m TO 1.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
			37	4							
			36	5							
			35	6							

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~41.6 m
Date: 1/10/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	DEFECT DETAILS – DESCRIPTION: Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness (Specific / General)	Formation
				START CORING AT 3.40m			ROCK STRENGTH BASED ON TACTILE ASSESSMENT	
		38	4	NO CORE 0.74m				
100% RETURN		37		Extremely weathered sandstone: sandy silty CLAY, low to medium plasticity, light grey mottled orange brown.	XW	(Hd)		Hawkesbury Sandstone
			5	SANDSTONE: medium grained, light grey and orange brown, bedded at 0-20°.	MW	(L - M)	(4.45m) J, 40 - 90°, C, R, Fe Sn (4.58m) Be, 20°, P, R, Fe Sn (4.95m) CS, 5°, 50 mm.t (5.77m) Cr, 0 - 5°, 10 mm.t (5.82m) Be, 5°, C, R, Fe Ct	
		36	6	END OF BOREHOLE AT 5.97 m				
		35	7					
		34	8					
		33	9					
		32						

POINT LOAD STRENGTH INDEX $I_s(50)$: VL -0.1, L -0.3, M -1, H -3, VH -10, EH

SPACING (mm): 600, 200, 60, 20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
105
1 / 2

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~44.8 m
Date: 27/9/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	Field Tests	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING		-	ASPHALTIC CONCRETE: 25mm.t.	M			SCREEN: 5.25kg 0.25-0.4m NO FCF
			FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous gravel.				APPEARS POORLY COMPACTED
	N = 8 4,4,4		FILL: Clayey silty sand, fine to medium grained, dark grey, with fine to coarse grained ironstone and igneous gravel, trace of slag.				
		CL	Sandy CLAY: low plasticity, grey and brown, trace of fine to coarse grained ironstone gravel.	w>PL	(St)		RESIDUAL
	N > 14 18,14/ 100mm REFUSAL		Extremely Weathered sandstone: Sandy CLAY, low plasticity, orange brown and red brown, with occasional low strength sandstone bands and clay bands.	XW	(Hd)		HAWKESBURY SANDSTONE VERY LOW 'TC' BIT RESISTANCE WITH LOW RESISTANCE BANDS
			SANDSTONE: fine to medium grained, red brown.	MW	L		
			REFER TO CORED BOREHOLE LOG				Groundwater monitoring well installed to 7.86m. Class 18 machine slotted 50mm dia. PVC standpipe 0.86m to 7.86m. Casing 0.1m to 0.86m. 2mm sand filter pack 1.6m to 7.86m. Bentonite seal 0.8m to 1.6m. Backfilled with sand to the surface. Completed with a concreted gatic cover. JKE SAMPLES WERE COLLECTED FROM THE CORED SAMPLES AT THE FOLLOWING DEPTHS: 3.9-4.0m 4.9-5.0m 5.9-6.0m 6.9-7.0m 7.7-7.83m

RL (m AHD): 44, 43, 42, 41, 40, 39, 38
Depth (m): 1, 2, 3, 4, 5, 6

SAMPLES: ES, U50, DB, DS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
105

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~44.8 m
Date: 27/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ (VL-0.1, L-0.3, M-1, H-3, VH-10, EH)	DEFECT DETAILS SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
					START CORING AT 3.13m						
80% RETURN; ON 20/10/21; ON 22/10/21; 60% RETURN		41, 40, 39, 38, 37	4, 5, 6, 7		SANDSTONE: medium grained, red brown, orange brown and light grey, bedded at 0-30°.	MW	M (to ~6.0m); M - H	0.60, 0.50, 0.90, 0.70, 0.60, 0.90, 1.1, 1.4, 0.70, 0.70, 1.6		(3.21m) Be, 25°, P, R, Fe Sn (4.38m) Be, 30°, P, R, Fe Sn (4.57m) Be, 10°, P, R, Fe Sn (4.62m) Be, 0°, C, R, Fe Sn (4.65m) Be, 0°, P, R, Clay Ct (4.95m) Be, 0°, P, R, Fe Sn (5.15m) Be, 0°, P, R, Fe Sn (5.25m) J, 25°, P, R, Cn (5.53m) Be, 20°, C, R, Fe Sn (5.58m) Be, 20°, P, R, Fe Sn (5.70m) Be, 20°, P, R, Fe Sn (5.86m) Be, 0°, P, R, Fe Sn (5.91m) Be, 0°, P, R, Fe Sn (6.35m) Bex2, 0°, P, R, Fe Ct (6.70m) Be, 0°, P, R, Fe Ct (7.46m) Be, 0°, P, R, Clay Ct (7.60m) CS, 0°, 12 mm.t (7.65m) XWS, 0°, 25 mm.t	Hawkesbury Sandstone
		36, 35	8, 9		END OF BOREHOLE AT 7.83 m						

JK 9.02.4 LIB.GLB Log JK CORED BOREHOLE - MASTER 32507R2 GREENWICH.GPJ <<DrawingFile>> 21/01/2022 12:46 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~49.1 m
Date: 28/9/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES (ES, U50, DB, DS)	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING			49			-	ASPHALTIC CONCRETE: 30mm.t	M			SCREEN: 3.8kg 0.03-0.3m NO FCF
							FILL: Clayey gravelly sand, fine to medium grained, grey, medium to coarse grained igneous gravel.				
		N > 10 10,10/ 50mm REFUSAL				CL	Silty CLAY: low plasticity, light grey with fine to medium grained sand and medium to coarse grained ironstone gravel.	w~PL	VSt - Hd	440 470 300	RESIDUAL
			48	1			Extremely Weathered sandstone: sandy CLAY, low to medium plasticity, fine to medium grained sand, light grey and red brown.	XW	(Hd)		HAWKESBURY SANDSTONE
							SANDSTONE: fine to medium grained, light grey and orange brown with occasional clay nodules.	MW	H		LOW 'TC' BIT RESISTANCE WITH VERY LOW BANDS
			47	2			REFER TO CORED BOREHOLE LOG				Groundwater monitoring well installed to 12.52m. Class 18 machine slotted 50mm dia. PVC standpipe 1.52m to 12.52m. Casing 0.11m to 1.52m. 2mm sand filter pack 1.2m to 12.52m. Bentonite seal 0.4m to 1.2m. Backfilled with sand to the surface. Completed with a concreted gatic cover.
			46	3							JKE SAMPLES WERE COLLECTED FROM THE CORED SAMPLES AT THE FOLLOWING DEPTHS: 1.4-1.5m 1.9-2.0m 2.4-2.5m 2.9-3.0m 3.9-4.0m 4.9-5.0m 5.9-6.0m 6.9-7.0m 7.9-8.0m 8.9-9.0m 9.9-10.0m 10.9-11.0m 11.9-12.0m 12.45-12.55m
			45	4							
			44	5							
			43	6							

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 | **Core Size:** NMLC | **R.L. Surface:** ~49.1 m
Date: 28/9/21 | **Inclination:** VERTICAL | **Datum:** AHD
Plant Type: JK205 | **Bearing:** N/A | **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ VL -0.1, L -0.3, M -1, H -3, VH -10, EH	SPACING (mm) 600 200 60 20	DEFECT DETAILS – DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		48			START CORING AT 1.24m						
100% RETURN		47	2		SANDSTONE: medium grained, light grey with grey laminations, and orange brown bands, bedded at 0-25°.	MW	H	1.4 1.6 1.6 1.7 1.8 1.9 1.6 1.5	600 200 60 20	(1.43m) Be, 10°, P, R, Cn (2.04m) Be, 25°, P, R, Fe Sn (3.03m) Bex2, P, R, Fe Sn (3.38m) Be, 15°, C, R, Fe Sn (4.37m) Be, 0°, P, R, Fe Sn (4.87m) Be, 20°, P, R, Clay Ct	Hawkesbury Sandstone
		46	3								
		45	4								
		44	5		SANDSTONE: medium grained, light grey with orange brown bands, bedded at 0-25°.	SW	M - H	1.0 1.0 1.0		(5.18m) Be, 25°, P, R, Fe Sn (5.43m) CS, 0°, 20 mm.t (6.28m) Be, 25°, P, R, Clay Ct (6.40m) CS, 20°, 20 mm.t	
		43	6								
					SANDSTONE: medium grained, light grey with grey and dark grey laminations, and red brown bands, bedded at 0-25°.	FR	M	0.90			
		42	7		SANDSTONE: medium grained, light grey with grey and dark grey laminations, and occasional red brown bands, bedded at 0-25°.			0.70 0.90	600 200 60 20	(7.11m) Be, 25°, P, R, Fe Sn (7.20m) Be, 25°, P, R, Fe Sn (7.30m) XWS, 0°, 40 mm.t (7.35m) CS, 0°, 5 mm.t	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~49.1 m
Date: 28/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

Water Loss\Level	Depth (m)	RL (m AHD)	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	Point Load Strength Index $I_s(50)$	Formation
ON 20/10/21; ON 22/10/21; 100% RETURN	to ~10.1		SANDSTONE: medium grained, light grey with grey and dark grey laminations, and occasional red brown bands, bedded at 0-25°. *(continued)*	FR	M	0.60, 0.70, 0.90, 0.80	Hawkesbury Sandstone
	~10.1 – ~11.1		as above, but brown and red brown banded.	MW (to ~11.0), FR	H	1.3, 1.4, 1.5	
	~11.1 – 12.55		as above, but light grey, with grey and dark grey laminations.	FR	H	1.1, 1.8, 1.4	
	12.55		END OF BOREHOLE AT 12.55 m				

Depth scale: 9, 10, 11, 12, 13, 14 m; RL scale: 41, 40, 39, 38, 37, 36, 35 m AHD.

DEFECT DETAILS (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)

- (8.05m) Be, 0°, P, R, Cn
- (8.52m) Be, 0°, P, R, Fe Sn
- (8.63m) CS, 0°, 35 mm.t
- (8.82m) CS, 10°, 5 mm.t
- (9.47m) Be, 20°, P, R, Fe Sn
- (9.90m) Be, 10°, P, R, Cb Ct
- (10.12m) Cr, 0°, 50 mm.t
- (10.19m) Be, 20°, P, R, Fe Ct
- (11.54m) CS, 15°, 3 mm.t
- (11.60m) Be, 20°, P, R, Clay Ct

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
107

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~51.6 m
Date: 27/9/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	Field Tests	RL (m AHD)	Depth (m)	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING			0		FILL: Silty clay, low plasticity, dark brown, trace of fine to coarse grained igneous, ironstone and sandstone gravel, fine grained sand, roots and root fibres.	w~PL			TOP 100mm ROOT AFFECTED SCREEN: 11.05kg 0-0.2m NO FCF
	N = 3 2,1,2	51		SM	FILL: Sandy clay, low plasticity, grey and brown, fine grained sand, medium to coarse grained ironstone gravel.	M			SCREEN: 4.55kg 0.2-0.4m NO FCF
			1	CI	Silty SAND: fine to medium grained, light grey brown mottled orange brown, with clay fines and clay nodules.	w>PL			RESIDUAL
		50		-	Silty CLAY: medium plasticity, orange brown, red brown and grey, with fine to medium grained sand.	MW	M		HAWKESBURY SANDSTONE
					SANDSTONE: fine to medium grained, light grey and orange brown, with occasional clay seams.				LOW 'TC' BIT RESISTANCE
			2		REFER TO CORED BOREHOLE LOG				Groundwater monitoring well installed to 14.93m. Class 18 machine slotted 50mm dia. PVC standpipe 1.93m to 14.93m. Casing 0.05m to 1.93m. 2mm sand filter pack 1.5m to 14.93m. Bentonite seal 0.3m to 1.5m. Backfilled with sand to the surface. Completed with a concreted gatic cover.
		49							
			3						JKE SAMPLES WERE COLLECTED FROM THE CORED SAMPLES AT THE FOLLOWING DEPTHS: 1.9-2.0m, 2.4-2.5m, 2.75-2.85m, 3.9-4.0m, 4.9-5.0m, 5.9-6.0m, 6.9-7.0m, 7.9-8.0m, 8.9-9.0m, 9.9-10.0m, 10.9-11.0m, 11.9-12.0m, 12.9-13.0m, 13.9-14.0m, 14.9-15.0m
		48	4						
		47	5						
		46	6						
		45							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
107

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~51.6 m
Date: 27/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness (Specific / General)	Formation
		50			START CORING AT 1.80m					
30% RETURN		49	2		SANDSTONE: fine to medium grained, light grey, red brown and orange brown, bedded at 0-20°.	MW	M / H	0.40 0.60 1.1	(2.21m) Be, 10°, P, R, Clay Ct (2.43m) XWS, 5°, 30 mm.t (2.56m) CS, 0 - 5°, 145 mm.t (2.85m) CS, 5°, 30 mm.t	Hawkesbury Sandstone
			3		NO CORE 0.13m					
30% RETURN / 90% RETURN		48 47 46	3 4 5 6		SANDSTONE: medium to coarse grained, light grey and orange brown, bedded at 0-25°.	MW / SW	H	2.0 1.5 1.8 2.0 1.9 1.9 1.3	(3.16m) Be, 5°, P, R, Fe Sn (4.05m) Be, 25°, P, R, Fe Sn (4.30m) Be, 15°, P, R, Fe Sn (4.94m) Bex2, 20°, P, R, Cn (5.06m) Be, 20°, P, R, Fe Sn (5.27m) Be, 0°, P, R, Fe Sn (5.78m) Be, 15°, P, R, Clay Vn (6.18m) Be, 20°, P, R, Cn (6.28m) Be, 20°, P, R, Cn	Hawkesbury Sandstone
90% RETURN		45	7		SANDSTONE: medium grained, light grey with grey laminations, bedded at 0-25°.	FR		1.7	(6.72m) Be, 20°, P, R, Fe Sn	
		44			SANDSTONE: medium grained, light grey with grey laminations, bedded at 0-25°.			1.8 1.2	(7.22m) Be, 20°, P, R, Fe Sn (7.75m) CS, 0 - 20°, 60 mm.t	

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2	**Core Size:** NMLC	**R.L. Surface:** ~51.6 m
Date: 27/9/21	**Inclination:** VERTICAL	**Datum:** AHD
Plant Type: JK205	**Bearing:** N/A	**Logged/Checked By:** J.L./P.R.

Water Loss\Level	RL (m AHD)	Depth (m)	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS – DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
	43		SANDSTONE: medium grained, light grey with grey laminations, bedded at 0-25°. *(continued)*	FR	H	1.5, 1.2		Hawkesbury Sandstone
		9	SANDSTONE: medium grained, light grey, with grey laminations and trace of carbonaceous lenses, bedded at 0-25°.			0.30, 1.7, 1.2, 1.7, 1.1	(8.71m) CS, 10°, 25 mm.t (9.00m) Be, 0°, P, R, Cb Vn (10.31m) Be, 25°, C, R, Cb Sn (10.40m) Be, 0°, P, R, Cb Sn (10.72m) Be, 10°, P, R, Cn	
ON 22/10/21 ON 20/10/21	42	10						
	41		Extremely Weathered siltstone band:	XW				
		11	NO CORE 0.22m					
90% RETURN			Extremely Weathered siltstone band.	XW				
	40		SANDSTONE: medium grained, light grey and orange brown, bedded at 0-25°.	FR MW	H	1.3, 1.7, 1.5, 1.8	(11.27m) Be, 10°, P, R, Cb Vn (11.31m) Be, 0°, P, R, Fe FILLED (11.33m) Be, 0°, P, R, Fe Ct (11.65m) Be, 0°, C, R, Fe Sn (12.15m) CS, 10°, 10 mm.t	Hawkesbury Sandstone
	39	12						
		13		FR		1.9		
	38		SANDSTONE: medium grained, light grey, with grey lamination, bedded at 0-25°.			1.4, 1.5, 1.7	(13.47m) Be, 25°, P, R, Cn (13.71m) Be, 15°, P, R, Clay FILLED (14.28m) Be, 0°, P, R, Clay Ct (14.78m) Be, 10°, C, R, Cb Vn	
	37	14						

END OF BOREHOLE AT 15.00 m

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No.
108

SDUP7: 0-0.1m

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~50.5 m
Date: 30/9/21 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES (ES, U50, DB, DS)	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING							FILL: Sandy silty clay, low plasticity, orange brown, fine grained sand, trace of fine to medium grained ironstone gravel.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
		N=SPT 10/ 50mm REFUSAL	50			-	SANDSTONE: fine to medium grained, light grey and red brown, with high strength iron indurated bands.	DW	L		HAWKESBURY SANDSTONE
				1					L - M		LOW 'TC' BIT RESISTANCE
			49				REFER TO CORED BOREHOLE LOG				JKE SAMPLES WERE COLLECTED FROM THE CORED SAMPLES AT THE FOLLOWING DEPTHS: 1.9-2.0m 2.4-2.5m 2.9-3.0m 3.9-4.0m 4.9-5.0m 5.9-6.0m 6.9-7.0m 7.9-8.0m 8.9-9.0m 9.9-10.0m 10.9-11.0m 11.9-12.0m 12.9-13.0m 13.85-13.95m
			48	2							
			47	3							
			46	4							
			45	5							
			44	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 108

SDUP7: 0-0.1m

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~50.5 m
Date: 30/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ VL -0.1, L -0.3, M -1, H -3, VH -10, EH	SPACING (mm) 600, 200, 60, 20	DEFECT DETAILS – DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 1.49m						
100% RETURN		49			SANDSTONE: fine to medium grained, red brown orange brown and light grey, bedded at 0-25°.	MW	H	1.8		(1.58m) Be, 5°, P, R, Fe Sn	Hawkesbury Sandstone
										(1.81m) Be, 25°, P, R, Fe Sn	
			2					1.1			
		48								(2.35m) Be, 0°, P, R, Fe Sn	
								1.0			
			3							(3.05m) Bex2, P, R, Fe Sn	
								1.1			
		47						1.7			
			4					1.6			
		46									
					SANDSTONE: medium to coarse grained, light grey, with grey laminations, bedded at 0-25°.	SW	M - H	0.70		(4.77m) Be, 20°, P, R, Fe Sn	
			5					1.5			
		45						1.1			
			6							(6.07m) Be, 10°, P, R, Fe Sn	
						FR		0.90			
		44								(6.56m) Be, 0°, P, R, Cn	
								1.0			
			7				H			(7.07m) CS, 0°, 5 mm.t	
										(7.25m) Be, 20°, P, R, Clay Ct	
								1.4			
		43						1.3			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. **108**

SDUP7: 0-0.1m

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~50.5 m
Date: 30/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$	DEFECT SPACING (mm)	DEFECT DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
100% RETURN		42, 41, 40, 39, 38, 37	9, 10, 11, 12, 13		SANDSTONE: medium to coarse grained, light grey, with grey laminations, bedded at 0-25°. *(continued)*	FR	H	2.0, 1.3, 1.1, 1.3, 1.4, 1.5, 2.4, 1.9, 1.5, 1.7, 1.4, 1.7		(8.67m) Bex2, P, R, Clay Ct (10.21m) CS, 10°, 10 mm.t (11.50m) Be, 20°, P, Cb Vn	Hawkesbury Sandstone
		36	14		END OF BOREHOLE AT 13.95 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~49.1 m
Date: 30/9/21 **Datum:** AHD
Plant Type: JK205 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES (ES, U50, DB, DS)	Field Tests	RL (m AHD)	Depth (m)	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING			49			ASPHALTIC CONCRETE: 100mm.t				
					-	FILL: Clayey gravelly sand, fine to medium grained, dark grey and brown, fine to coarse grained igneous gravel, with clay nodules.	M			SCREEN: 4.7kg 0.1-0.4m NO FCF
		N = 28 14,16,12				FILL: Sandy clay, low plasticity, grey brown and orange brown, with medium to coarse grained ironstone sandstone and igneous gravel, trace of slag.	w<PL		280 140 180	APPEARS MODERATELY COMPACTED
			48	1	CL	Sandy CLAY: low plasticity, orange brown, fine to medium grained sand, trace of fine to medium grained sandstone.	w~PL	VSt - Hd	560 500 340	SCREEN: 7.4kg 0.4-0.8m NO FCF
					-	SANDSTONE: fine to medium grained, light grey and orange brown.	MW	M - H		RESIDUAL
						REFER TO CORED BOREHOLE LOG				HAWKESBURY SANDSTONE
										LOW TO MODERATE 'TC' BIT RESISTANCE
			47	2						Groundwater monitoring well installed to 12.54m. Class 18 machine slotted 50mm dia. PVC standpipe 1.54m to 12.54m. Casing 0.1m to 1.54m. 2mm sand filter pack 1.4m to 12.54m. Bentonite seal 0.3m to 1.4m. Backfilled with sand to the surface. Completed with a concreted gatic cover.
			46	3						JKE SAMPLES WERE COLLECTED FROM THE CORED SAMPLES AT THE FOLLOWING DEPTHS: 1.42-1.5m 1.9-2.0m 2.4-2.5m 2.9-3.0m 3.9-4.0m 4.9-5.0m 5.9-6.0m 6.9-7.0m 7.9-8.0m 8.9-9.0m 9.9-10.0m 10.96-11.0m 11.35-11.45m 11.9-12.0m 12.45-12.56m
			45	4						
			44	5						
			43	6						

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
109

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2	**Core Size:** NMLC	**R.L. Surface:** ~49.1 m
Date: 30/9/21	**Inclination:** VERTICAL	**Datum:** AHD
Plant Type: JK205	**Bearing:** N/A	**Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS – DESCRIPTION: Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness (Specific / General)	Formation
		48			START CORING AT 1.42m						
100% RETURN		47	2		SANDSTONE: fine to medium grained, light grey with red brown bands, bedded at 0-25°. JKE sample 1.42-1.5m	MW	M - H	1.2, 1.7, 0.80		(2.15m) Cr, 20 mm.t; (2.25m) Be, P, R, Fe Sn	Hawkesbury Sandstone
		46, 45, 44, 43, 42	3, 4, 5, 6, 7		SANDSTONE: medium grained, light grey with grey lamination, and orange brown bands, bedded at 0-25°.	SW		0.90, 0.80, 0.80, 0.70, 1.1, 0.80, 1.5, 1.1, 0.70, 0.80		(3.04m) Be, P, R, Fe Sn; (3.24m) XWS, 15 mm.t; (3.53m) J, P, R, Clay FILLED; (4.66m) CS, 35 mm.t; (4.80m) CS, 150 mm.t; (5.31m) Be, P, R, Cb Ct; (5.40m) Be, P, R, Clay Ct; (6.14m) CS, 15 mm.t; (6.29m) CS, 5 mm.t; (6.46m) Cr, 20 mm.t; (6.86m) CS, 5 mm.t; (7.83m) Be, P, R, Cb Ct; (7.91m) CS, 3 mm.t	
ON 22/10/21											

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JK 9.02.4 LIB.GLB Log JK CORED BOREHOLE - MASTER 32507R2 GREENWICH.GPJ <<DrawingFile>> 21/01/2022 12:47 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
109

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 | **Core Size:** NMLC | **R.L. Surface:** ~49.1 m
Date: 30/9/21 | **Inclination:** VERTICAL | **Datum:** AHD
Plant Type: JK205 | **Bearing:** N/A | **Logged/Checked By:** J.L./P.R.

Water Loss\Level	RL (m AHD)	Depth (m)	Core Description (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	Point Load Strength Index $I_s(50)$	Defect Details – Description (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) – Specific	Formation
ON 20/10/21; 100% RETURN	41 – 38.1	8.54 – 11.0	SANDSTONE: medium grained, light grey with grey lamination, and orange brown bands, bedded at 0-25°.	SW	M - H	1.0, 1.3, 1.2, 0.60, 1.5, 1.1	(8.27m) Be, 15°, P, R, Cb Ct; (8.88m) Be, 25°, P, R, Fe Sn; (9.37m) Be, 25°, P, R, Cb Ct; (9.57m) XWS, 15°, 15 mm.t; (9.85m) CS, 10°, 20 mm.t; (10.76m) Be, 0°, P, R, Clay Ct; (10.96m) Be, 0 - 20°, C, R, Cn	Hawkesbury Sandstone
	38	11.0 – 11.5	SILTSTONE: dark grey, bedded sub horizontally.	MW	L	0.30	(11.45m) CS, 0°, 30 mm.t; (11.48m) Cr, 0°, 25 mm.t	
	37	11.5 – 12.56	SANDSTONE: medium grained, light grey with grey lamination, trace of siltstone, bedded at 0-20°.	FR	H	1.0, 1.3, 1.4	(12.50m) CS, 0°, 15 mm.t	
	36 – 35	12.56 – 14	END OF BOREHOLE AT 12.56 m					

Point load strength scale: VL -0.1, L -0.3, M -1, H -3, VH -10, EH
Spacing (mm): 600, 200, 60, 20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JK 9.02.4 LIB.GLB Log JK CORED BOREHOLE - MASTER 32507R2 GREENWICH.GPJ <<DrawingFile>> 21/01/2022 12:47 10.01.00.01 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

JKGeotechnics

BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** ~48.5 m
Date: 30/9/21 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES (ES / U50 / DB / DS)	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				0			FILL: Clayey silt, low plasticity, dark brown, trace of fine grained igneous and ironstone gravel.	w<PL			MULCH COVER
								D			APPEARS MODERATELY COMPACTED
		N = 9 4,5,4	48				FILL: Clayey sand, fine to medium grained, orange brown, trace of fine to medium grained sandstone and ironstone gravel, and clay nodules.	w<PL			
							FILL: Silty clay, low plasticity, brown, grey and orange brown, with fine to medium grained sand, trace of medium to coarse grained ironstone and sandstone gravel.				
				1		CI		w~PL	(St - VSt)		RESIDUAL
			47				Silty CLAY: medium plasticity, orange brown, trace of fine to medium grained sand.				
							REFER TO CORED BOREHOLE LOG				
				2							
			46								
				3							
			45								
				4							
			44								
				5							
			43								
				6							
			42								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No.
110

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2	**Core Size:** NMLC	**R.L. Surface:** ~48.5 m
Date: 30/9/21	**Inclination:** VERTICAL	**Datum:** AHD
Plant Type: JK305	**Bearing:** N/A	**Logged/Checked By:** J.L./P.R.

Columns: 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 $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH); DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20); DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General; Formation

START CORING AT 1.36m

Depth (m)	Core Description	Weathering	Strength	Point Load $I_s(50)$	Defect Details (Specific)
1.36	SANDSTONE: medium to coarse grained, brown orange, bedded at 0-25°.	MW	M - H	0.80, 0.90, 0.40	(1.58m) J, 80°, P, Fe Sn
~2.5	SANDSTONE: medium to coarse grained, light grey with red brown bands.	SW	M - H	1.1	(3.03m) Bex2, 25°, P, R, Fe Sn
~3.2		MW	L - M	0.30, 0.40	(3.64m) CS, 15°, 40 mm.t
~3.7		SW	M - H	0.60, 1.1, 0.90, 0.90, 1.0	(4.28m) CS, 10°, 30 mm.t; (6.04m) CS, 5°, 10 mm.t; (6.26m) CS, 5°, 15 mm.t; (6.34m) Be, 0°, P, R, Fe Sn
~6.35	as above, but bedded at 30°.			1.6, 1.0, 1.1	

Water Loss\Level: 100% RETURN (to ~4.0m); 80% RETURN (below ~4.0m)

RL (m AHD): 47, 46, 45, 44, 43, 42, 41; Depth (m): 2, 3, 4, 5, 6, 7

Formation: Hawkesbury Sandstone

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** ~48.5 m
Date: 30/9/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

Water Loss\Level	Depth (m)	Core Description (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	Point Load Strength Index $I_s(50)$	Defect Details – Specific	Formation
80% RETURN	to 8.97	SANDSTONE: medium to coarse grained, light grey with red brown bands, bedded at 30°.	FR	M - H	1.0, 1.4		Hawkesbury Sandstone
80% RETURN	8.97 – ~9.85	SILTSTONE: dark grey, bedded at 20-30°.	MW	L	0.30, 0.30	(8.97m) CS, 10°	Hawkesbury Sandstone
100% RETURN	~9.85 – 12.85	SANDSTONE: medium grained, light grey with grey lamination, trace of siltstone clasts, bedded at 0-20°.	FR	M - H	0.90, 1.1, 1.4, 1.4, 1.3, 1.7	(10.63m) Be, 5°, P, R, Fe Sn (11.91m) CS, 0°, 10 mm.t	Hawkesbury Sandstone
	12.85	END OF BOREHOLE AT 12.85 m					

RL (m AHD) scale: 40, 39, 38, 37, 36, 35, 34. Depth (m) scale: 9, 10, 11, 12, 13, 14.

Point load scale: VL -0.1, L -0.3, M -1, H -3, VH -10, EH. Spacing (mm): 600, 200, 60, 20.

COPYRIGHT

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **110A**

1/1

SDUP6: 0.0-0.1m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 48.5m

Date: 29/9/2021 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty gravelly sand, fine to medium grained, dark brown, fine to medium grained igneous gravel, trace of ash, slag and root fibres.	M			GRASS COVER SCREEN: 10.0kg 0.0-0.1m NO FCF
						FILL: Sandy gravel, fine to medium grained igneous gravel, grey, fine to medium grained, trace of ash, asphaltic concrete fragments and root fibres.	w<PL			SCREEN: 4.2kg 0.1-0.2m NO FCF
			1		CL-CI	FILL: Sandy clay, low to medium plasticity, yellow brown mottled red brown, trace of sandstone cobble and ironstone gravel, terracotta and root fibres.	w<PL			SCREEN: 5.8kg 0.2-1.1m NO FCF
						Sandy CLAY: low to medium plasticity, yellow brown, trace of ironstone gravel, ash and root fibres.				RESIDUAL
						END OF BOREHOLE AT 1.3m				REFUSAL ON INFERRED BEDROCK
			2							
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **111**

1/1

Environmental logs are not to be used for geotechnical purposes

SDUP3: 0.0-0.1m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** HAND AUGER **R.L. Surface:** ≈ 48.6m

Date: 28/9/2021 **Datum:** AHD

Plant Type: - **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty sand, fine to medium grained, dark brown, trace of ironstone, siltstone and sandstone gravel, tile fragments and root fibres.	D			GRASS COVER
										SCREEN: 10.8kg 0.0-0.1m NO FCF
						FILL: Silty clay, medium to high plasticity, brown, trace of sand, ironstone and igneous gravel and ash.	w<PL			SCREEN: 4.8kg 0.1-0.3m NO FCF
						FILL: Silty clayey sand, fine to medium grained, brown, trace of ironstone and igneous gravel and ash.	D			SCREEN: 5.2kg 0.3-0.6m NO FCF
			1			END OF BOREHOLE AT 0.8m				SCREEN: 4.9kg 0.6-0.8m NO FCF
			2							HAND AUGER REFUSAL ON INFERRED BEDROCK
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **112**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 48.6m

Date: 29/9/2021 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** H.W./V.B.

Groundwater Record	SAMPLES ES	ASS	ASB	SAL	DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 220mm.t				STEEL REINFORCEMENT AT 150mm
									-	FILL: Silty gravelly sand, fine to medium grained, brown, fine to medium grained sandstone gravel, trace of clay nodules, igneous and ironstone gravel and asphaltic concrete fragments.	M			SCREEN: 6.90kg 0.22-0.65m NO FCF
									-	Extremely Weathered sandstone: silty SAND, fine to medium grained, yellow brown.	XW			HAWKESBURY SANDSTONE
							1			END OF BOREHOLE AT 0.8m				REFUSAL
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **113**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 52.0m

Date: 29/9/2021 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	Samples (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty sand, fine to medium grained, brown, trace of igneous gravel, glass and root fibres.	D			GRASS COVER
						FILL: Silty clayey sand, fine to medium grained, light brown, trace of ironstone and igneous gravel, ash and root fibres.	M			SCREEN: 10.1kg 0.0-0.1m NO FCF SCREEN: 9.6kg 0.1-0.35m NO FCF
					CL-CI	Sandy CLAY: low to medium plasticity, dark brown mottled yellow, trace of ironstone gravel, ash and root fibres.	w<PL			RESIDUAL
						Sandy CLAY: low to medium plasticity, yellow brown, trace of ironstone gravel and root fibres.				
						END OF BOREHOLE AT 0.65m				REFUSAL ON INFERRED BEDROCK
			1							
			2							
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **114** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR | **Method:** PUSH TUBE | **R.L. Surface:** ≈ 50.7m
Date: 29/9/2021 | **Datum:** AHD
Plant Type: EZIPROBE | **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0		-	ASPHALTIC CONCRETE: 50mm.t	D			SCREEN: 9.61kg 0.05-0.2m NO FCF
					SC	FILL: Silty sandy gravel, fine to medium grained, igneous gravel, sub angular, light grey, fine to medium grained sand, trace of ironstone gravel and asphaltic concrete fragments.	M			
					CL-CI	Silty clayey SAND: fine to medium grained, light brown, trace of ironstone and sandstone gravel and root fibres.	w<PL			RESIDUAL
						Sandy CLAY: low to medium plasticity, yellow brown with ironstone gravel.				REFUSAL ON INFERRED BEDROCK
						END OF BOREHOLE AT 0.5m				
			1							
			2							
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **115**

1/1

SDUP4: 0.0-0.1m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 50.1m

Date: 29/9/2021 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty clayey sand, fine to medium grained, brown, trace of ironstone and sandstone gravel, and root fibres.	D			GRASS COVER SCREEN: 11.8kg 0.0-0.1m NO FCF
					CL-CI	Silty CLAY: low to medium plasticity, light grey, with ironstone banding, trace of root fibres.	w<PL			RESIDUAL
			1							
						END OF BORHEOLE AT 1.1m				REFUSAL ON INFERRED BEDROCK
			2							
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 116 — 1/1

Environmental logs are not to be used for geotechnical purposes

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 50.1m
Date: 29/9/2021 **Datum:** AHD
Plant Type: EZIPROBE **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES / ASS / ASB / SAL / DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	ES, ASB, DB		0		-	ASPHALTIC CONCRETE: 20mm.t	D			
					SC	FILL: Silty sandy gravel, fine to medium grained, igneous gravel, sub angular, light grey, fine to medium grained sand, trace of ironstone gravel and asphaltic concrete fragments.	M			SCREEN: 11.9kg 0.02-0.1m NO FCF
					CL-CI	Silty clayey SAND: light brown mottled yellow brown, trace of ironstone gravel, ash and root fibres.	w<PL			RESIDUAL
						Sandy CLAY: low to medium plasticity, yellow brown, with ironstone banding.				
					-	Extremely Weathered sandstone: silty SAND, fine to medium grained, yellow brown.	XW			HAWKESBURY SANDSTONE
						END OF BOREHOLE AT 0.6m				REFUSAL
			1							
			2							
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **117**

1/1

SDUP10: 0.0-0.1m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** SPIRAL AUGER **R.L. Surface:** ≈ 49.3m

Date: 6/10/2021 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** A.D./V.B.

Groundwater Record	SAMPLES ES ASS ASB SAL DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty sand, fine to medium grained, brown, trace of tile fragments and root fibres.	M			GRASS COVER SCREEN: 10.0kg 0-0.1m NO FCF
		N = 25 8,13,12	1			FILL: Silty sand, fine to medium grained, grey and brown, trace of igneous gravel and sandstone gravel.	D			
			2			END OF BOREHOLE AT 1.5m				
			3							
			4							
			5							
			6							
			7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **118**

1/1

SDUP5: 0.0-0.1m

Client: HAMMOND CARE

Project: PROPOSED HOSPITAL REDEVELOPMENT

Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: E32507BR **Method:** PUSH TUBE **R.L. Surface:** ≈ 40.0m

Date: 29/9/2021 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** M.M.E./V.B.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION			0			FILL: Silty sandy clay, low to medium plasticity, light brown mottled red and yellow, trace of siltstone, ironstone and sandstone gravel, ash, tile fragments and root fibres.	D			GRASS COVER SCREEN: 10.6kg 0.0-0.1m NO FCF SCREEN: 9.85kg 0.1-1.1m NO FCF SCREEN: 8.1kg 1.1-1.6m NO FCF
			1							
			2		CL-CI	Sandy CLAY: low to medium plasticity, yellow brown mottled red, trace of ironstone gravel.	w<PL			RESIDUAL
					CI-CH	Sandy CLAY: medium to high plasticity, light brown mottled yellow and red, with ironstone banding.				
						END OF BOREHOLE AT 2.5m				REFUSAL
			3							
			4							
			5							
			6							
			7							

JKGeotechnics

BOREHOLE LOG

Borehole No.
119

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Method:** SPIRAL AUGER **R.L. Surface:** 42.5 m
Date: 1/10/21 **Datum:** AHD
Plant Type: JK305 **Logged/Checked By:** J.L./P.R.

Groundwater Record	SAMPLES (ES, U50, DB, DS)	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING				0		-	ASPHALTIC CONCRETE: 50mm.t				
							FILL: Silty sand, fine to medium grained, yellow brown, trace of igneous and sandstone gravel, and ceramic tile fragments.	D			SCREEN: 3.2kg 0.05-0.3m NO FCF
			42			-	SANDSTONE: fine to medium grained, yellow brown.	DW	MD / M		HAWKESBURY SANDSTONE MODERATE 'TC' BIT RESISTANCE
			41	1							
			40	2					L - M		LOW TO MODERATE RESISTANCE
									H		HIGH RESISTANCE
			39	3			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 5.75m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.2m TO 5.75m. CASING 0m TO 1.2m. 2mm SAND FILTER PACK 1.0m TO 5.75m. BENTONITE SEAL 0.25m TO 1.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
			38	4							
			37	5							
			36	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 119

Client: HAMMOND CARE
Project: PROPOSED HOSPITAL REDEVELOPMENT
Location: 97-115 RIVER ROAD, GREENWICH, NSW

Job No.: 32507R2 **Core Size:** NMLC **R.L. Surface:** 42.5 m
Date: 1/10/21 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** J.L./P.R.

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 $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS DESCRIPTION: Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness — Specific / General	Formation
		40			START CORING AT 2.94m					ROCK STRENGTH BASED ON TACTILE ASSESSMENT	
100% RETURN		39, 38	3, 4, 5		SANDSTONE: medium grained, light grey, orange brown and red brown, bedded at 0-25°.	MW	(L - M)			(4.10m) CS, 5°, 10 mm.t (4.61m) J, 45°, P, R, Fe Ct (5.15m) Be, 20°, C, R, Fe Sn (5.16m) CS, 5°, 10 mm.t	Hawkesbury Sandstone
		37			SANDSTONE: fine to medium grained, light grey, bedded at 0-20°.	FR	(M)			(5.32m) Be x 2, 0°, C, R, Fe Ct (5.49m) Cr, 0°, 15 mm.t	
		36, 35, 34	6, 7, 8		END OF BOREHOLE AT 5.75 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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_c' 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.

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 65% 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	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine 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	–	–	–	–

Laboratory Classification Criteria

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

$$C_U = \frac{D_{60}}{D_{10}} \quad and \quad C_C = \frac{(D_{30})^2}{D_{10}\,D_{60}}$$

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:

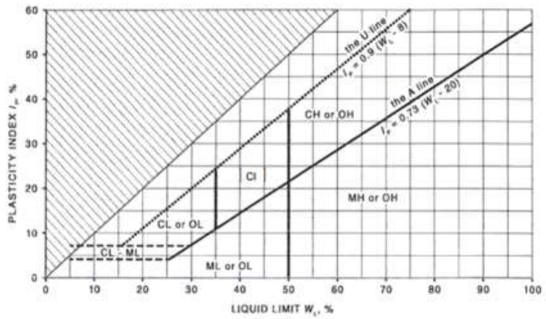
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 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.

3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition		
Groundwater Record	▼	Standing water level. Time delay following completion of drilling/excavation may be shown.		
	C	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_c = 5 7 3R	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.		
	VNS = 25	Vane shear reading in kPa of undrained shear strength.		
	PID = 100	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)			**Density Index (I_D) Range (%)**	**SPT 'N' Value Range (Blows/300mm)**
	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	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – 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. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – 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. LITTORAL – beach deposited soil.

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)	HW	DW	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		MW		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, but shows little or no change of strength from fresh rock.
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)	Guide to Strength: 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.

Appendix G: Laboratory Reports & COC Documents

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 279440-A

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32507BR, Greenwich**
Number of Samples	131 Soil
Date samples received	30/09/2021
Date completed instructions received	01/10/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	11/10/2021
Date of Issue	27/10/2021
Reissue Details	This report replaces R00 created on 11/10/2021 due to: revised report with additional results.

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

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

Results Approved By
Hannah Nguyen, Metals Supervisor
Nick Sarlamis, Assistant Operation Manager

Authorised By

Nancy Zhang, Laboratory Manager

Soil Aggressivity						
Our Reference		279440-A-53	279440-A-54	279440-A-55	279440-A-57	279440-A-74
Your Reference	UNITS	BH105	BH105	BH105	BH105	BH106
Depth		0.25-0.4	0.5-0.95	1.2-1.4	2.9-3.0	7.9-8.0
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	27/09/2021	27/09/2021	27/09/2021	28/09/2021
pH 1:5 soil:water	pH Units	8.8	8.7	8.0	5.4	6.0
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10	<10	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	44	53	10	64	20
Resistivity in soil*	ohm m	91	79	260	230	570

Soil Aggressivity						
Our Reference		279440-A-77	279440-A-79	279440-A-80	279440-A-83	279440-A-87
Your Reference	UNITS	BH106	BH106	BH107	BH107	BH107
Depth		10.9-11.0	12.45-12.55	0-0.2	1.3-1.5	3.9-4.0
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		28/09/2021	28/09/2021	27/09/2021	27/09/2021	27/09/2021
pH 1:5 soil:water	pH Units	6.2	6.2	6.8	5.9	5.3
Chloride, Cl 1:5 soil:water	mg/kg	<10	10	<10	<10	<10
Electrical Conductivity 1:5 soil:water	µS/cm	[NA]	[NA]	[NA]	21	12
Sulphate, SO4 1:5 soil:water	mg/kg	<10	<10	<10	21	10
Resistivity in soil*	ohm m	900	660	300	480	830

Soil Aggressivity						
Our Reference		279440-A-89	279440-A-97	279440-A-98	279440-A-99	279440-A-100
Your Reference	UNITS	BH107	BH107	BH107	BH109	BH109
Depth		5.9-6.0	13.9-14.0	14.9-15.0	0.01-0.4	0.5-0.8
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	27/09/2021	27/09/2021	28/09/2021	28/09/2021
pH 1:5 soil:water	pH Units	5.3	5.8	5.7	9.0	7.7
Chloride, Cl 1:5 soil:water	mg/kg	<10	20	20	<10	<10
Electrical Conductivity 1:5 soil:water	µS/cm	13	16	16	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	10	<10	<10	35	88
Resistivity in soil*	ohm m	750	610	610	130	170

Texture and Salinity*						
Our Reference		279440-A-53	279440-A-54	279440-A-55	279440-A-57	279440-A-74
Your Reference	UNITS	BH105	BH105	BH105	BH105	BH106
Depth		0.25-0.4	0.5-0.95	1.2-1.4	2.9-3.0	7.9-8.0
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	27/09/2021	27/09/2021	27/09/2021	28/09/2021
Date prepared	-	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021
Date analysed	-	08/10/2021	08/10/2021	08/10/2021	08/10/2021	08/10/2021
Electrical Conductivity 1:5 soil:water	µS/cm	110	130	39	43	17
Texture Value	-	9.0	9.0	7.0	14	17
Texture	-	CLAY LOAM	CLAY LOAM	MEDIUM CLAY	SANDY LOAM	SAND
ECe	dS/m	<2	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*					
Our Reference		279440-A-77	279440-A-80	279440-A-99	279440-A-100
Your Reference	UNITS	BH106	BH107	BH109	BH109
Depth		10.9-11.0	0-0.2	0.01-0.4	0.5-0.8
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		28/09/2021	27/09/2021	28/09/2021	28/09/2021
Date prepared	-	08/10/2021	08/10/2021	08/10/2021	08/10/2021
Date analysed	-	08/10/2021	08/10/2021	08/10/2021	08/10/2021
Electrical Conductivity 1:5 soil:water	µS/cm	11	34	77	60
Texture Value	-	17	9.0	14	7.0
Texture	-	SAND	CLAY LOAM	SANDY LOAM	MEDIUM CLAY
ECe	dS/m	<2	<2	<2	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE

CEC						
Our Reference		279440-A-53	279440-A-54	279440-A-55	279440-A-57	279440-A-74
Your Reference	UNITS	BH105	BH105	BH105	BH105	BH106
Depth		0.25-0.4	0.5-0.95	1.2-1.4	2.9-3.0	7.9-8.0
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	27/09/2021	27/09/2021	27/09/2021	28/09/2021
Date prepared	-	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021
Date analysed	-	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021
Exchangeable Ca	meq/100g	9.8	13	2.3	1.5	0.1
Exchangeable K	meq/100g	<0.1	0.1	<0.1	0.1	<0.1
Exchangeable Mg	meq/100g	1.6	2.2	0.8	0.4	0.6
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	12	15	3.2	2.0	<1

CEC				
Our Reference		279440-A-80	279440-A-99	279440-A-100
Your Reference	UNITS	BH107	BH109	BH109
Depth		0-0.2	0.01-0.4	0.5-0.8
Type of sample		Soil	Soil	Soil
Date Sampled		27/09/2021	28/09/2021	28/09/2021
Date prepared	-	11/10/2021	11/10/2021	11/10/2021
Date analysed	-	11/10/2021	11/10/2021	11/10/2021
Exchangeable Ca	meq/100g	8.2	13	2.5
Exchangeable K	meq/100g	0.2	0.2	<0.1
Exchangeable Mg	meq/100g	2.2	4.7	1.9
Exchangeable Na	meq/100g	<0.1	0.1	<0.1
Cation Exchange Capacity	meq/100g	11	18	4.5

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-002	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.
Inorg-081	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.
INORG-123	Determined using a "Texture by Feel" method.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	279440-A-79
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	77	6.2	6.3	2	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	77	<10	<10	0	106	99
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	89	13	14	7	103	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	77	<10	<10	0	106	103
Resistivity in soil*	ohm m	1	Inorg-002	<1	77	900	1100	20	[NT]	[NT]

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	89	5.3	5.3	0	[NT]	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	89	<10	<10	0	[NT]	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	89	10	20	67	[NT]	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	[NT]	89	750	690	8	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			08/10/2021	77	08/10/2021	08/10/2021		08/10/2021	[NT]
Date analysed	-			08/10/2021	77	08/10/2021	08/10/2021		08/10/2021	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	77	11	9	20	105	[NT]
Texture Value	-		INORG-123	[NT]	77	17	17	0	[NT]	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	279440-A-54
Date prepared	-			11/10/2021	53	11/10/2021	11/10/2021		11/10/2021	11/10/2021
Date analysed	-			11/10/2021	53	11/10/2021	11/10/2021		11/10/2021	11/10/2021
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	53	9.8	12	20	113	#
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	53	<0.1	<0.1	0	107	96
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	53	1.6	1.7	6	110	119
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	53	<0.1	<0.1	0	117	112

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

pH/EC
Samples were out of the recommended holding time for this analysis.

CEC - # Percent recovery is not applicable due to the high concentration of the element in the sample. However an acceptable recovery was obtained for the LCS.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	C Ridley

Sample Login Details	
Your reference	E32507BR, Greenwich
Envirolab Reference	279440-A
Date Sample Received	30/09/2021
Date Instructions Received	01/10/2021
Date Results Expected to be Reported	11/10/2021

Sample Condition	
Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	131 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoice accordingly.

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH105-0.25-0.4				✓
BH105-0.5-0.95				✓
BH105-1.2-1.4				✓
BH105-1.5-1.7				✓
BH106-0.03-0.3				✓
BH106-0.6-0.8				✓
BH107-0-0.2				✓
BH107-0.2-0.4				✓
BH107-0.5-0.95				✓
BH109-0.01-0.4				✓
BH109-0.5-0.8				✓
BH109-0.8-0.95				✓
BH109-1.0-1.2				✓
BH110A-0-0.1				✓
BH110A-0.1-0.2				✓
BH110A-0.5-0.8				✓
BH110A-1.1-1.3				✓
BH111-0-0.1				✓
BH111-0.2-0.3				✓
BH111-0.3-0.6				✓
BH111-0.6-0.8				✓
BH112-0.22-0.65				✓
BH112-0.65-0.8				✓
BH113-0-0.1				✓
BH113-0.1-0.2				✓
BH113-0.35-0.45				✓
BH113-0.45-0.6				✓
BH113-0.6-0.65				✓
BH114-0.05-0.2				✓
BH114-0.2-0.4				✓
BH114-0.4-0.5				✓
BH115-0-0.1				✓

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH115-0.3-0.5				✓
BH115-0.6-0.8				✓
BH115-0.9-1.1				✓
BH116-0-0.1				✓
BH116-0.1-0.3				✓
BH116-0.3-0.55				✓
BH118-0-0.1				✓
BH118-0.5-0.6				✓
BH118-1.4-1.5				✓
BH118-1.6-1.8				✓
BH118-2.3-2.5				✓
SDUP1				✓
SDUP2				✓
SDUP3				✓
SDUP4				✓
SDUP5				✓
SDUP6				✓
PFAS DUP1				✓
TS-S1				✓
TB-S1				✓
BH105-0.25-0.4	✓	✓	✓	
BH105-0.5-0.95	✓	✓	✓	
BH105-1.2-1.4	✓	✓	✓	
BH105-2.4-2.5				✓
BH105-2.9-3.0	✓	✓	✓	
BH105-3.9-4.0				✓
BH105-4.9-5.0				✓
BH105-5.9-6.0				✓
BH105-6.9-7.0				✓
BH105-7.7-7.83				✓
BH106-0.03-0.3				✓
BH106-0.6-0.8				✓

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH106-0.9-1.1				✓
BH106-1.4-1.5				✓
BH106-1.9-2.0				✓
BH106-2.4-2.5				✓
BH106-2.9-3.0				✓
BH106-3.9-4.0				✓
BH106-4.9-5.0				✓
BH106-5.9-6.0				✓
BH106-6.9-7.0				✓
BH106-7.9-8.0	✓	✓	✓	
BH106-8.9-9.0				✓
BH106-9.9-10.0				✓
BH106-10.9-11.0	✓	✓		
BH106-11.9-12.0				✓
BH106-12.45-12.55	✓			
BH107-0-0.2	✓	✓	✓	
BH107-0.2-0.4				✓
BH107-0.5-0.95				✓
BH107-1.3-1.5	✓			
BH107-1.9-2.0				✓
BH107-2.4-2.5				✓
BH107-2.75-2.85				✓
BH107-3.9-4.0	✓			
BH107-4.9-5.0				✓
BH107-5.9-6.0	✓			
BH107-6.9-7.0				✓
BH107-7.9-8.0				✓
BH107-8.9-9.0				✓
BH107-9.9-10.0				✓
BH107-10.9-11.0				✓
BH107-11.9-12.0				✓
BH107-12.9-13.0				✓

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH107-13.9-14.0	✓			
BH107-14.9-15.0	✓			
BH109-0.01-0.4	✓	✓	✓	
BH109-0.5-0.8	✓	✓	✓	
BH109-0.8-0.95				✓
BH109-1.0-1.2				✓
BH109-1.42-1.50				✓
BH109-1.9-2.0				✓
BH109-2.4-2.5				✓
BH109-2.9-3.0				✓
BH109-3.9-4.0				✓
BH109-4.9-5.0				✓
BH109-5.9-6.0				✓
BH109-6.9-7.0				✓
BH109-7.9-8.0				✓
BH109-8.9-9.0				✓
BH109-9.9-10.0				✓
BH109-10.96-11.0				✓
BH109-11.9-12.0				✓
BH109-12.45-12.56				✓
BH109-11.35-11.45				✓
PFAS Trip Blank -.				✓
BH107-1.0-1.3				✓
BH105-0.25-0.4				✓
BH105-0.5-0.95				✓
BH105-1.2-1.4				✓
BH106-1.5-1.7				✓
BH106-0.03-0.3				✓
BH106-0.6-0.8				✓
BH107-0-0.1				✓
BH107-0.1-0.4				✓
BH107-0.5-0.95				✓

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH109-0.01-0.4				✓
BH109-0.5-0.8				✓
BH109-0.8-0.95				✓

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.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 1 of 2	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location: Greenwich

Sampler: HW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos (NEPM)	PFAS	Asbestos (ID)	
27/09/2021	1	BH105	0.25-0.4	G, A, PFAS	0	Fill: Silty Gravelly Sand			X						X	X		
27/09/2021	2	BH105	0.5-0.95	G, A, PFAS	0	Fill: Clayey silty sand		X								X		
27/09/2021	3	BH105	1.2-1.4	G, A, PFAS	0	Sandy Clay		X										
27/09/2021	4	BH105	1.5-1.7	G, A, PFAS	0	XW Sandstone												
28/09/2021	5	BH106	0.03-0.3	G, A	0	Fill: Clayey gravelly sand			X						X			
28/09/2021	6	BH106	0.6-0.8	G, A	0	Silty Clay		X										
27/09/2021	7	BH107	0-0.2	G, A	0	Fill: Silty clay			X						X			
27/09/2021	8	BH107	0.2-0.4	G, A	0	Fill: Sandy clay		X										
27/09/2021	9	BH107	0.5-0.95	G, A	0	Silty Sand												
28/09/2021	10	BH109	0.01-0.4	G, A	0	Fill: Clayey gravelly sand			X						X			
28/09/2021	11	BH109	0.5-0.8	G, A	5	Fill: Sandy clay		X										
28/09/2021	12	BH109	0.8-0.95	G, A	1.5	Sandy Clay		X										
28/09/2021	13	BH109	1.0-1.2	G, A	0	Sandstone												
29/09/2021	14	BH110A	0-0.1	G, A	0.3	Fill: Silty gravelly sand			X						X			
29/09/2021	15	BH110A	0.1-0.2	G, A	0	Fill: Sandy gravel		X										
29/09/2021	16	BH110A	0.5-0.8	G, A	0	Fill: Sandy clay		X							X			
29/09/2021	17	BH110A	1.1-1.3	G, A	0	Sandy clay												
28/09/2021	18	BH111	0-0.1	G, A	0	Fill: Silty sand			X						X			
28/09/2021	19	BH111	0.2-0.3	G, A	0	Fill: Silty sand												
28/09/2021	20	BH111	0.3-0.6	G, A	0	Fill: Silty clay		X										
28/09/2021	21	BH111	0.6-0.8	G, A	0	Fill: Silty clayey Sand		X										
29/09/2021	22	BH112	0.22-0.65	G, A	0	F: Silty gravelly sand			X						X			
29/09/2021	23	BH112	0.65-0.8	G, A	0	XW Sandstone		X										
29/09/2021	24	BH113	0-0.1	G, A	0	Fill: Silty sand			X						X			
29/09/2021	25	BH113	0.1-0.2	G, A	0	Fill: Silty clayey sand		X										
29/09/2021	26	BH113	0.35-0.45	G, A	0	Sandy Clay		X										

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

Relinquished By:	Date:	Time:	Received By:	Date:
			TB	30/09/2021 COC 01/10/2021

279440

updated

COC

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location: Greenwich

Sampler: HW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos (NEPM)	PFAS	Asbestos (ID)	
29/09/2021	27	BH113	0.45-0.6	G	0	Sandy clay												
29/09/2021	28	BH113	0.6-0.65	G	0	Sandstone												
29/09/2021	29	BH114	0.05-0.2	G, A	0	Fill: Silty sandy gravel			X						X			
29/09/2021	30	BH114	0.2-0.4	G, A	0	Silty clayey sand												
29/09/2021	31	BH114	0.4-0.5	G, A	0	Sandy clay												
29/09/2021	32	BH115	0-0.1	G, A	0	Fill: Silty clayey sand			X						X			
29/09/2021	33	BH115	0.3-0.5	G, A	0	Fill: silty clayey sand												
29/09/2021	34	BH115	0.6-0.8	G, A	0	Sandy clay		X										
29/09/2021	35	BH115	0.9-1.1	G, A	0	Sandy clay												
29/09/2021	36	BH116	0-0.1	G, A	0	Fill: Silty sandy gravel			X						X			
29/09/2021	37	BH116	0.1-0.3	G, A	0	Silty clayey sand		X										
29/09/2021	38	BH116	0.3-0.55	G	0	Sandy clay												
29/09/2021	39	BH118	0-0.1	G, A	0	Fill: Silty sandy clay			X						X			
29/09/2021	40	BH118	0.5-0.6	G, A	0	Fill: Silty sandy clay												
29/09/2021	41	BH118	1.4-1.5	G, A	0	Fill: Silty sandy clay		X										
29/09/2021	42	BH118	1.6-1.8	G, A	0	Sandy clay		X										
29/09/2021	43	BH118	2.3-2.5	G, A	0	Sandy clay												
28/09/2021	44	SDUP1	-	G, A	-	Duplicate												
28/09/2021	45	SDUP2	-	G	-	Duplicate												
28/09/2021	46	SDUP3	-	G, A	-	Duplicate		X							X			
29/09/2021	47	SDUP4	-	G, A	-	Duplicate			X						X			
29/09/2021	48	SDUP5	-	G, A	-	Duplicate												
29/09/2021	49	SDUP6	-	G, A	-	Duplicate			X						X			
27/09/2021	50	PFAS DUP1	-	PFAS	-	Duplicate								X				
27/09/2021	51	TS-S1	-	V	-	Spike							X					
27/09/2021	52	TB-S1	-	G, PFAS	-	Blank								X				

Remarks (comments/detection limits required):	Sample Containers:
PLEASE SEND SDUP6 TO VIC	G - 250mg Glass Jar A - Ziplock Asbestos Bag PFAS - PFAS Jar P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:

279440

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 1 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location:	Greenwich	Sample Preserved in Esky on Ice
Sampler:	HW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC					
27/09/2021	53	BH105	0.25-0.4	G	Fill: Silty Gravelly Sand	X	X	X	X	X	X	X					
27/09/2021	54	BH105	0.5-0.95	G	Fill: Clayey silty sand	X	X	X	X	X	X	X					
27/09/2021	55	BH105	1.2-1.4	G	Sandy Clay	X	X	X	X	X	X	X					
27/09/2021	56	BH105	2.4-2.5	G	XW Sandstone												
27/09/2021	57	BH105	2.9-3.0	G	XW Sandstone	X	X	X	X	X	X	X					
27/09/2021	58	BH105	3.9-4.0	G	Sandstone												
27/09/2021	59	BH105	4.9-5.0	G	Sandstone												
27/09/2021	60	BH105	5.9-6.0	G	Sandstone												
27/09/2021	61	BH105	6.9-7.0	G	Sandstone												
27/09/2021	62	BH105	7.7-7.83	G	Sandstone												
28/09/2021	63	BH106	0.03-0.3	G	Fill: Clayey gravelly sand												
28/09/2021	64	BH106	0.6-0.8	G	Silty Clay												
28/09/2021	65	BH106	0.9-1.1	G	Sandstone												
28/09/2021	66	BH106	1.4-1.5	G	Sandstone												
28/09/2021	67	BH106	1.9-2.0	G	Sandstone												
28/09/2021	68	BH106	2.4-2.5	G	Sandstone												
28/09/2021	69	BH106	2.9-3.0	G	Sandstone												
28/09/2021	70	BH106	3.9-4.0	G	Sandstone												
28/09/2021	71	BH106	4.9-5.0	G	Sandstone												
28/09/2021	72	BH106	5.9-6.0	G	Sandstone												
28/09/2021	73	BH106	6.9-7.0	G	Sandstone												
28/09/2021	74	BH106	7.9-8.0	G	Sandstone	X	X	X	X	X	X	X					
28/09/2021	75	BH106	8.9-9.0	G	Sandstone												
28/09/2021	76	BH106	9.9-10.0	G	Sandstone												
28/09/2021	77	BH106	10.9-11.0	G	Sandstone	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:	Date:	Time:	Received By:	Date:

279440

3

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 2 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location: Greenwich

Sampler: HW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC					
28/09/2021	78	BH106	11.9-12.0	G	Sandstone												
28/09/2021	79	BH106	12.45-12.55	G	Sandstone	X	X		X	X	X						
27/09/2021	80	BH107	0-0.2	G	Fill: Silty clay	X	X	X	X	X	X	X					
27/09/2021	81	BH107	0.2-0.4	G	Fill: Sandy clay												
27/09/2021	82	BH107	0.5-0.95	G	Silty Sand												
27/09/2021	119	BH107	1.0-1.3	G	Silty Clay												
27/09/2021	83	BH107	1.3-1.5	G	Sandstone	X	X		X	X	X						
27/09/2021	84	BH107	1.9-2.0	G	Sandstone												
27/09/2021	85	BH107	2.4-2.5	G	Sandstone												
27/09/2021	86	BH107	2.75-2.85	G	Sandstone												
27/09/2021	87	BH107	3.9-4.0	G	Sandstone	X	X		X	X	X						
27/09/2021	88	BH107	4.9-5.0	G	Sandstone												
27/09/2021	89	BH107	5.9-6.0	G	Sandstone	X	X		X	X	X						
27/09/2021	90	BH107	6.9-7.0	G	Sandstone												
27/09/2021	91	BH107	7.9-8.0	G	Sandstone												
27/09/2021	92	BH107	8.9-9.0	G	Sandstone												
27/09/2021	93	BH107	9.9-10.0	G	Sandstone												
27/09/2021	94	BH107	10.9-11.0	G	Sandstone												
27/09/2021	95	BH107	11.9-12.0	G	Sandstone												
27/09/2021	96	BH107	12.9-13.0	G	Sandstone												
27/09/2021	97	BH107	13.9-14.0	G	Sandstone	X	X		X	X	X						
27/09/2021	98	BH107	14.9-15.0	G	Sandstone	X	X		X	X	X						
28/09/2021	99	BH109	0.01-0.4	G	Fill: Clayey gravelly sand	X	X	X	X	X	X	X					
28/09/2021	100	BH109	0.5-0.8	G	Fill: Sandy clay	X	X	X	X	X	X	X					
28/09/2021	101	BH109	0.8-0.95	G	Sandy Clay												

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

279440

4

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 3 of 3	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location: Greenwich

Sampler: HW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC					
28/09/2021	102	BH109	1.0-1.2	G	Sandstone												
28/09/2021	103	BH109	1.42-1.50	G	Sandstone												
28/09/2021	104	BH109	1.9-2.0	G	Sandstone												
28/09/2021	105	BH109	2.4-2.5	G	Sandstone												
28/09/2021	106	BH109	2.9-3.0	G	Sandstone												
28/09/2021	107	BH109	3.9-4.0	G	Sandstone												
28/09/2021	108	BH109	4.9-5.0	G	Sandstone												
28/09/2021	109	BH109	5.9-6.0	G	Sandstone												
28/09/2021	110	BH109	6.9-7.0	G	Sandstone												
28/09/2021	111	BH109	7.9-8.0	G	Sandstone												
28/09/2021	112	BH109	8.9-9.0	G	Sandstone												
28/09/2021	113	BH109	9.9-10.0	G	Sandstone												
28/09/2021	114	BH109	10.96-11.0	G	Sandstone												
28/09/2021	115	BH109	11.9-12.0	G	Sandstone												
28/09/2021	116	BH109	12.45-12.56	G	Sandstone												
28/09/2021	117	BH109	11.35-11.45	G	Sandstone												
27/09/21	118	PFAS Trip Blank	—														

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

279440

S

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location:	Greenwich					Sample Preserved in Esky on Ice											
Sampler:	HW					Tests Required											
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	SCr extended	pH field test (pHF apHFOX)										
27/09/2021	120	BH105	0.25-0.4	P	Fill: Sandy Gravelly Sand		X										
27/09/2021	121	BH105	0.5-0.95	P	Fill: Clayey silty sand		X										
27/09/2021	122	BH105	1.2-1.4	P	Sandy Clay		X										
28/09/2021	123	BH106	1.5-1.7	P	Fill: Clayey gravelly sand		X										
28/09/2021	124	BH106	0.03-0.3	P	Silty Clay		X										
27/09/2021	125	BH106	0.6-0.8	P	Silty Clay		X										
27/09/2021	126	BH107	0-0.1	P	Fill: Silty clay		X										
27/09/2021	127	BH107	0.1-0.4	P	Fill: Sandy clay		X										
27/09/2021	128	BH107	0.5-0.95	P	Silty Sand		X										
28/09/2021	129	BH109	0.01-0.4	P	Fill: Clayey gravelly sand		X										
28/09/2021	130	BH109	0.5-0.8	P	Fill: Clayey gravelly sand		X										
28/09/2021	131	BH109	0.8-0.95	P	Sandy Clay		X										
27/09/2021	119	BH107	1-1.3	P	Silty Clay		X										

Remarks (comments/detection limits required):		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag		
Relinquished By:	Date:	Time:	Received By: Tony	Date:

279440

6

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 279440-E

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32507BR, Greenwich**
Number of Samples	additional analysis
Date samples received	30/09/2021
Date completed instructions received	20/10/2021

Analysis Details

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

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

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

Report Details

Date results requested by	27/10/2021
Date of Issue	27/10/2021

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

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

Results Approved By
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

TCLP Preparation - Acid						
Our Reference		279440-E-1	279440-E-5	279440-E-10	279440-E-14	279440-E-15
Your Reference	UNITS	BH105	BH106	BH109	BH110A	BH110A
Depth		0.25-0.4	0.03-0.3	0.01-0.4	0-0.1	0.1-0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	28/09/2021	28/09/2021	29/09/2021	29/09/2021
pH of soil for fluid# determ.	pH units	9.4	9.6	9.1	8.6	8.7
pH of soil TCLP (after HCl)	pH units	1.8	1.8	1.7	1.7	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.3	5.0	5.1	5.1	5.1

TCLP Preparation - Acid					
Our Reference		279440-E-29	279440-E-36	279440-E-39	279440-E-41
Your Reference	UNITS	BH114	BH116	BH118	BH118
Depth		0.05-0.2	0-0.1	0-0.1	1.4-1.5
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		29/09/2021	29/09/2021	29/09/2021	29/09/2021
pH of soil for fluid# determ.	pH units	10.1	8.5	8.5	8.4
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.8	1.7
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.2	4.9	5.0	4.9

Metals from Leaching Fluid pH 2.9 or 5						
Our Reference		279440-E-1	279440-E-5	279440-E-10	279440-E-14	279440-E-15
Your Reference	UNITS	BH105	BH106	BH109	BH110A	BH110A
Depth		0.25-0.4	0.03-0.3	0.01-0.4	0-0.1	0.1-0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		27/09/2021	28/09/2021	28/09/2021	29/09/2021	29/09/2021
Date extracted	-	25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Date analysed	-	25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Nickel	mg/L	0.08	0.1	0.09	<0.02	0.03

Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		279440-E-29	279440-E-36	279440-E-39
Your Reference	UNITS	BH114	BH116	BH118
Depth		0.05-0.2	0-0.1	0-0.1
Type of sample		Soil	Soil	Soil
Date Sampled		29/09/2021	29/09/2021	29/09/2021
Date extracted	-	25/10/2021	25/10/2021	25/10/2021
Date analysed	-	25/10/2021	25/10/2021	25/10/2021
Lead	mg/L	[NA]	[NA]	0.72
Nickel	mg/L	0.05	<0.02	[NA]

PAHs in TCLP (USEPA 1311)		
Our Reference		279440-E-41
Your Reference	UNITS	BH118
Depth		1.4-1.5
Type of sample		Soil
Date Sampled		29/09/2021
Date extracted	-	26/10/2021
Date analysed	-	27/10/2021
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	90

CEC				
Our Reference		279440-E-5	279440-E-15	279440-E-29
Your Reference	UNITS	BH106	BH110A	BH114
Depth		0.03-0.3	0.1-0.2	0.05-0.2
Type of sample		Soil	Soil	Soil
Date Sampled		28/09/2021	29/09/2021	29/09/2021
Date prepared	-	27/10/2021	27/10/2021	27/10/2021
Date analysed	-	27/10/2021	27/10/2021	27/10/2021
Exchangeable Ca	meq/100g	18	14	23
Exchangeable K	meq/100g	0.4	1	0.3
Exchangeable Mg	meq/100g	5.2	3.3	2.5
Exchangeable Na	meq/100g	1.7	<0.1	9.7
Cation Exchange Capacity	meq/100g	25	18	36

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			25/10/2021	1	25/10/2021	25/10/2021		25/10/2021	[NT]
Date analysed	-			25/10/2021	1	25/10/2021	25/10/2021		25/10/2021	[NT]
Lead	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	101	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	1	0.08	0.08	0	100	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			26/10/2021	[NT]	[NT]	[NT]	[NT]	26/10/2021	[NT]
Date analysed	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	70	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	83	[NT]
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	78	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	77	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	86	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
Date analysed	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	C Ridley

Sample Login Details	
Your reference	E32507BR, Greenwich
Envirolab Reference	279440-E
Date Sample Received	30/09/2021
Date Instructions Received	20/10/2021
Date Results Expected to be Reported	27/10/2021

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH105-0.25-0.4	✓		✓																			
BH105-0.5-0.95																						✓
BH105-1.2-1.4																						✓
BH105-1.5-1.7																						✓
BH106-0.03-0.3	✓		✓																		✓	
BH106-0.6-0.8																						✓
BH107-0-0.2																						✓
BH107-0.2-0.4																						✓
BH107-0.5-0.95																						✓
BH109-0.01-0.4	✓		✓																			
BH109-0.5-0.8																						✓
BH109-0.8-0.95																						✓
BH109-1.0-1.2																						✓
BH110A-0-0.1	✓		✓																			
BH110A-0.1-0.2	✓		✓																		✓	
BH110A-0.5-0.8																						✓
BH110A-1.1-1.3																						✓
BH111-0-0.1																						✓
BH111-0.2-0.3																						✓
BH111-0.3-0.6																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH111-0.6-0.8																						✓
BH112-0.22-0.65																						✓
BH112-0.65-0.8																						✓
BH113-0-0.1																						✓
BH113-0.1-0.2																						✓
BH113-0.35-0.45																						✓
BH113-0.45-0.6																						✓
BH113-0.6-0.65																						✓
BH114-0.05-0.2	✓		✓																		✓	
BH114-0.2-0.4																						✓
BH114-0.4-0.5																						✓
BH115-0-0.1																						✓
BH115-0.3-0.5																						✓
BH115-0.6-0.8																						✓
BH115-0.9-1.1																						✓
BH116-0-0.1	✓		✓																			
BH116-0.1-0.3																						✓
BH116-0.3-0.55																						✓
BH118-0-0.1	✓	✓																				
BH118-0.5-0.6																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH118-1.4-1.5	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
BH118-1.6-1.8																						✓
BH118-2.3-2.5																						✓
SDUP1																						✓
SDUP2																						✓
SDUP3																						✓
SDUP4																						✓
SDUP5																						✓
SDUP6																						✓
PFAS DUP1																						✓
TS-S1																						✓
TB-S1																						✓
BH105-0.25-0.4																						✓
BH105-0.5-0.95																						✓
BH105-1.2-1.4																						✓
BH105-2.4-2.5																						✓
BH105-2.9-3.0																						✓
BH105-3.9-4.0																						✓
BH105-4.9-5.0																						✓
BH105-5.9-6.0																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH105-6.9-7.0																						✓
BH105-7.7-7.83																						✓
BH106-0.03-0.3																						✓
BH106-0.6-0.8																						✓
BH106-0.9-1.1																						✓
BH106-1.4-1.5																						✓
BH106-1.9-2.0																						✓
BH106-2.4-2.5																						✓
BH106-2.9-3.0																						✓
BH106-3.9-4.0																						✓
BH106-4.9-5.0																						✓
BH106-5.9-6.0																						✓
BH106-6.9-7.0																						✓
BH106-7.9-8.0																						✓
BH106-8.9-9.0																						✓
BH106-9.9-10.0																						✓
BH106-10.9-11.0																						✓
BH106-11.9-12.0																						✓
BH106-12.45-12.55																						✓
BH107-0-0.2																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH107-0.2-0.4																						✓
BH107-0.5-0.95																						✓
BH107-1.3-1.5																						✓
BH107-1.9-2.0																						✓
BH107-2.4-2.5																						✓
BH107-2.75-2.85																						✓
BH107-3.9-4.0																						✓
BH107-4.9-5.0																						✓
BH107-5.9-6.0																						✓
BH107-6.9-7.0																						✓
BH107-7.9-8.0																						✓
BH107-8.9-9.0																						✓
BH107-9.9-10.0																						✓
BH107-10.9-11.0																						✓
BH107-11.9-12.0																						✓
BH107-12.9-13.0																						✓
BH107-13.9-14.0																						✓
BH107-14.9-15.0																						✓
BH109-0.01-0.4																						✓
BH109-0.5-0.8																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH109-0.8-0.95																						✓
BH109-1.0-1.2																						✓
BH109-1.42-1.50																						✓
BH109-1.9-2.0																						✓
BH109-2.4-2.5																						✓
BH109-2.9-3.0																						✓
BH109-3.9-4.0																						✓
BH109-4.9-5.0																						✓
BH109-5.9-6.0																						✓
BH109-6.9-7.0																						✓
BH109-7.9-8.0																						✓
BH109-8.9-9.0																						✓
BH109-9.9-10.0																						✓
BH109-10.96-11.0																						✓
BH109-11.9-12.0																						✓
BH109-12.45-12.56																						✓
BH109-11.35-11.45																						✓
PFAS Trip Blank -.																						✓
BH107-1.0-1.3																						✓
BH105-0.25-0.4																						✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
BH105-0.5-0.95																						✓
BH105-1.2-1.4																						✓
BH106-1.5-1.7																						✓
BH106-0.03-0.3																						✓
BH106-0.6-0.8																						✓
BH107-0-0.1																						✓
BH107-0.1-0.4																						✓
BH107-0.5-0.95																						✓
BH109-0.01-0.4																						✓
BH109-0.5-0.8																						✓
BH109-0.8-0.95																						✓
BH118 - [TRIPLICATE]-0-0.1																						✓

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

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

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.

Ming To

Subject: FW: Results for Registration 279440 E32507BR, Greenwich

Ref: 279440-E
TAT: Standard
Due: 27/10/2021
MT

279440-E

From: Craig Ridley <CRidley@jkenvironments.com.au>
Sent: Wednesday, 20 October 2021 5:25 PM
To: Greta Petzold <GPetzold@envirolab.com.au>
Cc: Samplereceipt <Samplereceipt@envirolabservices.com.au>
Subject: Re: Results for Registration 279440 E32507BR, Greenwich

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 Greta,

Can we please arrange for the following additional analysis for this sample batch (standard turnaround is fine):

Sample ID and Depth		Lab Reference	Test Required
BH105 (0.25-0.4m)	1	1	TCLP Nickel
BH106 (0.03-0.3m)	5	5	TCLP Nickel, CEC
BH109 (0.01-0.4m)	10	10	TCLP Nickel
BH110A (0-0.1m)	14	14	TCLP Nickel
BH110A (0.1-0.2m)	15	15	TCLP Nickel, CEC
BH114 (0.05-0.2m)	29	29	TCLP Nickel, CEC
BH116 (0-0.1m)	36	36	TCLP Nickel
BH118 (0-0.1m)	39	39	TCLP Lead
BH118 (1.4-1.5m)	41	41	TCLP PAH

Any issues, please call.

Thanks,

Craig

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 280023

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32507BR, Greenwich**
Number of Samples	47 Soil
Date samples received	11/10/2021
Date completed instructions received	11/10/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	15/10/2021
Date of Issue	15/10/2021

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
Giovanni Agosti, Group Technical Manager

Authorised By

Nancy Zhang, Laboratory Manager

Soil Aggressivity						
Our Reference		280023-1	280023-2	280023-4	280023-12	280023-13
Your Reference	UNITS	BH101	BH101	BH101	BH102	BH102
Depth		0.02-0.4	0.5-0.85	1.7-1.95	0.05-0.1	0.5-0.95
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		6/10/2021	6/10/2021	6/10/2021	6/10/2021	6/10/2021
Electrical Conductivity 1:5 soil:water	µS/cm	170	110	60	71	81
pH 1:5 soil:water	pH Units	9.8	9.1	8.7	9.0	7.0
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10	<10	<10	10
Sulphate, SO4 1:5 soil:water	mg/kg	120	21	24	<10	56
Resistivity in soil*	ohm m	60	95	170	140	120

Soil Aggressivity						
Our Reference		280023-14	280023-22	280023-24	280023-26	280023-31
Your Reference	UNITS	BH102	BH104	BH104	BH104	BH108
Depth		1.4-1.6	0.04-0.3	1.5-1.95	3.2-3.45	0.1-0.4
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		6/10/2021	1/10/2021	1/10/2021	1/10/2021	30/09/2021
Electrical Conductivity 1:5 soil:water	µS/cm	53	[NA]	[NA]	170	[NA]
pH 1:5 soil:water	pH Units	7.8	8.5	9.0	8.2	4.9
Chloride, Cl 1:5 soil:water	mg/kg	10	25	<10	10	10
Sulphate, SO4 1:5 soil:water	mg/kg	32	1,800	100	130	45
Resistivity in soil*	ohm m	190	13	90	58	210

Soil Aggressivity						
Our Reference		280023-34	280023-36	280023-40	280023-41	280023-43
Your Reference	UNITS	BH108	BH108	BH108	BH108	BH108
Depth		1.9-2.0	2.9-3.0	6.9-7.0	7.9-8.0	9.9-10.0
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021
Electrical Conductivity 1:5 soil:water	µS/cm	19	11	13	16	20
pH 1:5 soil:water	pH Units	5.3	5.4	5.9	5.8	5.7
Chloride, Cl 1:5 soil:water	mg/kg	20	<10	10	20	20
Sulphate, SO4 1:5 soil:water	mg/kg	49	<10	<10	<10	<10
Resistivity in soil*	ohm m	530	900	760	640	500

Texture and Salinity*				
Our Reference		280023-22	280023-24	280023-31
Your Reference	UNITS	BH104	BH104	BH108
Depth		0.04-0.3	1.5-1.95	0.1-0.4
Type of sample		Soil	Soil	Soil
Date Sampled		1/10/2021	1/10/2021	30/09/2021
Date prepared	-	12/10/2021	12/10/2021	12/10/2021
Date analysed	-	12/10/2021	12/10/2021	12/10/2021
Electrical Conductivity 1:5 soil:water	µS/cm	790	110	49
Texture Value	-	9.0	9.0	14
Texture	-	CLAY LOAM	CLAY LOAM	SANDY LOAM
ECe	dS/m	7.1	<2	<2
Class	-	MODERATELY SALINE	NON SALINE	NON SALINE

CEC				
Our Reference		280023-22	280023-24	280023-31
Your Reference	UNITS	BH104	BH104	BH108
Depth		0.04-0.3	1.5-1.95	0.1-0.4
Type of sample		Soil	Soil	Soil
Date Sampled		1/10/2021	1/10/2021	30/09/2021
Date prepared	-	14/10/2021	14/10/2021	14/10/2021
Date analysed	-	14/10/2021	14/10/2021	14/10/2021
Exchangeable Ca	meq/100g	100	33	2.4
Exchangeable K	meq/100g	1.8	0.7	1.1
Exchangeable Mg	meq/100g	46	14	1.6
Exchangeable Na	meq/100g	2.0	0.3	0.2
Cation Exchange Capacity	meq/100g	153	48	5.2

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-002	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.
Inorg-081	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.
INORG-123	Determined using a "Texture by Feel" method.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	280023-34
Electrical Conductivity 1:5 soil:water	μS/cm	1	Inorg-002	<1	14	53	49	8	101	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	14	7.8	7.9	1	102	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	14	10	10	0	95	75
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	14	32	30	6	93	#
Resistivity in soil*	ohm m	1	Inorg-002	<1	14	190	200	5	[NT]	[NT]

QUALITY CONTROL: Soil Aggressivity					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Electrical Conductivity 1:5 soil:water	μS/cm	1	Inorg-002	[NT]	40	13	14	7	[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	40	5.9	5.9	0	[NT]	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	40	10	10	0	[NT]	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	40	<10	<10	0	[NT]	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	[NT]	40	760	720	5	[NT]	[NT]

QUALITY CONTROL: Texture and Salinity*					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/10/2021	[NT]	[NT]	[NT]	[NT]	13/10/2021	[NT]
Date analysed	-			13/10/2021	[NT]	[NT]	[NT]	[NT]	13/10/2021	[NT]
Electrical Conductivity 1:5 soil:water	μS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	280023-24
Date prepared	-			14/10/2021	22	14/10/2021	14/10/2021		14/10/2021	14/10/2021
Date analysed	-			14/10/2021	22	14/10/2021	14/10/2021		14/10/2021	14/10/2021
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	22	100	100	0	118	#
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	22	1.8	1.9	5	122	108
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	22	46	49	6	118	126
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	22	2.0	2.2	10	126	117

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

CEC - # High spike recovery was obtained for this sample. The sample was re-digested and re-spiked and the high recovery was confirmed. This is suspected to be from matrix interferences. However, an acceptable recovery was obtained for the LCS.

AGGRESSIVITY - # Percent recovery is not possible to report due to the high concentration of the analyte/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	C Ridley

Sample Login Details	
Your reference	E32507BR, Greenwich
Envirolab Reference	280023
Date Sample Received	11/10/2021
Date Instructions Received	11/10/2021
Date Results Expected to be Reported	15/10/2021

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	47 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH101-0.02-0.4	✓			
BH101-0.5-0.85	✓			
BH101-1.5-1.7				✓
BH101-1.7-1.95	✓			
BH101-2.4-2.5				✓
BH101-2.9-3.0				✓
BH101-3.9-4.0				✓
BH101-4.9-5.0				✓
BH101-5.9-6.0				✓
BH101-6.9-7.0				✓
BH101-7.4-7.5				✓
BH102-0.05-0.1	✓			
BH102-0.5-0.95	✓			
BH102-1.4-1.6	✓			
BH102-1.9-2.0				✓
BH102-2.4-2.5				✓
BH102-2.9-3.0				✓
BH102-3.9-4.0				✓
BH102-4.9-5.0				✓
BH102-5.9-6.0				✓
BH102-6.0-6.12				✓
BH104-0.04-0.3	✓	✓	✓	
BH104-0.5-0.95				✓
BH104-1.5-1.95	✓	✓	✓	
BH104-2.4-2.5				✓
BH104-3.2-3.45	✓			
BH104-4.2-4.3				✓
BH104-4.89-4.99				✓
BH104-5.87-5.97				✓
BH108-0-0.1				✓
BH108-0.1-0.4	✓	✓	✓	
BH108-0.8-1.0				✓

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

Sample ID	Soil Aggressivity	Texture and Salinity*	CEC	On Hold
BH108-1.4-1.5				✓
BH108-1.9-2.0	✓			
BH108-2.4-2.5				✓
BH108-2.9-3.0	✓			
BH108-3.9-4.0				✓
BH108-4.9-5.0				✓
BH108-5.9-6.0				✓
BH108-6.9-7.0	✓			
BH108-7.9-8.0	✓			
BH108-8.9-9.0				✓
BH108-9.9-10.0	✓			
BH108-10.9-11.0				✓
BH108-11.9-12.0				✓
BH108-12.9-13.0				✓
BH108-13.85-13.95				✓

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.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 1 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location: Greenwich
Sampler: HW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC					
6/10/2021	1	BH101	0.02-0.4	G	F: Silty gravelly sand	x	x		x	x	x						
6/10/2021	2	BH101	0.5-0.85	G	F: silty sand	x	x		x	x	x						
6/10/2021	3	BH101	1.5-1.7	G	F: silty sand												
6/10/2021	4	BH101	1.7-1.95	G	XW Sandstone	x	x		x	x	x						
6/10/2021	5	BH101	2.4-2.5	G	Sandstone												
6/10/2021	6	BH101	2.9-3.0	G	Sandstone												
6/10/2021	7	BH101	3.9-4.0	G	Sandstone												
6/10/2021	8	BH101	4.9-5.0	G	Sandstone												
6/10/2021	9	BH101	5.9-6.0	G	Sandstone												
6/10/2021	10	BH101	6.9-7.0	G	Sandstone												
6/10/2021	11	BH101	7.4-7.5	G	Sandstone												
6/10/2021	12	BH102	0.05-0.1	G	F: Silty gravelly sand	x	x		x	x	x						
6/10/2021	13	BH102	0.5-0.95	G	F: silty clay	x	x		x	x	x						
6/10/2021	14	BH102	1.4-1.6	G	Sandstone	x	x		x	x	x						
6/10/2021	15	BH102	1.9-2.0	G	Sandstone												
6/10/2021	16	BH102	2.4-2.5	G	Sandstone												
6/10/2021	17	BH102	2.9-3.0	G	Sandstone												
6/10/2021	18	BH102	3.9-4.0	G	Sandstone												
6/10/2021	19	BH102	4.9-5.0	G	Sandstone												
6/10/2021	20	BH102	5.9-6.0	G	Sandstone												
6/10/2021	21	BH102	6.0-6.12	G	Sandstone												
1/10/2021	22	BH104	0.04-0.3	G	F: sandy gravel	x	x	x	x	x	x	x					
1/10/2021	23	BH104	0.5-0.95	G	F: silty gravelly sand												
1/10/2021	24	BH104	1.5-1.95	G	F: silty gravelly sand	x	x	x	x	x	x	x					
1/10/2021	25	BH104	2.4-2.5	G	F: silty gravelly sand												

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 280023
Date Received: 8/10/2021
Time Received: 1600
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

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

Relinquished By:	Date:	Time:	Received By:	Date:
C Ridley	8/10/2021	1600	8/10/2021	1600

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E32507BR Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Craig Ridley cridley@jkenvironments.com.au

Location:	Greenwich	Sample Preserved in Esky on Ice
Sampler:	HW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC
1/10/2021	26	BH104	3.2-3.45	G	F: silty sand	x	x		x	x	x	
1/10/2021	27	BH104	4.2-4.3	G	Sandstone							
1/10/2021	28	BH104	4.89-4.99	G	Sandstone							
1/10/2021	29	BH104	5.87-5.97	G	Sandstone							
30/09/2021	30	BH108	0-0.1	G	Fill: Sandy Silty Clay							
30/09/2021	31	BH108	0.1-0.4	G	Fill: Sandy Silty Clay	X	X	x	x	x	x	x
30/09/2021	32	BH108	0.8-1.0	G	Sandstone							
30/09/2021	33	BH108	1.4-1.5	G	Sandstone							
30/09/2021	34	BH108	1.9-2.0	G	Sandstone	x	x		x	x	x	
30/09/2021	35	BH108	2.4-2.5	G	Sandstone							
30/09/2021	36	BH108	2.9-3.0	G	Sandstone	x	x		x	x	x	
30/09/2021	37	BH108	3.9-4.0	G	Sandstone							
30/09/2021	38	BH108	4.9-5.0	G	Sandstone							
30/09/2021	39	BH108	5.9-6.0	G	Sandstone							
30/09/2021	40	BH108	6.9-7.0	G	Sandstone	x	x		x	x	x	
30/09/2021	41	BH108	7.9-8.0	G	Silty Clay	x	x		x	x	x	
30/09/2021	42	BH108	8.9-9.0	G	Sandstone							
30/09/2021	43	BH108	9.9-10.0	G	Sandstone	x	x		x	x	x	
30/09/2021	44	BH108	10.9-11.0	G	Sandstone							
30/09/2021	45	BH108	11.9-12.0	G	Sandstone							
30/09/2021	46	BH108	12.9-13.0	G	Sandstone							
30/09/2021	47	BH108	13.85-13.95	G	Sandstone							

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	280023

Relinquished By:	Date:	Time:	Received By:	Date:
		160	[signature]	8/10/2021

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 280027-A

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32507BR, Greenwich**
Number of Samples	additional analysis
Date samples received	08/10/2021
Date completed instructions received	20/10/2021

Analysis Details

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

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

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

Report Details

Date results requested by	27/10/2021
Date of Issue	27/10/2021

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
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

svTRH (C10-C40) in Soil		
Our Reference		280027-A-11
Your Reference	UNITS	BH103
Depth		1.4-1.5
Type of sample		Soil
Date Sampled		6/10/2021
Date extracted	-	27/10/2021
Date analysed	-	27/10/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	69

TCLP Preparation - Acid						
Our Reference		280027-A-1	280027-A-5	280027-A-6	280027-A-8	280027-A-12
Your Reference	UNITS	BH101	BH102	BH102	BH103	BH104
Depth		0.02-0.4	0.05-0.1	0.5-0.95	0.03-0.4	0.04-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		6/10/2021	6/10/2021	6/10/2021	6/10/2021	1/10/2021
pH of soil for fluid# determ.	pH units	9.3	8.3	8.1	8.7	8.5
pH of soil TCLP (after HCl)	pH units	1.8	1.8	1.8	1.7	1.8
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.8	5.0	5.0	5.1	5.4

TCLP Preparation - Acid		
Our Reference		280027-A-13
Your Reference	UNITS	BH104
Depth		0.5-0.95
Type of sample		Soil
Date Sampled		1/10/2021
pH of soil for fluid# determ.	pH units	8.6
pH of soil TCLP (after HCl)	pH units	1.8
Extraction fluid used	-	1
pH of final Leachate	pH units	5.4

Metals from Leaching Fluid pH 2.9 or 5						
Our Reference		280027-A-1	280027-A-5	280027-A-6	280027-A-12	280027-A-13
Your Reference	UNITS	BH101	BH102	BH102	BH104	BH104
Depth		0.02-0.4	0.05-0.1	0.5-0.95	0.04-0.3	0.5-0.95
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		6/10/2021	6/10/2021	6/10/2021	1/10/2021	1/10/2021
Date extracted	-	25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Date analysed	-	25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Lead	mg/L	[NA]	[NA]	0.2	[NA]	[NA]
Nickel	mg/L	0.02	0.09	[NA]	0.07	0.06

PAHs in TCLP (USEPA 1311)			
Our Reference		280027-A-6	280027-A-8
Your Reference	UNITS	BH102	BH103
Depth		0.5-0.95	0.03-0.4
Type of sample		Soil	Soil
Date Sampled		6/10/2021	6/10/2021
Date extracted	-	26/10/2021	26/10/2021
Date analysed	-	27/10/2021	27/10/2021
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	71	88

CEC			
Our Reference		280027-A-5	280027-A-13
Your Reference	UNITS	BH102	BH104
Depth		0.05-0.1	0.5-0.95
Type of sample		Soil	Soil
Date Sampled		6/10/2021	1/10/2021
Date prepared	-	27/10/2021	27/10/2021
Date analysed	-	27/10/2021	27/10/2021
Exchangeable Ca	meq/100g	23	12
Exchangeable K	meq/100g	0.3	0.3
Exchangeable Mg	meq/100g	5.5	5.0
Exchangeable Na	meq/100g	0.3	0.2
Cation Exchange Capacity	meq/100g	29	17

sTPH in Soil (C10-C40)-Silica			
Our Reference		280027-A-13	280027-A-30
Your Reference	UNITS	BH104	SDup7
Depth		0.5-0.95	-
Type of sample		Soil	Soil
Date Sampled		1/10/2021	30/09/2021
Date extracted	-	27/10/2021	27/10/2021
Date analysed	-	27/10/2021	27/10/2021
TPH C_{10} - C_{14}	mg/kg	<50	<50
TPH C_{15} - C_{28}	mg/kg	150	<100
TPH C_{29} - C_{36}	mg/kg	230	<100
TPH >C_{10} -C_{16}	mg/kg	<50	<50
TPH >C_{16} -C_{34}	mg/kg	340	<100
TPH >C_{34} -C_{40}	mg/kg	100	<100
Surrogate o-Terphenyl	%	79	74

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-22	
Date extracted	-			27/10/2021	11	27/10/2021	27/10/2021		27/10/2021	[NT]
Date analysed	-			27/10/2021	11	27/10/2021	27/10/2021		27/10/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	11	<50	<50	0	127	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	11	<100	<100	0	137	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	11	<100	<100	0	76	[NT]
TRH $>C_{10}$ -C_{16}	mg/kg	50	Org-020	<50	11	<50	<50	0	127	[NT]
TRH $>C_{16}$ -C_{34}	mg/kg	100	Org-020	<100	11	<100	<100	0	137	[NT]
TRH $>C_{34}$ -C_{40}	mg/kg	100	Org-020	<100	11	<100	<100	0	76	[NT]
Surrogate o-Terphenyl	%		Org-020	83	11	69	69	0	88	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			25/10/2021	1	25/10/2021	25/10/2021		25/10/2021	[NT]
Date analysed	-			25/10/2021	1	25/10/2021	25/10/2021		25/10/2021	[NT]
Lead	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	101	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	1	0.02	0.02	0	100	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			26/10/2021	[NT]	[NT]	[NT]	[NT]	26/10/2021	[NT]
Date analysed	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	70	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	83	[NT]
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	78	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	77	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	86	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			27/10/2021	5	27/10/2021	27/10/2021		27/10/2021	[NT]
Date analysed	-			27/10/2021	5	27/10/2021	27/10/2021		27/10/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	5	23	21	9	109	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	5	0.3	0.3	0	110	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	5	5.5	4.9	12	104	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	5	0.3	0.2	40	115	[NT]

QUALITY CONTROL: sTPH in Soil (C10-C40)-Silica					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
Date analysed	-			27/10/2021	[NT]	[NT]	[NT]	[NT]	27/10/2021	[NT]
TPH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TPH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TPH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TPH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TPH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TPH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
Surrogate o-Terphenyl	%		Org-020	102	[NT]	[NT]	[NT]	[NT]	96	[NT]

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	C Ridley

Sample Login Details	
Your reference	E32507BR, Greenwich
Envirolab Reference	280027-A
Date Sample Received	08/10/2021
Date Instructions Received	20/10/2021
Date Results Expected to be Reported	27/10/2021

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

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	sTPH in Soil (C10-C40)-Silica	On Hold
BH101-0.02-0.4	✓		✓																				
BH101-0.5-0.85																							✓
BH101-1.5-1.7																							✓
BH101-1.7-1.95																							✓
BH102-0.05-0.1	✓		✓																		✓		
BH102-0.5-0.95	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH102-1.4-1.6																							✓
BH103-0.03-0.4	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH103-0.5-0.7																							✓
BH103-0.7-0.95																							✓
BH103-1.4-1.5																						✓	
BH104-0.04-0.3	✓		✓																				
BH104-0.5-0.95	✓		✓																		✓	✓	
BH104-1.5-1.95																							✓
BH104-3.0-3.2																							✓
BH104-3.2-3.45																							✓
BH104-3.8-4.1																							✓
BH108-0-0.1																							✓
BH108-0.1-0.4																							✓
BH108-0.8-1.0																							✓

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

Sample ID	TCLP Preparation - Acid	Lead	Nickel	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	sTPH in Soil (C10-C40)-Silica	On Hold
BH117-0-0.1																							✓
BH117-0.5-0.95																							✓
BH117-0.5-1.5																							✓
BH117-1.3-1.5																							✓
BH119-0.05-0.3																							✓
BH119-0.5-0.8																							✓
BH119-1.0-1.3																							✓
BH119-1.8-2.0																							✓
BH119-2.4-2.5																							✓
SDup7																						✓	
SDup9																							✓
PFAS Dup 2																							✓
PFASDup4																							✓
PFASDup5																							✓
FRI-SPT																							✓
PFAS Soil																							✓

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

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

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.

Ming To

Subject: FW: Results for Registration 280027 E32507BR, Greenwich

Ref: 280027-A.
TAT: Standard.
Due: 27/10/2021
MT

280027-A

From: Craig Ridley <CRidley@jkenvironments.com.au>
Sent: Wednesday, 20 October 2021 5:26 PM
To: Greta Petzold <GPetzold@envirolab.com.au>
Cc: Samplereceipt <Samplereceipt@envirolabservices.com.au>
Subject: Re: Results for Registration 280027 E32507BR, Greenwich

Hi Greta,

Can we please arrange for the following additional analysis for this sample batch (standard turnaround):

Sample ID and Depth	Lab Reference	Test Required
BH101 (0.02-0.4m) 1.	1	TCLP Nickel
BH102 (0.05-0.1m) 5	5	TCLP Nickel, CEC
BH102 (0.5-0.95m) 6.	6	TCLP Lead, TCLP PAH
BH103 (0.03-0.4m) 8	8	TCLP PAH
BH103 (1.4-1.5m) 11	11	TRH (Silica Gel)
BH104 (0.04-0.3m) 12	12	TCLP Nickel
BH104 (0.5-0.95m) 13	13	TCLP Nickel, TRH (Silica Gel), CEC
SDUP7 30	30	TRH (Silica Gel)

Any issues, please call.

Thanks,

Craig

Regards

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 280509

Client Details

Client	JK Environments
Attention	C Ridley
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E32507BR, Greenwich**
Number of Samples	11 Water
Date samples received	15/10/2021
Date completed instructions received	15/10/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	22/10/2021
Date of Issue	22/10/2021

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
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Senior Chemist
Jenny He, Chemist
Josh Williams, LC Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/10/2021	18/10/2021	18/10/2021	18/10/2021	18/10/2021
Date analysed	-	18/10/2021	18/10/2021	18/10/2021	18/10/2021	18/10/2021
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	42	<1	16	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	7	<1	2	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference	UNITS	280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference		MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	110	105	109	108
Surrogate toluene-d8	%	101	100	101	100	99
Surrogate 4-BFB	%	111	110	110	110	109

VOCs in water			
Our Reference		280509-6	280509-7
Your Reference	UNITS	MW109	WDUP1
Date Sampled		14/10/2021	13/10/2021
Pump ID		27.2	-
Type of sample		Water	Water
Date extracted	-	18/10/2021	18/10/2021
Date analysed	-	18/10/2021	18/10/2021
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	<1	<1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1

VOCs in water			
Our Reference		280509-6	280509-7
Your Reference	UNITS	MW109	WDUP1
Date Sampled		14/10/2021	13/10/2021
Pump ID		27.2	-
Type of sample		Water	Water
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	108	108
Surrogate toluene-d8	%	99	100
Surrogate 4-BFB	%	111	110

vTRH(C6-C10)/BTEXN in Water						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/10/2021	18/10/2021	18/10/2021	18/10/2021	18/10/2021
Date analysed	-	18/10/2021	18/10/2021	18/10/2021	18/10/2021	18/10/2021
TRH C_6 - C_9	µg/L	43	<10	22	<10	<10
TRH C_6 - C_{10}	µg/L	44	<10	23	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	44	<10	23	<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	%	103	110	105	109	108
Surrogate toluene-d8	%	101	100	101	100	99
Surrogate 4-BFB	%	111	110	110	110	109

vTRH(C6-C10)/BTEXN in Water					
Our Reference		280509-6	280509-7	280509-9	280509-10
Your Reference	UNITS	MW109	WDUP1	TS-W1	TB-W1
Date Sampled		14/10/2021	13/10/2021	13/10/2021	13/10/2021
Pump ID		27.2	-	-	-
Type of sample		Water	Water	Water	Water
Date extracted	-	18/10/2021	18/10/2021	18/10/2021	18/10/2021
Date analysed	-	18/10/2021	18/10/2021	21/10/2021	21/10/2021
TRH C_6 - C_9	µg/L	<10	<10	[NA]	[NA]
TRH C_6 - C_{10}	µg/L	<10	<10	[NA]	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	[NA]	[NA]
Benzene	µg/L	<1	<1	96%	<1
Toluene	µg/L	<1	<1	103%	<1
Ethylbenzene	µg/L	<1	<1	115%	<1
m+p-xylene	µg/L	<2	<2	110%	<2
o-xylene	µg/L	<1	<1	110%	<1
Naphthalene	µg/L	<1	<1	[NA]	[NA]
Surrogate Dibromofluoromethane	%	108	108	105	104
Surrogate toluene-d8	%	99	100	101	100
Surrogate 4-BFB	%	111	110	100	103

svTRH (C10-C40) in Water						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Date analysed	-	20/10/2021	20/10/2021	20/10/2021	20/10/2021	20/10/2021
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	92	84	89	100

svTRH (C10-C40) in Water			
Our Reference		280509-6	280509-7
Your Reference	UNITS	MW109	WDUP1
Date Sampled		14/10/2021	13/10/2021
Pump ID		27.2	-
Type of sample		Water	Water
Date extracted	-	19/10/2021	19/10/2021
Date analysed	-	20/10/2021	20/10/2021
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50
Surrogate o-Terphenyl	%	76	84

PAHs in Water - Low Level						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Date analysed	-	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	0.3
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	0.29
Surrogate p-Terphenyl-d14	%	77	96	90	94	91

PAHs in Water - Low Level			
Our Reference		280509-6	280509-7
Your Reference	UNITS	MW109	WDUP1
Date Sampled		14/10/2021	13/10/2021
Pump ID		27.2	-
Type of sample		Water	Water
Date extracted	-	19/10/2021	19/10/2021
Date analysed	-	19/10/2021	19/10/2021
Naphthalene	µg/L	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	5.1	<0.1
Fluorene	µg/L	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5
Total +ve PAH's	µg/L	5.1	<0.1
Surrogate p-Terphenyl-d14	%	75	77

PFAS in Waters Extended				
Our Reference		280509-3	280509-8	280509-11
Your Reference	UNITS	MW105	WPFASDUP1	PFASTB-W
Date Sampled		14/10/2021	14/10/2021	13/10/2021
Pump ID		2.8	-	-
Type of sample		Water	Water	Water
Date prepared	-	18/10/2021	18/10/2021	20/10/2021
Date analysed	-	18/10/2021	18/10/2021	20/10/2021
Perfluorobutanesulfonic acid	µg/L	<0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01	<0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	97	96	91
Surrogate $^{13}C_2$ *PFOA*	%	100	111	112
Extracted ISTD $^{13}C_3$ *PFBS*	%	94	95	97
Extracted ISTD $^{18}O_2$ *PFHxS*	%	111	111	108
Extracted ISTD $^{13}C_4$ *PFOS*	%	100	99	104

PFAS in Waters Extended				
Our Reference		280509-3	280509-8	280509-11
Your Reference	UNITS	MW105	WPFASDUP1	PFASTB-W
Date Sampled		14/10/2021	14/10/2021	13/10/2021
Pump ID		2.8	-	-
Type of sample		Water	Water	Water
Extracted ISTD $^{13}C_4$ *PFBA*	%	101	101	109
Extracted ISTD $^{13}C_3$ *PFPeA*	%	95	96	97
Extracted ISTD $^{13}C_2$ *PFHxA*	%	113	112	98
Extracted ISTD $^{13}C_4$ *PFHpA*	%	113	113	101
Extracted ISTD $^{13}C_4$ *PFOA*	%	110	108	113
Extracted ISTD $^{13}C_5$ *PFNA*	%	124	122	128
Extracted ISTD $^{13}C_2$ *PFDA*	%	121	123	114
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	123	108	123
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	107	100	104
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	81	87	83
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	111	107	122
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	111	108	166
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	100	100	152
Extracted ISTD $^{13}C_8$ *FOSA*	%	110	112	107
Extracted ISTD d_3 *N MeFOSA*	%	110	110	103
Extracted ISTD d_5 *N EtFOSA*	%	109	107	97
Extracted ISTD d_7 *N MeFOSE*	%	123	123	109
Extracted ISTD d_9 *N EtFOSE*	%	111	115	105
Extracted ISTD d_3 *N MeFOSAA*	%	119	120	143
Extracted ISTD d_5 *N EtFOSAA*	%	107	97	179
Total Positive PFHxS & PFOS	µg/L	<0.01	<0.01	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01	<0.01	<0.01
Total Positive PFAS	µg/L	<0.01	<0.01	<0.01

HM in water - dissolved						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Date analysed	-	19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Arsenic-Dissolved	µg/L	2	1	<1	3	2
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.2	0.2	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	6	5	7	5
Lead-Dissolved	µg/L	<1	<1	<1	17	3
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	3	<1	18	10	5
Zinc-Dissolved	µg/L	40	6	81	73	47

HM in water - dissolved			
Our Reference		280509-6	280509-7
Your Reference	UNITS	MW109	WDUP1
Date Sampled		14/10/2021	13/10/2021
Pump ID		27.2	-
Type of sample		Water	Water
Date prepared	-	19/10/2021	19/10/2021
Date analysed	-	19/10/2021	19/10/2021
Arsenic-Dissolved	µg/L	1	2
Cadmium-Dissolved	µg/L	<0.1	0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	4	4
Lead-Dissolved	µg/L	<1	3
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	3	5
Zinc-Dissolved	µg/L	18	38

Miscellaneous Inorganics						
Our Reference		280509-1	280509-2	280509-3	280509-4	280509-5
Your Reference	UNITS	MW101	MW102	MW105	MW106	MW107
Date Sampled		14/10/2021	14/10/2021	14/10/2021	14/10/2021	13/10/2021
Pump ID		29.7	40.3	2.8	11.2	2.4
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	15/10/2021	15/10/2021	15/10/2021	15/10/2021	15/10/2021
Date analysed	-	15/10/2021	15/10/2021	15/10/2021	15/10/2021	15/10/2021
pH	pH Units	6.2	7.0	5.4	4.5	4.9
Electrical Conductivity	µS/cm	300	69	590	350	250
Sulphate, SO4	mg/L	36	4	150	65	40
Chloride, Cl	mg/L	25	4	16	42	32

Miscellaneous Inorganics		
Our Reference		280509-6
Your Reference	UNITS	MW109
Date Sampled		14/10/2021
Pump ID		27.2
Type of sample		Water
Date prepared	-	15/10/2021
Date analysed	-	15/10/2021
pH	pH Units	5.3
Electrical Conductivity	µS/cm	240
Sulphate, SO4	mg/L	48
Chloride, Cl	mg/L	19

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-081	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.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-029	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. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 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. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			18/10/2021	1	18/10/2021	20/10/2021		18/10/2021	[NT]
Date analysed	-			18/10/2021	1	18/10/2021	21/10/2021		18/10/2021	[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	110	[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	42	36	15	104	[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	98	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	106	[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	[NT]	[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	104	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	7	5	33	102	[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	[NT]	[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	94	[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	103	[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	[NT]	[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	[NT]	[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]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[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	106	1	103	102	1	102	[NT]
Surrogate toluene-d8	%		Org-023	100	1	101	100	1	102	[NT]
Surrogate 4-BFB	%		Org-023	109	1	111	103	7	104	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			18/10/2021	1	18/10/2021	20/10/2021		18/10/2021	[NT]
Date analysed	-			18/10/2021	1	18/10/2021	21/10/2021		18/10/2021	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	43	45	5	103	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	44	45	2	103	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	107	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	106	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	96	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	102	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	98	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	106	1	103	102	1	102	[NT]
Surrogate toluene-d8	%		Org-023	100	1	101	100	1	102	[NT]
Surrogate 4-BFB	%		Org-023	102	1	111	103	7	104	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	280509-7
Date extracted	-			19/10/2021	1	19/10/2021	19/10/2021		19/10/2021	19/10/2021
Date analysed	-			20/10/2021	1	20/10/2021	20/10/2021		20/10/2021	20/10/2021
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	112	94
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	114	99
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	94	85
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	112	94
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	114	99
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	94	85
Surrogate o-Terphenyl	%		Org-020	91	1	90	78	14	95	78

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	280509-2
Date extracted	-			19/10/2021	[NT]	[NT]	[NT]	[NT]	19/10/2021	19/10/2021
Date analysed	-			19/10/2021	[NT]	[NT]	[NT]	[NT]	19/10/2021	19/10/2021
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	87	104
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	67	83
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	77	98
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	118
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	81	93
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	91
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	66	76
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	70	83
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	88	[NT]	[NT]	[NT]	[NT]	83	93

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			20/10/2021	11	20/10/2021	20/10/2021		20/10/2021	[NT]
Date analysed	-			20/10/2021	11	20/10/2021	20/10/2021		20/10/2021	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	115	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	105	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	96	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	103	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	102	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	78	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	107	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	116	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	101	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	117	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	99	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	100	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	91	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	95	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	11	<0.05	<0.05	0	105	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	11	<0.1	<0.1	0	93	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	11	<0.5	<0.5	0	110	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	104	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	11	<0.01	<0.01	0	108	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	105	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	117	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	11	<0.1	<0.1	0	102	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	11	<0.05	<0.05	0	106	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	11	<0.1	<0.1	0	112	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	11	<0.05	<0.05	0	113	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	11	<0.5	<0.5	0	95	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	123	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	11	<0.02	<0.02	0	117	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	101	11	91	101	10	97	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	113	11	112	115	3	113	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	92	11	97	93	4	94	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	113	11	108	108	0	107	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	100	11	104	96	8	97	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	112	11	109	107	2	108	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	99	11	97	96	1	95	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	102	11	98	93	5	103	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	108	11	101	108	7	100	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	110	11	113	100	12	103	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	130	11	128	116	10	118	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	125	11	114	110	4	117	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	121	11	123	107	14	121	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	103	11	104	99	5	96	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	84	11	83	71	16	83	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	119	11	122	110	10	106	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	114	11	166	116	35	86	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	142	11	152	112	30	120	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	107	11	107	105	2	102	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	104	11	103	103	0	101	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	98	11	97	99	2	98	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	117	11	109	113	4	112	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	112	11	105	96	9	105	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	135	11	143	123	15	109	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	111	11	179	107	50	89	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	280509-2
Date prepared	-			19/10/2021	1	19/10/2021	19/10/2021		19/10/2021	19/10/2021
Date analysed	-			19/10/2021	1	19/10/2021	19/10/2021		19/10/2021	19/10/2021
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	2	1	67	94	93
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	97	94
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	94	94
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	95	97
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	1	0	94	93
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	105	102
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	94	95
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	40	40	0	98	101

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			15/10/2021	1	15/10/2021	15/10/2021		15/10/2021	[NT]
Date analysed	-			15/10/2021	1	15/10/2021	15/10/2021		15/10/2021	[NT]
pH	pH Units		Inorg-001	[NT]	1	6.2	6.2	0	101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	300	300	0	100	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	36	36	0	86	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	25	25	0	88	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

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).

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	C Ridley

Sample Login Details	
Your reference	E32507BR, Greenwich
Envirolab Reference	280509
Date Sample Received	15/10/2021
Date Instructions Received	15/10/2021
Date Results Expected to be Reported	22/10/2021

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	8 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	8
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Sample NOT RECEIVED - TS-W1, TB-W1 and PFASTB-W1

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	PFAS in Waters Extended	HM in water - dissolved	pH	Electrical Conductivity	Sulphate, SO4	Chloride, Cl
MW101	✓	✓	✓	✓		✓	✓	✓	✓	✓
MW102	✓	✓	✓	✓		✓	✓	✓	✓	✓
MW105	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW106	✓	✓	✓	✓		✓	✓	✓	✓	✓
MW107	✓	✓	✓	✓		✓	✓	✓	✓	✓
MW109	✓	✓	✓	✓		✓	✓	✓	✓	✓
WDUP1	✓	✓	✓	✓		✓				
WPFASDUP1					✓					

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.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201	JKE Job Number: E32507BR Date Results Required: STANDARD	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001
Attention: Aileen	Page: 1 of 1	Attention: Craig Ridley

Location: Greenwich

Sampler: MME

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 2	Combo 3L	VOCs	pH / EC	8 Metals	PAHs	TRH/BTEX	BTEX	Hardness	Sulfate and Chloride	PFAS	
14/10/2021	1	MW101	G1 x2, V x3, H, PVC x2	29.7	Water		X	X	X						X		
14/10/2021	2	MW102	G1 x2, V x3, H, PVC	40.3	Water		X	X	X						X		
14/10/2021	3	MW105	G1 x2, V x3, H, PVC, PFAS	2.8	Water		X	X	X						X	X	
14/10/2021	4	MW106	G1 x2, V x3, H, PVC	11.2	Water		X	X	X						X		
13/10/2021	5	MW107	G1 x 2, V x 3, H, PVC	2.4	Water		X	X	X						X		
14/10/2021	6	MW109	G1 x 2, V x 3, H, PVC	27.2	Water		X	X	X						X		
13/10/2021	7	WDUP1	G1 x 2, V x 3, H, PVC	-	Duplicate		X	X									
14/10/2021	—	WDUP2	G1 x 2, V x 3, H, PVC	-	Duplicate		X	X		SEND TO VIC							
14/10/2021	8	WPFASDUP1	PFAS	-	Duplicate											X	
13/10/2021	NR	TS-W1	V		Trip Spike								X				
13/10/2021	NR	TB-W1	V		Trip Blank								X				
13/10/2021	NR	PFASTB-W1	PFAS		PFAS Blank											X	

Remarks (comments/detection limits required):	Sample Containers:
All analysis PQLs to ANZECC (2000) Detection Limits Please	G1 - 100mL Amber Glass Bottle G2 - 1L Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles PFAS - PFAS Bottle

Relinquished By:	Date:	Time:	Received By:	Date:
			[signature]	15/10/21

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 280509
Date Received: 15/10/21
Time Received: 16:05
Received By: Ar
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Appendix H: Groundwater Field Records

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	TSA
Project:	Proposed Hospital Redevelopment
Location:	97-115 River Road, GREENWICH, NSW
Job Number:	E32507BR

DISSOLVED OXYGEN

Make: YSI 4	Model: Professional Plus
Date of calibration: 06·10·21	Name of Calibrator: MME
Span value: 70% to 130%	
Measured value: 106%	
Measured reading Acceptable (Yes/No):	

pH

Make: YSI 4	Model: Professional Plus	
Date of calibration: 6/10/21	Name of Calibrator: MME	
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 08/22	Lot No: 367754
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 06/22	Lot No: 366070
Measured reading of Buffer 1: 7·05		
Measured reading of Buffer 2: 4·0		
Slope: —	Measured reading Acceptable (Yes/No):	

EC

Make: YSI 4		Model: Professional Plus	
Date: 06·10·21	Name of Calibrator: MME		Temperature: 23 °C
Calibration solution: Conductivity standard		Expiry date: 11/22	Lot No: 373623
Theoretical conductivity at temperature (see solution container): 1359 µS/cm			
Measured conductivity: 1360 µS/cm		Measured reading Acceptable (Yes/No):	

REDOX

Make: YSI 4	Model: Professional Plus	
Date of calibration: 06·10·21	Name of Calibrator: MME	
Calibration solution: ORP Test Solution	Expiry date: 04/26	Lot No: 6393
Theoretical redox value: 240mV		
Measured redox reading: 240·9 mV	Measured reading Acceptable (Yes/No):	

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	TSA		
Project:	Proposed Hospital Redevelopment		
Location:	97-115 River Road, GREENWICH, NSW		
Job Number:	E32507BR		
DISSOLVED OXYGEN			
Make: YSI 4		Model: Professional Plus	
Date of calibration: 7/10/21		Name of Calibrator: MME	
Span value: 70% to 130%			
Measured value: 94%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 4		Model: Professional Plus	
Date of calibration: 7/10/21		Name of Calibrator: MME	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 8/22	Lot No: 367754
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 6/22	Lot No: 366070
Measured reading of Buffer 1: 7.02			
Measured reading of Buffer 2: 4.00			
Slope: —		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI4		Model: Professional Plus	
Date: 7/10/21	Name of Calibrator: MME		Temperature: 19.8 °C
Calibration solution: Conductivity standard		Expiry date: 11/22	Lot No: 373623
Theoretical conductivity at temperature (see solution container): 1278 µS/cm			
Measured conductivity: 1251 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI 4		Model: Professional Plus.	
Date of calibration: 7/10/21		Name of Calibrator: MME	
Calibration solution: ORP Test Solution		Expiry date: 4/26	Lot No: 6393
Theoretical redox value: 240mV			
Measured redox reading: 240.2 mV		Measured reading Acceptable (Yes/No):	

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	TSA		
Project:	Proposed Hospital Redevelopment		
Location:	97-115 River Road, GREENWICH, NSW		
Job Number:	E32507BR2		
DISSOLVED OXYGEN			
Make: YSI		Model: Professional plus	
Date of calibration: 5/10/21		Name of Calibrator: HW	
Span value: 70% to 130%			
Measured value: 99%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI		Model: Professional plus	
Date of calibration: 5/10/21		Name of Calibrator: HW	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 8/22	Lot No: 367754
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 6/22	Lot No: 366070
Measured reading of Buffer 1: 7.62			
Measured reading of Buffer 2: 4.75			
Slope: —		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI		Model: Professional plus	
Date: 5/10/21	Name of Calibrator: HW		Temperature: 20.3 °C
Calibration solution: Conductivity Standard		Expiry date: 11/22	Lot No: 373623
Theoretical conductivity at temperature (see solution container): 1278 µS/cm			
Measured conductivity: 1372 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI		Model: Professional plus	
Date of calibration: 5/10/21		Name of Calibrator: HW	
Calibration solution: ORP Test Solution		Expiry date: 4/26	Lot No: 6393
Theoretical redox value: 240mV			
Measured redox reading: 229.7 mV		Measured reading Acceptable (Yes/No):	

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	TSA
Project:	Proposed Hospital Redevelopment
Location:	97-115 River Road, GREENWICH, NSW
Job Number:	E32507BR

PID

Make: Mini Rae	Model: 2000	Unit: Yellow	Date of last factory calibration: 10/09/2021
Date of calibration: 6/10/21		Name of Calibrator: MME	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.2 ppm		Error in measured reading: ± 0.02 ppm	
Measured reading Acceptable (Yes/No):			

PID

Make: Mini Rae	Model: 2000	Unit: Yellow	Date of last factory calibration: 10/09/2021
Date of calibration: 7/10/21		Name of Calibrator: MME	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 99.7 ppm		Error in measured reading: ± 0.03 ppm	
Measured reading Acceptable (Yes/No):			

PID

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):			

PID

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):			

PID

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):			

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW101
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	7.5

WELL FINISH DETAILS

Gatic Cover ☒ Standpipe ☐ Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump.	**SWL – Before (m):**	2.29 m
Date:	6/10/21	**Time – Before:**	2:13pm
Undertaken By:	MME	**SWL – After (m):**	Dry
Total Vol. Removed:	14 L	**Time – After:**	2:17 pm
PID Reading (ppm):	2.7ppm.		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1	19.6	7.2	274.5	6.73	198
2	19.1	2.3	385	6.62	192.6
3	19.2	2.3	417.9	6.57	185.9
4	19.5	2.4	422.5	6.54	182
6	19.9	2.4	369.9	6.50	178.7
8	19.9	2.1	368	6.44	178.1
10	19.8	1.8	428.1	6.42	177.4
12	19.8	1.5	420.7	6.42	175.8
14	19.6	1.3	386.4	6.43	171.7

Comments: **Odours (YES / NO)** **NAPL/PSH (YES / NO)** **Sheen (YES / NO)** **Steady State Achieved (YES / NO)**

YSI Used: 4.

Tested By:	MME.	**Remarks:**
Date Tested:	6/10/21.	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	**VB**	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	E32507BR2
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW102
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	6.1

WELL FINISH DETAILS

Gatic Cover ☒ Standpipe ☐ Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump.	**SWL – Before (m):**	3.70
Date:	7/10/21.	**Time – Before:**	9:35 am.
Undertaken By:	MME	**SWL – After (m):**	Dry
Total Vol. Removed:	5 L	**Time – After:**	9:37 am.
PID Reading (ppm):	29.8		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1	17.5	8.1	201.9	6.93	158.6
2	18.8	6.5	220.9	6.73	158.9
4	18.8	~~7~~5.8	230.9	6.57	149.3
5.	18.7	5.2	219.5	6.53	138.0

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4.

Tested By:	MME	**Remarks:**
Date Tested:	7/10/21	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	**VB**	
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	E32507BR2
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW104
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	6.0

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump	**SWL – Before (m):**	Dry
Date:	5/10/21	**Time – Before:**	—
Undertaken By:	MME	**SWL – After (m):**	—
Total Vol. Removed:	—	**Time – After:**	—
PID Reading (ppm):	24 ppm		
Comments:			

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)

Comments: ~~Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)~~

YSI Used: 4

Tested By:	MME	**Remarks:** - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	5/10/21	
Checked By:	**VB**	
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	E32507BR2
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW105
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	7.85 m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump.	**SWL – Before (m):**	5.80 m
Date:	5/10/21.	**Time – Before:**	12:40 pm.
Undertaken By:	MME.	**SWL – After (m):**	Dry.
Total Vol. Removed:	3 L.	**Time – After:**	12:48 pm.
PID Reading (ppm):	1.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1	21.1	6.4	451.1	5.85	64.5
2	20.6	5.5	524	5.75	66.3
3.	20.2	5.6	514	5.68	64.0.

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4

Tested By:	MME.	**Remarks:** - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	5/10/21.	
Checked By:	**VB**	
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	E32507BR2
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW106
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	12.52m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump	**SWL – Before (m):**	8.26
Date:	5/10/21	**Time – Before:**	12:20pm.
Undertaken By:	MME	**SWL – After (m):**	Dry.
Total Vol. Removed:	10L.	**Time – After:**	12:30pm.
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
1	20.8	8.2	319.4	6.33	83.4
2	21.7	6.4	343.2	6.17	77.6
3	21.6	5.4	345.5	6.00	78.6
4	21.5	4.9	347.2	5.81	82.8
5	21.5	4.6	347.0	5.63	85.0
6	21.4	4.4	348.4	5.51	86.3
7	21.4	4.3	349.7	5.42	86.1
8	21.4	4.2	350.4	5.35	85.8
9	21.4	4.2	353.2	5.27	85.4
10.	21.4	4.2	354.8	5.22	85.1

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4.

Tested By:	MME	**Remarks:**
Date Tested:	5/10/21.	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	**VB**	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR2**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW107
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	14.93m

WELL FINISH DETAILS

	Gatic Cover ☒	**Standpipe** ☐	**Other (describe)** ☐

WELL DEVELOPMENT DETAILS

Method:	Pump	**SWL – Before (m):**	8.75
Date:	5/10/21	**Time – Before:**	9:18 am
Undertaken By:	MME	**SWL – After (m):**	Dry
Total Vol. Removed:		**Time – After:**	9:21 am
PID Reading (ppm):	1.7		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (μS/cm)	pH	Eh (mV)
0.5	18.6	5.2	308.5	6.6	130.6
1	19.0	4.0	264.9	6.44	123.4
2	19.2	3.5	253.4	6.33	117.7
3	19.2	3.2	250.8	6.27	110.8
4	19.3	2.8	249.9	6.17	105.3

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO) Steady State Achieved (YES / NO)

YSI Used: 4

Tested By:	MME	**Remarks:** - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	5/10/21	
Checked By:	**VB**	
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR2**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW109
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	12.54 m

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Pump.	**SWL – Before (m):**	7.27
Date:	5/10/21	**Time – Before:**	10:00 am.
Undertaken By:	MME	**SWL – After (m):**	Dry
Total Vol. Removed:	~~3.0~~ 4.0	**Time – After:**	10:07 am.
PID Reading (ppm):	12.3		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	20.4	5.5	242.1	5.92	79.4
1.0	19.8	4.9	262.2	5.80	78.0
1.5	19.9	4.9	261.5	5.68	75.2
2.0	19.9	5.0	250.7	5.56	72.8
2.5	19.9	5.4	246.8	5.33	71.9
3.0	20.0	5.2	245.4	5.10	71.7
3.5	20.0	3.1	243.0	4.85	73.1
4.0	20.3	2.6	244.8	4.73	73.5

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4

Tested By:	MME	**Remarks:**
Date Tested:	5/10/21.	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	**VB**	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR2**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW119.
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	5.75m

WELL FINISH DETAILS

	Gatic Cover ☒	**Standpipe** ☐	**Other (describe)** ☐

WELL DEVELOPMENT DETAILS

Method:	Pump.	**SWL – Before (m):**	Dry at 2.57
Date:	5/10/21.	**Time – Before:**	—
Undertaken By:	MME	**SWL – After (m):**	—
Total Vol. Removed:	—	**Time – After:**	—
PID Reading (ppm):	1.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
Dry					

Comments: ~~Odours (YES / NO)~~, ~~NAPL/PSH (YES / NO)~~, ~~Sheen (YES / NO)~~, ~~Steady State Achieved (YES / NO)~~

YSI Used:

Tested By:	MME	**Remarks:**
Date Tested:	5/10/21.	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	**VB**	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	**17-01-22**	

JKEnvironments

Client:	TSA	Job No.:	E32507BR
Project:	Proposed Hospital Redevelopment	Well No.:	MW101
Location:	97-115 River Road, GREENWICH, NSW	Depth (m):	7.5

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow.	SWL – Before:	3.58 m.
Date:	14/10/21	Time – Before:	10:18
Undertaken By:	MME	Total Vol Removed:	0.9 L.
Pump Program No:	–	PID (ppm):	29.7

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
10:23.	3.65	0.4		20.0	3.2	301.2	5.75	-8.6
10:28	3.69	0.5		21.0	1.6	308.1	5.78	-36.7
10:33	3.70	0.6		21.3	1.6	317.2	5.80	-38.3
10:38	3.72	0.7		21.0	1.7	317.0	5.80	-36.8
10:43.	3.74	0.8.		20.9	1.4	316.2	5.79	-37.0
10:48	3.75	0.9		20.9	1.4	316.1	5.79	-37.1
			start sampling					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 3 x BTEX vials, 1 x HNO3 plastic, ~~x H2SO4 plastic~~, 2 x unpreserved plastic

YSI used: 5

Tested By: ~~Craig Ridley~~ MME		**Remarks:**
Date Tested:	14/10/21.	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Checked By:	CR	
Date:	15/10/21	

JKEnvironments

Client:	TSA	**Job No.:**	E32507BR
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW102
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	6.1

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow.	**SWL – Before:**	3.67 m.
Date:	14/10/21.	**Time – Before:**	11:21 am.
Undertaken By:	MME	**Total Vol Removed:**	1.0 L
Pump Program No:	—	**PID (ppm):**	40.3

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
11:23.	3.77	0.3		20.5	5.4	45.6	6.57	-40.2
11:25	3.81	0.4		20.5	4.7	44.8	6.51	-50.4
11:29	3.88	0.5		20.4	3.8	73.5	6.41	-51.5
11:36.	3.94	0.6		20.8	3.8	71.3	6.32	-46.8
11:43	3.97	0.7		21.4	3.9	71.2	6.34	-45.2
11:49	4.02	0.8		22.0	3.7	71.6	6.46	-46.5
11:55	4.04	0.9		22.0	3.5	71.7	6.46	-43.6
12:01	4.07	1.0		22.0	3.6	71.7	6.46	-44.0
			start Sampling					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 3 x BTEX vials, | x HNO3 plastic, ~~x H2SO4 plastic~~, | x unpreserved plastic

YSI used: 5

Tested By: ~~Craig Ridley~~ MME.	**Remarks:**
Date Tested: 14/10/21.	- Steady state conditions
Checked By: CR	- difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Date: 15/10/21	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW104.
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	6.0

WELL FINISH

X	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Low flow sampling.	**SWL – Before:**	Dry.
Date:	13/10/21.	**Time – Before:**	2:24pm.
Undertaken By:	MME	**Total Vol Removed:**	-
Pump Program No:	–	**PID (ppm):**	15.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic

YSI used:

Tested By: ~~Craig Ridley~~ MME.	**Remarks:**
Date Tested: 13/10/21.	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Checked By: CR	
Date: 15/10/21	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW105
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	7.85

WELL FINISH

X	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Low flow	**SWL – Before:**	6.03
Date:	14/10/21	**Time – Before:**	12:37 pm
Undertaken By:	MME	**Total Vol Removed:**	0.8 L
Pump Program No:	—	**PID (ppm):**	2.8

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
12:41	6.17	0.3		23.8	7.7	3.1	5.53	10.2
12:45	6.20	0.4		24.2	3.2	333.4	5.05	-38.1
12:52	6.23	0.5		24.6	3.9	653	5.07	-34.7
1:01	6.25	0.6		24.7	3.7	658	5.06	-33.7
1:10	6.26	0.7		24.8	3.6	659	5.06	-33.3
1:21	6.27	0.8		24.9	3.5	660	5.06	-34.5
			start sampling					

Comments: Odours (YES / NO) NAPL/PSH (YES / NO), Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 **x glass amber,** 3 **x BTEX vials,** 1 **x HNO3 plastic,** ~~**x H2SO4 plastic**~~**,** 1 **x unpreserved plastic**

YSI used: 5 PFAS Dp1 taken here.

Tested By: ~~Craig Ridley~~ MME	**Remarks:**
Date Tested: 14/10/21	- Steady state conditions
Checked By: CR	- difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Date: 15/10/21	

JKEnvironments

Client:	TSA	Job No.:	E32507BR
Project:	Proposed Hospital Redevelopment	Well No.:	MW106
Location:	97-115 River Road, GREENWICH, NSW	Depth (m):	12.52

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow	SWL – Before:	~~9.28 m~~ 9.17m
Date:	14/10/21	Time – Before:	~~12:28 pm~~ 2:30pm
Undertaken By:	MME	Total Vol Removed:	1.1
Pump Program No:	—	PID (ppm):	~~9.6~~ 11.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2:33	9.24	0.2		22.3	7.9	13.9	4.82	158.9
2:36	9.27	0.3		22.8	7.0	197.8	4.20	-8.9
2:39	9.27	0.4		22.9	6.4	377.4	4.06	-43.9
2:42	9.28	0.5		23.1	6.8	377.1	4.01	-50.8
2:47	9.28	0.6		23.3	6.5	378.1	4.01	-52.3
2:52	9.29	0.7		23.4	6.7	378.8	4.03	-52.9
2:58	9.30	0.8		23.4	6.5	378.8	4.05	-52.6
3:06	9.30	0.9		23.4	6.5	378.9	4.06	-52.4
3:12	9.30	1.0		23.4	6.7	378.5	4.06	-52.6
3:19	9.30	1.1		23.4	6.5	378.5	4.07	-51.6
			start sampling					

Comments: Odours (YES / NO) NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 3 x BTEX vials, 1 x HNO3 plastic, ~~x H2SO4 plastic~~, 1 x unpreserved plastic

YSI used: 5 WDup2 taken here.

Tested By: ~~Craig Ridley~~ MME	Remarks:
Date Tested: 14/10/21	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Checked By: CR	
Date: 15/10/21	

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW107
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	14.93

WELL FINISH

Y	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Low flow	**SWL – Before:**	9.90
Date:	13/10/21	**Time – Before:**	9:05 am
Undertaken By:	MME	**Total Vol Removed:**	0.8 L
Pump Program No:	—	**PID (ppm):**	2.4

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
9:07	9.96	0.2		16.4	8.9	10.2	6.7	46.4
9:12	9.97	0.4		16.3	3.0	131.5	4.24	-2.0
9:22	9.98	0.5		16.3	3.2	236.9	4.29	-3.7
9:32	10.01	0.6		16.2	3.0	233.0	4.32	-14.0
9:42	10.02	0.7		16.1	3.2	232.5	4.32	-16.0
9:52	10.02	0.8		16.1	3.1	231.2	4.32	-16.2
10:02	10.02	0.9		16.0	3.1	230.6	4.32	-16.2
			START SAMPLING					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2 **x glass amber,** 3 **x BTEX vials,** 1 **x HNO3 plastic, x ~~H2SO4 plastic~~,** 1 **x unpreserved plastic**

YSI used: 5 WDup1 taken here.

Tested By: ~~Craig Ridley~~ MME	**Remarks:**
Date Tested: 13/10/21	- Steady state conditions
Checked By: CR	- difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Date: 15/10/21	

MM
MM
CM
B

JKEnvironments

Client:	TSA	Job No.:	E32507BR
Project:	Proposed Hospital Redevelopment	Well No.:	MW109
Location:	97-115 River Road, GREENWICH, NSW	Depth (m):	12.54

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow	SWL – Before:	7.07
Date:	14/10/21.	Time – Before:	~~8:20~~ am. 8:41
Undertaken By:	MME	Total Vol Removed:	1.2L
Pump Program No:	–	PID (ppm):	27.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
8:43.	7.14	0.2		18.8	3.1	15.1	4.58	-55.4
8:46.	7.19	0.4		18.8	1.9	53.3	4.61	-57.3
8:53	7.30	0.6		19.0	1.4	10.0	4.75	-109.4
8:58	7.33	0.7		19.0	2.0	242.8	4.81	-57.9
9:03.	7.37	0.8		19.0	1.2	243.6	4.83	-69.3
9:08	7.38	0.9		19.0	1.1	243.5	4.83	-57.9
9:13.	7.39	1.0		19.1	1.1	244.1	4.84	-56.5
9:18	7.41	1.1		19.0	1.0	244.6	4.86	-54.0
9:23.	7.42	1.2.		19.2	1.1	245.6	4.86	-53.2
			start sampling					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: 2 **x glass amber,** 3 **x BTEX vials,** 1 **x HNO3 plastic,** ~~**x H2SO4 plastic**~~**,** 1 **x unpreserved plastic**

YSI used: 5.

Tested By: ~~Craig Ridley~~ MME.	**Remarks:**
Date Tested: 14/10/21.	- Steady state conditions
Checked By: CR	- difference in the pH less than 0.2 units, difference in conductivity less than
Date: 15/10/21	10% and SWL stable/not in drawdown

JKEnvironments

Client:	TSA	**Job No.:**	**E32507BR**
Project:	Proposed Hospital Redevelopment	**Well No.:**	MW119
Location:	97-115 River Road, GREENWICH, NSW	**Depth (m):**	2.75

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low flow sampling.	**SWL – Before:**	Dry.
Date:	13/10/21.	**Time – Before:**	2:45pm
Undertaken By:	MME.	**Total Vol Removed:**	—
Pump Program No:	—	**PID (ppm):**	1.3

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic

YSI used:

Tested By: ~~Craig Ridley~~ MME.	**Remarks:**
Date Tested: 13/10/21.	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% and SWL stable/not in drawdown
Checked By: CR	
Date: 15/10/21	