REPORT TO

NSW DEPARTMENT OF EDUCATION

ON

PRELIMINARY SITE INVESTIGATION (PSI) - CONTAMINATION

FOR

PROPOSED MULGOA RISE PUBLIC SCHOOL

AT

1-23 FORESTWOOD DRIVE, GLENMORE PARK NSW

Date: 3 June 2020
Ref: E33177PArpt

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Executive Summary

NSW Department of Education | School Infrastructure NSW ('the client') commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed new primary school development at 1-23 Forestwood Drive, Glenmore Park, NSW ('the site'). The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the project team through the design and delivery stages of this new school infrastructure project. Based on the Request for Tender (RFT) documentation provided, we understand that a new primary school is proposed (Mulgoa Rise Public School). The final design and layout of the school are yet to be determined.

A geotechnical investigation was undertaken in conjunction with this PSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report.

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil and groundwater contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of in-situ soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint);
- Assess whether further intrusive investigation and/or remediation is required; and
- Provide recommendations for completing such work in the context of the development consent and issue of construction certificate.

The scope of work included the following:

- Review of site information, including background and site history information from a Lotsearch Pty Ltd *Environmental Risk and Planning Report* and other sources;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The investigation included a review of historical information, soil sampling from 12 boreholes, 10 test pits and groundwater sampling from one monitoring well installed on-site. The site has historically been used quarrying activities and was rehabilitated from around the year 2000 via importation of material and controlled filling.

The PSI has not identified any soil or groundwater contamination that was assessed to pose a risk to on-site receptors and/or in relation to the proposed land use. Groundwater was found to be impacted by arsenic, nickel and zinc at concentrations that exceeded the ecological SAC. However, the occurrence of these heavy metals in the groundwater may be attributed to regional factors. Potential risks to ecological receptors in relation to groundwater requires further assessment as part of the detailed investigation.

The PSI has not identified any triggers for remediation, however a detailed investigation is required to establish whether remediation will be necessary. Based on the findings of the PSI, JKE are of the opinion that the site can be made suitable for the proposed development, subject to the implementation of the following recommendations:

- Prepare a Sampling, Analysis and Quality Plan (SAQP) for the DSI. If a NSW EPA accredited site auditor is to be engaged for the project, the auditor should review and endorse the SAQP prior to commencing the DSI;
- Complete the DSI in accordance with the SAQP; and
- Consider the requirement for completing further waste classification concurrently with the DSI. The extent of any further waste classification assessment should be discussed with the project stakeholders based on project risks moving forward.

Depending on the outcome of the DSI, remediation and validation may also be required. If remediation is required, we anticipate that a Remediation Action Plan (RAP) will need to be prepared as part of the development application.

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

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Attachments

Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Above-Ground Storage Tank	**AST**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Detailed Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environmental Management Plan	**EMP**
Excavated Natural Material	**ENM**
Environment Protection Authority	**EPA**
Environmental Site Assessment	**ESA**
Ecological Screening Level	**ESL**
Fibre Cement Fragment(s)	**FCF**
General Approval of Immobilisation	**GAI**
Health Investigation Level	**HILs**
Hardness Modified Trigger Values	**HMTV**
Health Screening Level	**HSL**
Health Screening Level-Site Specific Assessment	**HSL-SSA**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Potential ASS	**PASS**
Polychlorinated Biphenyls	**PCBs**
Per-and Polyfluoroalkyl Substances	**PFAS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
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Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Site Audit Statement	**SAS**
Site Audit Report	**SAR**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Standard Sampling Procedure	**SSP**
Standing Water Level	**SWL**
Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**

1 INTRODUCTION

NSW Department of Education | School Infrastructure NSW ('the client') commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed new primary school development at 1-23 Forestwood Drive, Glenmore Park, NSW ('the site'). The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the project team through the design and delivery stages of this new school infrastructure project.

A geotechnical investigation was undertaken in conjunction with this PSI by JK Geotechnics (JKG). The results of the investigation are presented in a separate report (Ref: 33177PNrpt, dated 3 June 2020)[1]. This report should be read in conjunction with the JKG report.

1.1 Proposed Development Details

Based on the Request for Tender (RFT) documentation provided, we understand that a new primary school is proposed (Mulgoa Rise Public School). The final design and layout of the school are yet to be determined. We have not been provided with any drawings or plans of the proposed public school, except for an unreferenced contour plan of the site.

1.2 Aims and Objectives

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
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- Provide a preliminary waste classification for off-site disposal of in-situ soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint);
- Assess whether further intrusive investigation and/or remediation is required; and
- Provide recommendations for completing such work in the context of the development consent and issue of construction certificate.

[1] Referred to as JKG report

1.3 Scope of Work

The PSI was undertaken generally in accordance with a JKE proposal (Ref: EP51519P) of 6 April 2020 and formal agreement in relation to tender Ref. SINSW00711/20 executed on 8 May 2020. The scope of work included the following:

- Review of site information, including background and site history information from a Lotsearch Pty Ltd *Environmental Risk and Planning Report* and other sources;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[2], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[3] and State Environmental Planning Policy No.55 – Remediation of Land (1998)[4]. A list of reference documents/guidelines is included in the appendices.

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

[3] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

[4] *State Environmental Planning Policy No. 55 – Remediation of Land 1998* (NSW) (referred to as SEPP55)

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Current Site Owner:	The Minister for Education
Site Address:	1-23 Forestwood Drive, Glenmore Park, NSW
Lot & Deposited Plan:	Lot 1663 in DP1166869
Current Land Use:	Vacant
Proposed Land Use:	Primary School (kindergarten to year six)
Local Government Authority:	Penrith City Council
Current Zoning:	R1 – General Residential
Site Area (m^2) (approx.):	30,000
RL (AHD in m) (approx.):	60
Geographical Location (decimal degrees) (approx.):	Latitude: -33.802927 Longitude: 150.681562
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
Site Contamination Plan:	Figure 3

2.2 Site Location and Regional Setting

The site is located in a predominantly residential and recreational area of Glenmore Park and is bound by Deerubbin Drive to the north, Darug Avenue to the west, Forestwood Drive to the south and Mulgoa Rise Field recreational grounds to the east / south-east. The majority of the surrounding properties were residential in nature. The site is located approximately 200m to the west of Surveyors Creek.

2.3 Topography

The site fell gently towards the north-east with an overall slope of approximately 2°. The site topography was generally in-line with the surrounding natural elevation and topographic features.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 11 May 2020. Selected site photographs obtained during the inspection are attached in the appendices. A summary of the inspection findings is outlined in the following subsections:

2.4.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the site was vacant, levelled grassed area.

2.4.2 Buildings, Structures and Roads

No buildings or structures of any kind were present on site. Footpaths were observed along the northern and western perimeter of the site. A substation kiosk was observed along the western site boundary. This was most likely installed during late 1990s to early 2000s and is therefore considered unlikely to contain polychlorinated biphenyl (PCB) oils.

2.4.3 Boundary Conditions, Soil Stability and Erosion

The site was fenced by steel post and wire fencing along the southern boundary, and steel post/tubing along the eastern boundary. Visual inspection of the site extents revealed no obvious signs of soil erosion.

2.4.4 Visible or Olfactory Indicators of Contamination

No apparent visible or olfactory indicators of contamination were identified during site inspection and throughout the course of our intrusive investigation.

2.4.5 Presence of Drums/Chemicals, Waste and Fill Material

Filling was not obvious during the inspection. However, it is noted that substantial filling was identified in all boreholes drilled across the site.

2.4.6 Drainage and Services

A stormwater drain appeared to run along the eastern site boundary, with stormwater collection pit situated in the north-eastern corner of the site. A sewer main was also noted to be present in the north-eastern corner of the site.

2.4.7 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds. Mulgoa Rise Field recreational grounds were situated directly to the east / south-east of the site with Surveyors Creek and associated areas of native vegetation located approximately 200m further to the east / south-east.

2.4.8 Landscaped Areas and Visible Signs of Plant Stress

The site was overgrown with grasses and weeds with larger tree plantings along the footpaths next to the northern, western and southern site boundaries. No obvious signs of vegetation stress or grass dieback were observed anywhere on site.

2.5 Surrounding Land Use

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

- North – vacant grassed lot beyond Deerubbin Drive as well as residential properties including an early learning centre ("Young Academies") to the north-east;
- South – residential properties beyond Forestwood Drive;
- East – recreational land (Mulgoa Rise Field) including parking area, soccer fields, children's playground and amenities; and
- West – residential properties beyond Darug Avenue.

JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the assessment in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. The DBYD plans indicated that a sewer main was present in the north-eastern corner of the site.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information presented in the Lotsearch report (attached in the appendices) indicated that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

The site is not located in an acid sulfate soil (ASS) risk area according to the risk maps prepared by the Department of Land and Water Conservation.

ASS information presented in the Lotsearch report indicated that the site is not located within an ASS risk area according to ASS risk maps published by the council.

3.3 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 seven registered bores within the report buffer of 1,000m. In summary:

- The nearest registered bore was located approximately 800m north of the site. This was utilised for monitoring purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 1,000m) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified top soil and/or clay soil to depths of 1.0-6.0m, underlain by shale bedrock. Standing water levels (SWLs) in these bores was not recorded however final drill depth ranged from 2.5m below ground level (BGL) to 8.9mBGL.

The information reviewed for this investigation indicated that the subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shale bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development.

Considering the local topography and surrounding land features, JKE would generally expect groundwater to flow eastwards towards Surveyors Creek.

3.4 Receiving Water Bodies

The site location and regional topography indicates that most of the excess surface water flows through the site are expected to eventuate in the stormwater drainage trench along the eastern perimeter and collection pit in the north-eastern corner of the site which is expected to discharge into Surveyors Creek located approximately 200m east of the site. This water body is considered to be the closest potential ecological receptor.

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were included in the Lotsearch report. JKE has reviewed the photographs and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Details
1947	**On-site:** The site appeared to be vacant land overgrown with trees, shrubs and grasses (possibly used for grazing purposes). **Off-site:** The land to the south appeared to have been cleared of trees and was most likely part of the rural property utilised for agricultural uses (i.e. growing crops and/or grazing purposes). The land to the north east and west appeared to have been vacant land similar to the site, overgrown with trees, shrubs and grasses and was most likely used for grazing purposes.
1956	The site and surrounding features appeared generally similar to the previous photograph.
1961	The site and surrounding features appeared generally similar to the previous photograph.
1965	The site and surrounding features appeared generally similar to the previous photograph.
1970	The site and the surrounding land to the north, east and west appeared to have been cleared of most trees and was grassed (possibly used for grazing purposes).
1978	The site and surrounding features appeared generally similar to the previous photograph.
1982	The site and surrounding features appeared generally similar to the previous photograph.
1986	**On-site:** Northern parts of the site appeared to have been used for quarrying (i.e. extractive industry) activities with various pits, material stockpiles and access roads visible throughout the area. **Off-site:** The surrounding land to the north and to the west appeared to have also been utilised for quarrying activities, similar to the site area.
1991	**On-site:** The entire site area appeared to have now been used for quarrying activities. **Off-site:** All of the surrounding land in the immediate vicinity appeared to have also been used for quarrying activities, similar to the site.
2000	**On-site:** Quarrying activities appeared to have ceased throughout the site area by this time and the land largely appeared to have been rehabilitated (i.e. filled and levelled). Rehabilitation appeared to have still been underway across the northern part of the site. **Off-site:** Quarrying activities appeared to still beunderway on the land to the south of the site. The land to the east and west appeared to have been rehabilitated, consistent with most of the site. Rehabilitation appeared to still be ongoing on the land to the north.
2007	All on-site and nearby off-site quarrying activities appeared to have ceased by this time, with the site and all surrounding areas rehabilitated.
2014	**On-site:** The site appeared to include a vacant, levelled, grass-covered area bound by Deerubbin Drive to the north, Darug Avenue to the west and Forestwood Drive to the south.

Year	Details
	Off-site: Residential properties had been established on the surrounding land to the west, north-west and south. The land to the north, north-east and east and south-east appeared to be vacant at this time.
2019	**On-site:** The site appeared to be vacant and grassed. Vehicles were parked throughout the eastern part of the site. **Off-site:** More residential properties had been established on the surrounding land to the north-west, west, south and north-east. Recreational grounds and playing fields had been established on the land to the east and south-east including parking area directly to the east as well as public amenities and children's playground to the south-east.

4.2 Review of Historical Land Title Records

Historical land title records were reviewed for the investigation. The record search was undertaken by Advance Legal Searchers Pty Ltd. Copies of the title records are attached in the appendices. The title records indicate the following:

- The site was under the private ownership of various grazier farmers and cattle dealers since at least the early 1900s;
- Various corporate entities owned parts of the site since late 1960s. Part of the site was noted to have been under the ownership of a number of corporate entities (i.e. Zacuba Pty Ltd, Monier PGH Holdings Limited, JM & JA Wearn Pty Limited and Holicombe Pty Limited) since 1980 through to 2013 which includes the period when the site was known to have been utilised for quarrying activities. The NSW Land and Housing Corporation also owned parts of the site throughout the period of known quarrying activities across the site;
- The entire site went under the ownership of Lensworth Glenmore Park Limited who amalgamated the site under current Lot/DP in 2013; and
- The site was attributed to The Minister for Education since 2014 who remains its current registered proprietor/custodian.

4.3 NSW EPA Records

The Lotsearch report included information from the NSW EPA databases for the following:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[5]; and
- Licensed activities under the Protection of the Environment Operations Act (1997)[6].

The search included the site area and surrounding areas in the report buffer of 1,000m. The search indicated the following:

- There were no records for the site or any properties in the report buffer under Section 58 of the CLM Act 1997;

[5] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

[6] Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)

- The site has not been notified with regards to the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.;
- There were no records for licenced activities at the site under the POEO Act 1997. Listed historical delicensed and former licensed/regulated EPA activities were identified for several properties within the report buffer, including land-based extraction (i.e. former licensed activity attributed to Mulgoa Quarries Pty Ltd) and the application of herbicides along waterways. Former quarrying activities on site are considered to pose a potential contamination risk to the site.

4.4 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the table below. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 4-2: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
Circa early 1900s until at least 1982	Vacant land, overgrown with trees, shrubs and grasses which was possibly used for grazing purposes.	Vacant land, possibly used for agricultural activities (i.e. crop cultivation) and/or grazing.
Since at least 1986 until 2007.	Quarry activities which ceased by 2000.	Quarry activities which have ceased by 2007.
2000-2007	Rehabilitation of land post Quarry activities. Filling of the site occurred.	Rehabilitation of land post Quarry activities. Filling of the surrounding land also occurred.
2007-Current	Vacant, levelled grassed over area.	Mostly residential and recreational uses. Neighbouring land to the north remains vacant.

4.5 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. JKE have relied upon the Lotsearch report and have not independently verified any information contained within. However, it is noted that the Lotsearch report is generated based on databases maintained by various government agencies and is expected to be reliable.

5 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 10.

5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site appears to have been historically filled to achieve the existing levels. The aerial photographs suggested that the depth of filling could be substantial. Fill material is expected to be present throughout the site area attributed to filling which occurred as part of site rehabilitation post quarrying activities. The fill may have been imported from various sources and could be contaminated. The client supplied limited information relating to earthworks and compaction which suggested that the filling of the site was undertaken in controlled manner (i.e. controlled fill/earthworks).	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Historical mining/extractive industry – The site and surrounding areas were historically used for quarrying activities. The aerial photographs suggested soil and/or rock quarrying occurred. The main source of contamination is therefore considered to be the operational aspect of the mining such as the use of machinery and plant (e.g. re-fuelling, spills, leaks etc). Backfilling of the quarry also occurred (see discussion on 'fill material' above).	TRH/BTEX and the PAH compound naphthalene. Heavy metals, cyanide, radionuclides and explosives are generally associated with minerals mining. Minerals mining and the associated processing of ores and minerals is not expected to have occurred at the site. On this basis these have not been considered as CoPC.
Use of the site by parked vehicles – eastern part of the site	Heavy metal lead, TRHs, BTEX and the PAH compound naphthalene.

5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 5-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc), or sub-surface release (e.g. impacts from buried material); • Use of the site by parked vehicles – 'top-down' and spills (e.g. leaks onto unpaved ground surface); and • Historical mining/extractive industry – spills associated with refuelling of plant, fuel stores etc, or sub-surface release (e.g. impacts from buried material).
Affected media	Soil and groundwater have been identified as potentially affected media. The potential for soil vapour/ground gas impacts is considered to be relatively low. However, soil vapour would need to be considered in the event volatile contamination or uncontrolled fill material containing organics is identified.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, and recreational water users within Surveyors Creek. Ecological receptors include terrestrial organisms and plants within unpaved areas, and freshwater ecology of Surveyors Creek.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens/playground areas, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements. Exposure to groundwater could occur in Surveyors Creek through direct migration, however, connectivity between the aquifer and the creek has not been confirmed at this time. Groundwater has the potential to enter the creek via the stormwater system (which is expected to discharge into the creek) in a drained basement scenario and/or a situation where groundwater seepage is captured and discharged to stormwater.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed structures (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas; and • Migration of groundwater off-site and into nearby water body (Surveyors Creek), including aquatic ecosystems and those being used for recreation.

Presence of preferential pathways for contaminant movement	Local underground services such as sewer and stormwater have the potential to act as preferential pathways for contaminant migration at the site. However, the potential for migration would depend on the fate and transport properties of the CoPC.

6 SAMPLING, ANALYSIS AND QUALITY PLAN

6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013) and the Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)[7]. The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 8.1 and the detailed evaluation is provided in the appendices.

6.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the project team in the design and delivery of the project as well as by the consent authority in exercising its planning functions in relation to the approval of the development consent and issue of construction certificate.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the assessment are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is remediation required?
- Is the site characterisation sufficient to provide adequate confidence that remediation is/is not required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?
- In the event that remediation and/or further investigation is required, what are the recommendations for completing such work in the context of the development consent and issue of construction certificate?

[7] NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme, 3rd ed.* (referred to as Site Auditor Guidelines 2017)

6.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;
- Laboratory analysis of soils, fibre cement and groundwater for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

6.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of 12.45mBGL (spatial boundary). The sampling was completed on 11, 12 and 18 May 2020 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary. The scope of the investigation is limited to that described in Section 1.3.

6.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this assessment, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the preliminary nature of the intrusive investigation.

6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike and trip blank samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

6.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this assessment, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this assessment.

6.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the assessment objectives. Adjustment of the assessment design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

6.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this assessment is outlined in the table below:

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	The sampling density for asbestos in soil included sampling from 10 test pits at 25% of the minimum sampling density recommended in the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)[8] (endorsed in NEPM 2013). This density was considered adequate in the absence of any existing sub-surface data for the site. Samples for other contaminants were collected from all 22 locations as shown on the attached Figure 2, although we note that analysis of samples did not occur from BH21 and BH22. Based on the site area (30,000m^2), this number of locations corresponded to a sampling density of one

[8] Western Australian (WA) Department of Health (DoH), (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. (referred to as WA DoH 2009)

Aspect	Input
	sampling location per approximately 1,365m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[9].
Sampling Plan	The sampling locations were placed on a systematic, grid-based sampling plan. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted. The test pits were typically limited to a depth of 1.5-2mBGL due to the compacted nature of the fill and limitations associated with excavating this material.
Set-out and Sampling Equipment	Sampling locations were set out using hand held GPS unit (with an accuracy of ±5m). In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples collected on 11 and 12 May 2020 using a drill rig equipped with spiral flight augers (150mm diameter). Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, and/or directly from the auger. Samples were also collected on 12 May 2020 using an excavator. Samples were obtained from the test pit walls or directly from the bucket by hand. Where sampling occurred from the bucket, JKE collected samples from the central portion of large soil clods, or from material that was unlikely to have come into contact with the bucket.
Sample Collection and Field QA/QC	Soil samples were obtained on the 11 and 12 May 2020 in accordance with the standard sampling procedure (SSP) attached in the appendices. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. The field screening for asbestos quantification was undertaken only from the test pit locations and included the following: • A representative 10L sample was collected from fill at 1m intervals, or from each distinct fill profile. The bulk sample intervals are shown on the attached borehole and test pit logs; • Each 10L sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement. Due to the cohesive nature of the soils, some of the sample material

[9] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
	was subsequently placed on a contrasting support (blue tarpaulin) and inspected for the presence of fibre cement. Any soil clumps/nodules were disaggregated; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the 10L sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 7.1.
Decontamination and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was decontaminated as outlined in the SSP. Soil samples were preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

6.3 Groundwater Sampling Plan and Methodology

The groundwater sampling plan and methodology is outlined in the table below:

Table 6-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring well was installed in BH8 (MW8). The well was positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW8 was considered to be in the intermediate area of the site and would be expected to provide an indication of groundwater flowing across (beneath) the site.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole log attached in the appendices. The monitoring well was installed down to approximately 6mBGL. The well was generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water. The well construction was considered to be appropriate for screening purposes to assess general aquifer conditions with regards to the recommended monitoring well installation requirements in Schedule B2 of NEPM 2013.
Monitoring Well Development	The monitoring well was developed on 11 May 2020 using a submersible electrical pump in accordance with the SSP. The monitoring well was developed until steady state conditions were achieved. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring well was allowed to recharge for seven days after development. Groundwater samples were obtained on 18 May 2020.

Aspect	Input
	Prior to sampling, the monitoring well was checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a peristaltic pump. During sampling, the following parameters were monitored using calibrated field instruments (see SSP): • SWL using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Steady state conditions were considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Decontaminant and Sample Preservation	The decontamination procedure adopted during sampling is outlined in the SSP attached in the appendices. The pump tubing was discarded after the sampling event for the single well onsite therefore no decontamination procedure was considered necessary. The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice in accordance with the SSP. On completion of the fieldwork, the samples were temporarily stored in a fridge at the JKE office, before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

6.4 Analytical Schedule

The analytical schedule (for primary samples) is outlined in the following table:

Table 6-3: Analytical Schedule (Primary Samples)

Analyte/CoPC	Fill Samples	Natural Soil Samples	Fibre Cement Material Samples	Groundwater Samples
Heavy Metals	20	-	-	1
TRH/BTEX	21	-	-	1
PAHs	20	-	-	1
VOCs*	-	-	-	1
OCPs/OPPs	10	-	-	-
PCBs	10	-	-	-

Analyte/CoPC	Fill Samples	Natural Soil Samples	Fibre Cement Material Samples	Groundwater Samples
Asbestos (500ml)	5	-	-	-
pH/EC	-	-	-	1
Toxicity characteristic leachate procedure (TCLP) Metals and/or PAHs for waste classification purposes	0	-	-	-

* VOCs were included in the analytical schedule for screening purposes and were not identified as a CoPC

Soil analysis was targeted at the surficial soils for the PSI. Samples of the subsurface fill were collected, however, these were not analysed due to the limited scope of the investigation.

6.4.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 6-4: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks and trip spikes)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	242855 and 243106
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	21106

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A);
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'clay' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[10]; and
- Asbestos was assessed against the HSL-A criteria. A summary of the asbestos criteria is provided in the table below:

Table 7-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-A criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on WA DoH (2009) guidance. The SAC include the following: • <0.01% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. The NEPM (2013) and WA DoH (2009) also specify that the surface should be free of visible asbestos. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $$\text{\% w/w asbestos in soil} = \frac{\text{\% asbestos content x bonded ACM (kg)}}{\text{Soil volume (L) x soil density (kg/L)}}$$ However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams): $$\text{\% w/w asbestos in soil} = \frac{\text{\% asbestos content x bonded ACM (g)}}{\text{Soil weight (g)}}$$

[10] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[11];
- ESLs were adopted based on the soil type; and
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[12] This method is considered to be adequate for the Tier 1 screening.

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered (if required) following evaluation of human health and ecological risks, and risks to groundwater.

7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[13] as outlined in the following table:

Table 7-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC > CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

[11] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[12] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

[13] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

7.2 Groundwater

Groundwater data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007)[14]. Environmental values for this assessment include aquatic ecosystems and human-health risks in non-use scenarios (vapour intrusion and recreational exposure).

7.2.1 Human Health

- The NEPM (2013) HSLs were not considered to be applicable for this assessment as the proposed development design was not ascertained at this point in time. In addition, the groundwater was recorded at shallow depth around 2mBGL. On this basis, JKE have undertaken a site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):
    - Australian Drinking Water Guidelines 2011 (updated 2018)[15] for BTEX compounds and selected VOCs;
    - World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[16] for petroleum hydrocarbons;
    - USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
    - The use of the laboratory PQLs for other contaminants where there were no Australian guidelines.
- The ADWG 2011 were multiplied by a factor of 10 to assess potential risks associated with incidental/recreational-type exposure to groundwater (e.g. within down-gradient water bodies, with bore water used for irrigation, or with seepage water in a basement). These have been deemed as 'recreational' SAC.

7.2.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[17]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

[14] NSW Department of Environment and Conservation, (2007). *Guidelines for the Assessment and Management of Groundwater Contamination.*

[15] National Health and Medical Research Council (NHMRC), (2018). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[16] World Health Organisation (WHO), (2008). *Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality* (referred to as WHO 2008)

[17] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

8.2 Subsurface Conditions

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

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Fill	Fill was encountered at the surface in all boreholes and extended to depths of greater than approximately 1.3-12.45mBGL. All boreholes were terminated in fill. The fill typically comprised silty clay and gravelly silty clay, with inclusions comprising of varying sizes and fractions of igneous, ironstone, sandstone and siltstone gravel, ash, traces of sand, roots, glass and plastic (in some of the locations). The occurrence of anthropogenic inclusions was negligible and organic materials were not encountered (except for root-affected soils at the ground surface).
Natural Soil	Natural residual soil was not encountered in any of the boreholes down to the maximum depth of 12.45mBGL.
Bedrock	Bedrock was not encountered in any of the boreholes down to the maximum depth of 12.45mBGL.
Groundwater	All test pits were dry on completion of excavation. Groundwater seepage was observed in BH2, BH6, BH8, BH10 and BH16 at depths ranging between 4.0-7.2mBGL after completion of drilling. A groundwater monitoring well was installed at BH8 to allow for further groundwater sampling. The groundwater was observed at depths ranging between 2.05-2.07mBGL during well development and upon return to the site for sampling at a later date. Based on the initial water strike level/seepage depths recorded during drilling, compared to the SWLs recorded in MW8, it is considered possible that the groundwater is confined or semi-confined. The SWL may be representative of a potentiometric water level rather than the true groundwater level.

8.3 Field Screening

A summary of the field screening results is presented in the following table:

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0.0ppm to 3.1ppm equivalent isobutylene. These results indicate PID detectable VOCs. Samples with elevated PID readings were analysed for TRH and BTEX.

Aspect	Details
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report tables. All other results were below the SAC. Visible asbestos was not detected in any of the bulk screening samples.
Groundwater Depth & Flow	Groundwater seepage was encountered in boreholes BH2, BH6, BH8, BH10 and BH16 during drilling at depths of approximately 4.0 to 7.2mBGL. A SWL was measured in BH8/MW8 where the monitoring well was installed, at depths ranging from 2.05 to 2.07mBGL during well development and sampling. The remaining boreholes were dry during and a short time after completion of drilling. The groundwater flow direction was not established for the PSI. However, we expect groundwater to flow in an easterly (or north-easterly) direction towards the creek and in sympathy with the local topography.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 6.74 to 6.92; - EC ranged from 5,185µS/cm to 5,414µS/cm; - Eh ranged from 6.7mV to 175.1mV; and - DO ranged from 0.6ppm to 2.6ppm.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

8.4 Soil Laboratory Results

The soil laboratory results are compared to the relevant SAC in the attached report tables. A summary of the results assessed against the SAC is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	Results Compared to SAC
Heavy Metals	All heavy metals results were below the SAC.
TRH	All TRH results were below the SAC.
BTEX	All BTEX results were below the SAC. All BTEX concentrations were below the laboratory PQLs
PAHs	All PAH results were below the SAC.
OCPs and OPPs	All OCP and OPP results were below the SAC. All pesticide concentrations were below the laboratory PQLs.
PCBs	All PCB results were below the SAC. All PCB concentrations were below the laboratory PQLs.
Asbestos	All asbestos results were below the SAC (i.e. asbestos was absent in the samples analysed for the investigation).

8.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Part 1 of the Waste Classification Guidelines, as summarised previously in this report. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	No. of Samples Analysed	No. of Results > CT Criteria	No. of Results > SCC Criteria	Comments
Heavy Metals	20	0	0	-
TRH	21	0	0	-
BTEX	21	0	0	-
Total PAHs	20	0	0	-
Benzo(a)pyrene	20	0	0	-
OCPs & OPPs	10	0	0	-
PCBs	10	0	0	-
Asbestos	5	-	-	Asbestos was not detected in the samples analysed.

8.5 Groundwater Laboratory Results

The groundwater laboratory results are compared to the relevant SAC in the attached report tables. A summary of the results assessed against the SAC is presented in the following table:

Table 8-5: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	Results Compared to SAC
Heavy Metals	Arsenic (48µg/L), nickel (25µg/L) and zinc (11µg/L) concentrations exceeded the ecological SAC of 24µg/L, 11µg/L and 8µg/L respectively. All other results for heavy metals were below the SAC.
TRH	All TRH results were below the SAC and the laboratory PQLs.
BTEX	All BTEX results were below the SAC and the laboratory PQLs.
Other VOCs	All VOC results were below the SAC and the laboratory PQLs.
PAHs	All PAH results were below the SAC and the laboratory PQLs.
Other Parameters	The results for pH and EC are summarised below: • pH was recorded at 7.1 in the primary sample; • EC was recorded at 6,100µS/cm in the primary sample.

9 WASTE CLASSIFICATION ASSESSMENT

Based on the results of the assessment, and at the time of reporting, the fill material is classified as **General Solid Waste (non-putrescible)**. Further assessment and finalisation of the waste classification will be required prior to off-site disposal.

Based on the laboratory results and field observations during sampling JKE are of the opinion that the fill material at the site could potentially be classified as Excavated Natural Material (ENM) for off-site disposal or re-use purposes. ENM could be considered suitable for re-use on-site (from a contamination viewpoint), or alternatively, the information included in this report may be used to assess whether the material is suitable for beneficial reuse at another site as fill material.

In accordance with "The excavated natural material order 2014", compliance with the ENM classification requirements must be further confirmed by undertaking designed characterisation sampling and analysis program as outlined within the order document. ENM can also be disposed of accordingly to a facility that is licensed to accept it. The cost associated with disposing ENM to a licensed facility is significantly less (i.e. up to four times based on our recent project experience) than the cost for disposing General Solid Waste (non-putrescible).

10 DISCUSSION

10.1 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

10.1.1 Soil

Concentrations of all CoPC within soil were below the SAC. On this basis, there were no complete SPR-linkages identified and therefore the PSI identified no soil contamination-related risks to the receptors.

Although the analytical schedule for the PSI was limited and analysis was generally targeted at the surficial soils, the fill appeared to be sourced from natural material and there were negligible anthropogenic inclusions. Our boreholes and test pits identified no visual or olfactory indicators of contamination (i.e. asbestos material, staining, odours etc). On this basis, and considering the apparent controlled nature of the historical backfilling of the quarry, in our opinion it is unlikely that significant, widespread contamination impacts would occur in the fill. Additional sampling and analysis are required to support this opinion.

We note that information regarding the origin of the fill was requested from the client, however this has not been provided to date.

10.1.2 Groundwater

Arsenic, nickel and zinc concentrations in excess of the ecological SAC (GIL freshwater) were reported for the primary and duplicate samples collected from MW8. Nickel and zinc in groundwater may potentially constitute a regional issue which is common in urban environments due to runoff and leaking water infrastructure. The arsenic may also be a regional issue, however, it is also considered possible that the arsenic in groundwater could potentially be associated with the historical extractive industries (although we note that a specific use of arsenic was not identified and is not expected to be associated with soil/rock quarrying).

Trace concentrations of arsenic, nickel and zinc were identified in all fill samples analysed as part of this PSI. The observed groundwater table (i.e. 2.05-2.07mBGL) was within fill material which was identified across the site and extending down to at least 1.3-12.45mBGL. As the groundwater is within the fill and due to the fact that the majority of the site area is unpaved (which could result in increased surface water infiltration), it is possible that the arsenic and other heavy metals could have leached from the fill soil and added to the contaminant load in the groundwater. Further analysis of the deeper fill soils would be required to establish whether the deeper, subsurface soils contain appreciable concentrations of heavy metals and to confirm whether this transport mechanism is contributing to the heavy metals in groundwater.

The identified concentration of heavy metals in groundwater does not pose a risk to the on-site receptors as there is no complete SPR-linkage. There could be a complete SPR-linkage to ecological receptors if there is groundwater connectivity with the creek. This requires further consideration as part of the detailed investigation and in consideration of the regional conditions.

10.2 Decision Statements

The decision statements are addressed below:

Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?

The historical information identified potential sources of contamination, being: historical mining/extractive industry (i.e. quarrying activities) on site and surrounding areas; historical levelling and filling of the site and surrounding areas as part of rehabilitation of the land following quarrying activities; and the use of the eastern part of the site by parked vehicles. It is noted that extractive industries are listed as potentially contaminating activities in the SEPP55 Planning Guidelines which triggers a need for a detailed (Stage 2) Site Investigation (DSI).

Are any results above the SAC?

Arsenic, nickel and zinc were identified above the ecological SAC for groundwater within MW8. All soil results were below the SAC.

Do potential risks associated with contamination exist, and if so, what are they?

The PSI has not identified any soil or groundwater contamination that was assessed to pose a risk to on-site receptors and/or in relation to the proposed land use. Potential risks to ecological receptors in relation to groundwater requires further assessment as part of the detailed investigation.

Is remediation required?

Based on the current dataset, JKE consider that remediation is not warranted at this point in time.

Is the site characterisation sufficient to provide adequate confidence in the above decisions?

Yes, however further detailed investigation is required to establish whether remediation will be necessary. Design of the proposed development has not been finalised. Given the historical uses of the site, observed depth of fill and identified groundwater exceedances, a detailed investigation of the site is required.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

The site can be made suitable for the proposed development subject to appropriate further characterisation via implementation of a DSI to address the data gaps.

In the event that remediation and/or further investigation is required, what are the recommendations for completing such work in the context of the development consent and issue of construction certificate?

Based on our experience with similar projects proceeding via the State Significant Development (SSD) planning pathway, we expect that the DSI will be required prior to the SSD approval. In the event that remediation is required, a Remediation Action Plan (RAP) would also typically be required prior to the development approval being granted. Remediation and validation (where required) would occur prior to or as part of the construction.

We note that the NSW EPA, in reviewing SSD submissions, often recommends that a NSW EPA accredited site auditor be engaged to provide a site audit statement in accordance with the CLM Act 1997. We consider it likely that this requirement will apply to this project and we recommend engaging the site auditor early in the site investigation process.

10.3 Data Gaps

An assessment of data gaps is provided in the following table:

Table 10-1: Data Gap Assessment

Data Gap	Assessment
Groundwater flow direction not confirmed / groundwater assessment limited in scope	The PSI included a limited assessment of groundwater. The groundwater flow direction was not confirmed. The groundwater conditions and quality is to be further assessed during the DSI.
Soil sampling density below minimum guideline density	Sampling was limited to approximately 50% of the minimum sampling density recommended in the EPA Sampling Design Guidelines 1995. Additionally, there is lack of laboratory data associated with deeper fill profile layers across the site. The depth of fill was also not confirmed across the site as it extended in some parts to depths greater than 12.45mBGL. Analysis was undertaken mostly on the surficial samples of fill across the site and only limited analysis conducted on one fill sample from 1.3-1.4m depth. Recommendations for additional soil sampling are included in the report to address this data gap. This data gap can be addressed as part of the DSI.
Characterisation of soils for waste classification purposes	The waste classification of fill material provided within this report is preliminary in nature due to the limited sampling and analysis program, and will require confirmation prior to off-site disposal. Based on the current results and field observations, the fill could be classified as ENM for off-site disposal or re-use purposes. This classification should be confirmed by implementation of an appropriate characterisation sampling and analysis program.

11 CONCLUSIONS AND RECOMMENDATIONS

The investigation included a review of historical information, soil sampling from 12 boreholes, 10 test pits and groundwater sampling from one monitoring well installed onsite. The site has historically been used quarrying activities and was rehabilitated from around the year 2000 via importation of material and controlled filling.

The PSI has not identified any soil or groundwater contamination that was assessed to pose a risk to on-site receptors and/or in relation to the proposed land use. Groundwater was found to be impacted by arsenic, nickel and zinc at concentrations that exceeded the ecological SAC. However, the occurrence of these heavy metals in the groundwater may be attributed to regional factors. Potential risks to ecological receptors in relation to groundwater requires further assessment as part of the detailed investigation.

The PSI has not identified any triggers for remediation, however a detailed investigation is required to establish whether remediation will be necessary. Based on the findings of the PSI, JKE are of the opinion that the site can be made suitable for the proposed development described in Section 1.1, subject to the implementation of the following recommendations:

- Prepare a Sampling, Analysis and Quality Plan (SAQP) for the DSI. If a NSW EPA accredited site auditor is to be engaged for the project, the auditor should review and endorse the SAQP prior to commencing the DSI;
- Complete the DSI in accordance with the SAQP; and
- Consider the requirement for completing further waste classification concurrently with the DSI. The extent of any further waste classification assessment should be discussed with the project stakeholders based on project risks moving forward.

Depending on the outcome of the DSI, remediation and validation may also be required. If remediation is required, we anticipate that a Remediation Action Plan (RAP) will need to be prepared as part of the development application.

At this stage, JKE consider that there is no requirement to notify the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[18]. This should be reassessed as part of the DSI.

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

[18] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)

12 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination 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;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- 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 contamination sources or may have been impacted by site contamination, 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 landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- 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.

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 contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. 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 contamination, the likely impact on the proposed development and appropriate remediation 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
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

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 remediation 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: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Project No: E33177PA

Figure No: 1

JKEnvironments

PLOT DATE: 18/05/2020 11:05:51 AM DWG FILE: L:\SC EIS JOBS\33000'S\E33177PA GLENMORE PARK\CAD\E33177PA.DWG

LEGEND

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

0 10 20 30 40 50

SCALE 1:1000 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Project No: E33177PA

Figure No: 2

JKEnvironments

PLOT DATE: 18/05/2020 11:11:53 AM DWG FILE: L:\5C EIS JOBS\33000'S\E33177PA GLENMORE PARK\CAD\E33177PA.DWG

BH8/MW8	
Arsenic	48µg/L
Nickel	25µg/L
Zinc	11µg/L

TP1 (>1.3)
BH2 (>6.45)
TP3 (>1.8)
BH4 (>6.45)
TP5 (>2.0)
BH21 (>6.45)
BH6 (>12.45)
TP7 (>1.5)
BH8/MW8 (>6.45)
TP9 (>2.0)
BH10 (>12.45)
TP11 (>1.8)
BH12 (>6.02)
TP13 (>1.8)
BH14 (>6.45)
TP15 (>1.5)
BH16 (>12.45)
TP17 (>1.8)
BH18 (>6.45)
TP19 (>2.0)
BH20 (>12.45)
BH22 (>6.45)

LEGEND

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

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

GROUNDWATER CONTAMINATION ABOVE SAC

0 10 20 30 40 50
SCALE 1:1000 @A3 METRES

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

Title: **CONTAMINATION LOCATION PLAN**

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Project No: E33177PA

Figure No: 3

JKEnvironments

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Appendix B: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for new suburbs with low traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-A: 'Residential with garden/accessible soils; children's day care centers; preschools; and primary schools'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
TP1	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**8**	**24**	**16**	<0.1	**10**	**50**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**9**	**27**	**16**	<0.1	**10**	**47**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH2	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**9**	**36**	**16**	<0.1	**19**	**75**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP3	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**32**	**18**	<0.1	**14**	**55**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH4	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**11**	**30**	**16**	<0.1	**14**	**55**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP5	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**33**	**19**	<0.1	**15**	**61**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**13**	**24**	**13**	<0.1	**16**	**57**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP7	0.0-0.1	Fill: Silty Clay	<4	<0.4	**4**	**10**	**6**	<0.1	**2**	**10**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP7	1.3-1.4	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**8**	**18**	**12**	<0.1	**7**	**30**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP9	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**11**	**23**	**15**	<0.1	**9**	**36**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH10	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**10**	**29**	**15**	<0.1	**12**	**47**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP11	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**10**	**26**	**17**	<0.1	**11**	**45**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP11	0.3-0.4	Fill: Silty Gravelly Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH12	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**25**	**17**	<0.1	**10**	**38**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP13	0.0-0.1	Fill: Silty Clay	**8**	<0.4	**10**	**29**	**17**	<0.1	**12**	**47**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH14	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**10**	**24**	**15**	<0.1	**10**	**39**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP15	0.0-0.1	Fill: Silty Gravelly Clay	<4	<0.4	**7**	**27**	**13**	<0.1	**11**	**42**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH16	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**41**	**26**	<0.1	**14**	**62**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP17	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**33**	**17**	<0.1	**13**	**71**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**8**	**30**	**16**	<0.1	**26**	**77**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH18	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**9**	**32**	**21**	<0.1	**14**	**54**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP19	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**7**	**27**	**19**	<0.1	**12**	**51**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP19	0.3-0.5	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH20	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**10**	**32**	**15**	<0.1	**14**	**61**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**9**	**28**	**12**	<0.1	**14**	**48**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	-	**8**	<0.4	**12**	**27**	**22**	<0.1	**11**	**48**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP5	-	-	**9**	<0.4	**12**	**28**	**22**	<0.1	**14**	**58**	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			25	25	25	25	25	25	25	25	24	24	12	12	12	12	12	12	12	12	12	5
Maximum Value			9	<PQL	13	41	26	<PQL	26	77	0.3	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category							HSL-A/B:LOW/HIGH DENSITY RESIDENTIAL					
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
TP1	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH2	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP3	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH4	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP5	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH6	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP7	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP7	1.3-1.4	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	3.1
BH8	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP9	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH10	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	NA	<0.2	<0.5	<1	<3	<1	0
TP11	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP11	0.3-0.4	Fill: Silty Gravelly Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA	0
BH12	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP13	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH14	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP15	0.0-0.1	Fill: Silty Gravelly Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH16	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP17	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH18	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP19	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP19	0.3-0.5	Fill: Silty Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA	0
BH20	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	0
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA	-
SDUP1	-	-	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	-
SDUP5	-	-	0m to <1m	Clay	<25	<50	<0.2	<0.5	<1	<3	<1	-
Total Number of Samples					26	25	26	26	26	26	26	26
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	3.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP1	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH2	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP3	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH4	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP5	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH6	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP7	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP7	1.3-1.4	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH8	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP9	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH10	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	NA	0.7	480	NL	110	5
TP11	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP11	0.3-0.4	Fill: Silty Gravelly Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA
BH12	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP13	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH14	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP15	0.0-0.1	Fill: Silty Gravelly Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH16	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP17	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
BH18	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP19	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP19	0.3-0.5	Fill: Silty Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA
BH20	0.0-0.2	Fill: Silty Clay	0m to <1m	Clay	50	280	0.7	480	NL	110	5
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	0m to <1m	Clay	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	-	0m to <1m	Clay	50	280	0.7	480	NL	110	5
SDUP5	-	-	0m to <1m	Clay	50	280	0.7	480	NL	110	5

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
TP1	0.0-0.1	Fine	<25	<50	<100	<100
TP1 - [LAB_DUP]	0.0-0.1	Fine	<25	<50	<100	<100
BH2	0.0-0.2	Fine	<25	<50	<100	<100
TP3	0.0-0.1	Fine	<25	<50	<100	<100
BH4	0.0-0.2	Fine	<25	<50	<100	<100
TP5	0.0-0.1	Fine	<25	<50	<100	<100
BH6	0.0-0.1	Fine	<25	<50	<100	<100
TP7	0.0-0.1	Fine	<25	<50	<100	<100
TP7	1.3-1.4	Fine	<25	<50	<100	<100
BH8	0.0-0.2	Fine	<25	<50	<100	<100
TP9	0.0-0.1	Fine	<25	<50	<100	<100
BH10	0.0-0.2	Fine	<25	<50	<100	<100
BH10 - [LAB_DUP]	0.0-0.2	Fine	<25	NA	NA	NA
TP11	0.0-0.1	Fine	<25	<50	<100	<100
TP11	0.3-0.4	Fine	NA	NA	NA	NA
BH12	0.0-0.2	Fine	<25	<50	<100	<100
TP13	0.0-0.1	Fine	<25	<50	<100	<100
BH14	0.0-0.2	Fine	<25	<50	<100	<100
TP15	0.0-0.1	Fine	<25	<50	<100	<100
BH16	0.0-0.2	Fine	<25	<50	<100	<100
TP17	0.0-0.1	Fine	<25	<50	<100	<100
TP17 - [LAB_DUP]	0.0-0.1	Fine	<25	<50	<100	<100
BH18	0.0-0.2	Fine	<25	<50	<100	<100
TP19	0.0-0.1	Fine	<25	<50	<100	<100
TP19	0.3-0.5	Fine	NA	NA	NA	NA
BH20	0.0-0.2	Fine	<25	<50	<100	<100
TP17 -	0.0-0.1	Fine	NA	NA	NA	NA
SDUP1	-	Fine	<25	<50	<100	<100
SDUP5	-	Fine	<25	<50	<100	<100
Total Number of Samples			26	25	25	25
Maximum Value			<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
TP1	0.0-0.1	Fine	800	1000	3500	10000
TP1 - [LAB_DUP]	0.0-0.1	Fine	800	1000	3500	10000
BH2	0.0-0.2	Fine	800	1000	3500	10000
TP3	0.0-0.1	Fine	800	1000	3500	10000
BH4	0.0-0.2	Fine	800	1000	3500	10000
TP5	0.0-0.1	Fine	800	1000	3500	10000
BH6	0.0-0.1	Fine	800	1000	3500	10000
TP7	0.0-0.1	Fine	800	1000	3500	10000
TP7	1.3-1.4	Fine	800	1000	3500	10000
BH8	0.0-0.2	Fine	800	1000	3500	10000
TP9	0.0-0.1	Fine	800	1000	3500	10000
BH10	0.0-0.2	Fine	800	1000	3500	10000
BH10 - [LAB_DUP]	0.0-0.2	Fine	800	--	--	--
TP11	0.0-0.1	Fine	800	1000	3500	10000
TP11	0.3-0.4	Fine	--	--	--	--
BH12	0.0-0.2	Fine	800	1000	3500	10000
TP13	0.0-0.1	Fine	800	1000	3500	10000
BH14	0.0-0.2	Fine	800	1000	3500	10000
TP15	0.0-0.1	Fine	800	1000	3500	10000
BH16	0.0-0.2	Fine	800	1000	3500	10000
TP17	0.0-0.1	Fine	800	1000	3500	10000
TP17 - [LAB_DUP]	0.0-0.1	Fine	800	1000	3500	10000
BH18	0.0-0.2	Fine	800	1000	3500	10000
TP19	0.0-0.1	Fine	800	1000	3500	10000
TP19	0.3-0.5	Fine	--	--	--	--
BH20	0.0-0.2	Fine	800	1000	3500	10000
TP17 -	0.0-0.1	Fine	--	--	--	--
SDUP1	-	Fine	800	1000	3500	10000
SDUP5	-	Fine	800	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		**RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
TP1	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP1 - [LAB_DUP]	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH2	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP3	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH4	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP5	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH6	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP7	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP7	1.3-1.4	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**3.1**
BH8	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP9	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH10	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH10 - [LAB_DUP]	0.0-0.2	<25	NA	NA	NA	<0.2	<0.5	<1	<3	<1	0
TP11	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP11	0.3-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
BH12	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP13	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH14	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP15	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH16	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP17	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP17 - [LAB_DUP]	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH18	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP19	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP19	0.3-0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
BH20	0.0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
TP17 - [TRIPLICATE]	0.0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
SDUP5	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
Total Number of Samples		26	25	25	25	26	26	26	26	26	26
Maximum Value		<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	3.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools

HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools

FIELD DATA															LABORATORY DATA												
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.01**			**0.001**			**0.001**											**0.01**	**0.001**
12/05/2020	TP1	0.0-0.1	No	10	8,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP1	0.1-0.7	NA	10	12,630	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP1	0.7-1.3	NA	10	12,660	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP3	0.0-0.1	No	10	11,750	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP3	0.1-0.9	NA	10	12,480	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP3	0.9-1.8	NA	10	12,210	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP5	0.0-0.1	No	10	10,230	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	242855	TP5	0.0-0.1	612.47	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
12/05/2020	TP5	0.1-1.1	NA	10	13,550	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP5	1.1-2.0	NA	10	12,260	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP7	0.0-0.3	No	10	9,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	242855	TP7	0.0-0.1	522.51	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
12/05/2020	TP7	0.3-1.2	NA	10	10,640	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP7	1.2-1.5	NA	10	12,310	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP9	0.0-0.1	No	10	12,260	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP9	0.1-1.0	NA	10	13,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP9	1.0-2.0	NA	10	11,960	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP11	0.0-0.1	No	10	9,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP11	0.1-1.1	NA	10	14,520	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	242855	TP11	0.3-0.4	737.46	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
12/05/2020	TP11	1.1-1.8	NA	10	12,790	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP13	0.0-0.1	No	10	11,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP13	0.1-0.6	NA	10	12,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP13	0.6-1.6	NA	10	13,460	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP13	1.6-1.8	NA	10	10,650	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP15	0.0-0.1	No	10	12,680	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	242855	TP15	0.0-0.1	802.62	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
12/05/2020	TP15	0.1-1.1	NA	10	12,260	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP15	1.1-1.5	NA	10	11,780	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP17	0.0-0.1	No	10	10,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP17	0.1-1.1	NA	10	10,120	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP17	1.1-1.8	NA	10	10,940	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP19	0.0-0.1	No	10	13,240	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/05/2020	TP19	0.1-1.1	NA	10	13,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	242855	TP19	0.3-0.5	685.77	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
12/05/2020	TP19	1.1-2.0	NA	10	12,860	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

JKEnvironments

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																	
							AGED HEAVY METALS-EILs						EILs		ESLs						
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	9	11	17	5	24	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
TP1	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**8**	**24**	**16**	**10**	**50**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**9**	**27**	**16**	**10**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH2	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**5**	**9**	**36**	**16**	**19**	**75**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP3	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**9**	**32**	**18**	**14**	**55**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH4	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**8**	**11**	**30**	**16**	**14**	**55**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP5	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**9**	**33**	**19**	**15**	**61**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH6	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**13**	**24**	**13**	**16**	**57**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP7	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	**4**	**10**	**6**	**2**	**10**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP7	1.3-1.4	Fill: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	NA
BH8	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**5**	**8**	**18**	**12**	**7**	**30**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP9	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**11**	**23**	**15**	**9**	**36**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH10	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**10**	**29**	**15**	**12**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	<25	NA	NA	NA	<0.2	<0.5	<1	<3	NA
TP11	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**10**	**26**	**17**	**11**	**45**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP11	0.3-0.4	Fill: Silty Gravelly Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH12	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**12**	**25**	**17**	**10**	**38**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP13	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**8**	**10**	**29**	**17**	**12**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH14	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**5**	**10**	**24**	**15**	**10**	**39**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP15	0.0-0.1	Fill: Silty Gravelly Clay	Fine	NA	NA	NA	<4	**7**	**27**	**13**	**11**	**42**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH16	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**12**	**41**	**26**	**14**	**62**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP17	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**9**	**33**	**17**	**13**	**71**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**8**	**30**	**16**	**26**	**77**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH18	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**8**	**9**	**32**	**21**	**14**	**54**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP19	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**7**	**7**	**27**	**19**	**12**	**51**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP19	0.3-0.5	Fill: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH20	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	**8**	**10**	**32**	**15**	**14**	**61**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	**6**	**9**	**28**	**12**	**14**	**48**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	-	Fine	NA	NA	NA	**8**	**12**	**27**	**22**	**11**	**48**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP5	-	-	Fine	NA	NA	NA	**9**	**12**	**28**	**22**	**14**	**58**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
Total Number of Samples				0	0	0	25	25	25	25	25	25	26	12	26	25	25	25	26	26	26	26	24
Maximum Value				NA	NA	NA	9	13	41	26	26	77	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Soil Texture	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
TP1	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH2	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP3	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH4	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP5	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH6	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP7	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
TP7	1.3-1.4	Fill: Silty Clay	Fine	NA	NA	NA	--	--	--	--	--	--	170	--	180	120	1300	5600	65	105	125	45	--
BH8	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP9	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
BH10	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	--	--	--	--	--	--	170	--	180	--	--	--	65	105	125	45	--
TP11	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
TP11	0.3-0.4	Fill: Silty Gravelly Clay	Fine	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BH12	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP13	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH14	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP15	0.0-0.1	Fill: Silty Gravelly Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH16	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP17	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
BH18	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP19	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
TP19	0.3-0.5	Fill: Silty Clay	Fine	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BH20	0.0-0.2	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	170	180	180	120	1300	5600	65	105	125	45	20
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	70	1100	35	95	--	--	--	--	--	--	--	--	--	--	--
SDUP1	-	-	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20
SDUP5	-	-	Fine	NA	NA	NA	100	200	70	1100	35	95	170	--	180	120	1300	5600	65	105	125	45	20

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
TP1	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**8**	**24**	**16**	<0.1	**10**	**50**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP1 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**9**	**27**	**16**	<0.1	**10**	**47**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH2	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**9**	**36**	**16**	<0.1	**19**	**75**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP3	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**32**	**18**	<0.1	**14**	**55**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH4	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**11**	**30**	**16**	<0.1	**14**	**55**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP5	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**33**	**19**	<0.1	**15**	**61**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH6	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**13**	**24**	**13**	<0.1	**16**	**57**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP7	0.0-0.1	Fill: Silty Clay	<4	<0.4	**4**	**10**	**6**	<0.1	**2**	**10**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
TP7	1.3-1.4	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH8	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**8**	**18**	**12**	<0.1	**7**	**30**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP9	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**11**	**23**	**15**	<0.1	**9**	**36**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH10	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**10**	**29**	**15**	<0.1	**12**	**47**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH10 - [LAB_DUP]	0.0-0.2	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25	NA	NA	NA	NA	<0.2	<0.5	<1	<3	NA
TP11	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**10**	**26**	**17**	<0.1	**11**	**45**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP11	0.3-0.4	Fill: Silty Gravelly Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH12	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**25**	**17**	<0.1	**10**	**38**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP13	0.0-0.1	Fill: Silty Clay	**8**	<0.4	**10**	**29**	**17**	<0.1	**12**	**47**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH14	0.0-0.2	Fill: Silty Clay	**5**	<0.4	**10**	**24**	**15**	<0.1	**10**	**39**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP15	0.0-0.1	Fill: Silty Gravelly Clay	<4	<0.4	**7**	**27**	**13**	<0.1	**11**	**42**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH16	0.0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**41**	**26**	<0.1	**14**	**62**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP17	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**9**	**33**	**17**	<0.1	**13**	**71**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP17 - [LAB_DUP]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**8**	**30**	**16**	<0.1	**26**	**77**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH18	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**9**	**32**	**21**	<0.1	**14**	**54**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP19	0.0-0.1	Fill: Silty Clay	**7**	<0.4	**7**	**27**	**19**	<0.1	**12**	**51**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP19	0.3-0.5	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH20	0.0-0.2	Fill: Silty Clay	**8**	<0.4	**10**	**32**	**15**	<0.1	**14**	**61**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
TP17 - [TRIPLICATE]	0.0-0.1	Fill: Silty Clay	**6**	<0.4	**9**	**28**	**12**	<0.1	**14**	**48**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	-	**8**	<0.4	**12**	**27**	**22**	<0.1	**11**	**48**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
SDUP5	-	-	**9**	<0.4	**12**	**28**	**22**	<0.1	**14**	**58**	**0.3**	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
Total Number of Samples			25	25	25	25	25	25	25	25	24	24	12	12	12	12	12	26	25	25	25	25	26	26	26	26	5
Maximum Value			9	<PQL	13	41	26	<PQL	26	77	0.3	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

JKEnvironments

TABLE S8
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	TP1	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP5	0.0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP5	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	0.075	nc	nc	nc	0.125	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	nc	nc	120%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-S1	-	NA	NA	NA	NA	<0.2	<0.5	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	15/05/20																									
Trip	TS-S1		-	-	-	-	99%	98%	99%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	15/05/20																									

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	TP1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP5	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-S1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	15/05/20																					
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	15/05/20																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	TP1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6	<0.4	8	24	16	<0.1	10	50
laboratory	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	<0.4	12	27	22	<0.1	11	48
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	7	nc	10	25.5	19	nc	10.5	49
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	29%	nc	40%	12%	32%	nc	10%	4%
Inter	TP5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7	<0.4	9	33	19	<0.1	15	61
laboratory	SDUP5	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9	<0.4	12	28	22	<0.1	14	58
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	8	nc	10.5	30.5	20.5	nc	14.5	59.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	25%	nc	29%	16%	15%	nc	7%	5%
Field	TB-S1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	15/05/20																						
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	15/05/20																						

Result outside of QA/QC acceptance criteria (highlighted yellow)

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES	
			MW8	WDUP1
Inorganic Compounds and Parameters				
pH		6.5 - 8.5	7.1	NA
Electrical Conductivity (µS/cm)	1	NSL	**6100**	NA
Turbidity (NTU)		NSL	NA	NA
Metals and Metalloids				
Arsenic (As III)	1	24	**48**	**47**
Cadmium	0.1	0.2	<0.1	<0.1
Chromium (SAC for Cr III adopted)	1	3.3	<1	<1
Copper	1	1.4	<1	<1
Lead	1	3.4	<1	<1
Total Mercury (inorganic)	0.05	0.06	<0.05	<0.05
Nickel	1	11	**25**	**25**
Zinc	1	8	**9**	**11**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)				
Benzene	1	950	<1	<1
Toluene	1	180	<1	<1
Ethylbenzene	1	80	<1	<1
m+p-xylene	2	75	<2	<2
o-xylene	1	350	<1	<1
Total xylenes	2	NSL	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs				
Dichlorodifluoromethane	10	NSL	<10	NA
Chloromethane	10	NSL	<10	NA
Vinyl Chloride	10	100	<10	NA
Bromomethane	10	NSL	<10	NA
Chloroethane	10	NSL	<10	NA
Trichlorofluoromethane	10	NSL	<10	NA
1,1-Dichloroethene	1	700	<1	NA
Trans-1,2-dichloroethene	1	NSL	<1	NA
1,1-dichloroethane	1	90	<1	NA
Cis-1,2-dichloroethene	1	NSL	<1	NA
Bromochloromethane	1	NSL	<1	NA
Chloroform	1	370	<1	NA
2,2-dichloropropane	1	NSL	<1	NA
1,2-dichloroethane	1	1900	<1	NA
1,1,1-trichloroethane	1	270	<1	NA
1,1-dichloropropene	1	NSL	<1	NA
Cyclohexane	1	NSL	<1	NA
Carbon tetrachloride	1	240	<1	NA
Benzene	1	950	<1	NA
Dibromomethane	1	NSL	<1	NA
1,2-dichloropropane	1	900	<1	NA
Trichloroethene	1	330	<1	NA
Bromodichloromethane	1	NSL	<1	NA
trans-1,3-dichloropropene	1	NSL	<1	NA
cis-1,3-dichloropropene	1	NSL	<1	NA
1,1,2-trichloroethane	1	6500	<1	NA
Toluene	1	180	<1	NA
1,3-dichloropropane	1	1100	<1	NA
Dibromochloromethane	1	NSL	<1	NA
1,2-dibromoethane	1	NSL	<1	NA
Tetrachloroethene	1	70	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	NA
Chlorobenzene	1	55	<1	NA
Ethylbenzene	1	80	<1	NA
Bromoform	1	NSL	<1	NA
m+p-xylene	2	75	<2	NA
Styrene	1	NSL	<1	NA
1,1,2,2-tetrachloroethane	1	400	<1	NA
o-xylene	1	350	<1	NA
1,2,3-trichloropropane	1	NSL	<1	NA
Isopropylbenzene	1	30	<1	NA
Bromobenzene	1	NSL	<1	NA
n-propyl benzene	1	NSL	<1	NA
2-chlorotoluene	1	NSL	<1	NA
4-chlorotoluene	1	NSL	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	NA
Tert-butyl benzene	1	NSL	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	NA
1,3-dichlorobenzene	1	260	<1	NA
Sec-butyl benzene	1	NSL	<1	NA
1,4-dichlorobenzene	1	60	<1	NA
4-isopropyl toluene	1	NSL	<1	NA
1,2-dichlorobenzene	1	160	<1	NA
n-butyl benzene	1	NSL	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	NA
1,2,4-trichlorobenzene	1	85	<1	NA
Hexachlorobutadiene	1	NSL	<1	NA
1,2,3-trichlorobenzene	1	3	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)				
Naphthalene	0.2	16	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G2
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011 (v3.5 2018)	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES MW8	SAMPLES WDUP1
Total Recoverable Hydrocarbons (TRH)						
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)						
Benzene	1	1	-	-	<1	<1
Toluene	1	800	-	-	<1	<1
Ethylbenzene	1	300	-	-	<1	<1
Total xylenes	2	600	-	-	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	1	-	-	6.1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs						
Dichlorodifluoromethane	10	-	-	-	<10	NA
Chloromethane	10	-	-	-	<10	NA
Vinyl Chloride	10	0.3	-	-	<10	NA
Bromomethane	10	-	-	-	<10	NA
Chloroethane	10	-	-	-	<10	NA
Trichlorofluoromethane	10	-	-	-	<10	NA
1,1-Dichloroethene	1	30	-	-	<1	NA
Trans-1,2-dichloroethene	1	60	-	-	<1	NA
1,1-dichloroethane	1	-	-	-	<1	NA
Cis-1,2-dichloroethene	1	60	-	-	<1	NA
Bromochloromethane	1	250	-	-	<1	NA
Chloroform	1		-	-	<1	NA
2,2-dichloropropane	1	-	-	-	<1	NA
1,2-dichloroethane	1	3	-	-	<1	NA
1,1,1-trichloroethane	1	-	-	-	<1	NA
1,1-dichloropropene	1	-	-	-	<1	NA
Cyclohexane	1	-	-	-	<1	NA
Carbon tetrachloride	1	3	-	-	<1	NA
Benzene	1	1	-	-	<1	NA
Dibromomethane	1	-	-	-	<1	NA
1,2-dichloropropane	1	-	-	-	<1	NA
Trichloroethene	1	-	-	-	<1	NA
Bromodichloromethane	1	-	-	-	<1	NA
trans-1,3-dichloropropene	1	100	-	-	<1	NA
cis-1,3-dichloropropene	1	100	-	-	<1	NA
1,1,2-trichloroethane	1	-	-	-	<1	NA
Toluene	1	800	-	-	<1	NA
1,3-dichloropropane	1	-	-	-	<1	NA
Dibromochloromethane	1	-	-	-	<1	NA
1,2-dibromoethane	1	-	-	-	<1	NA
Tetrachloroethene	1	50	-	-	<1	NA
1,1,1,2-tetrachloroethane	1	-	-	-	<1	NA
Chlorobenzene	1	300	-	-	<1	NA
Ethylbenzene	1	300	-	-	<1	NA
Bromoform	1	-	-	-	<1	NA
m+p-xylene	2	-	-	-	<2	NA
Styrene	1	30	-	-	<1	NA
1,1,2,2-tetrachloroethane	1	-	-	-	<1	NA
o-xylene	1	-	-	-	<1	NA
1,2,3-trichloropropane	1	-	-	-	<1	NA
Isopropylbenzene	1	-	-	-	<1	NA
Bromobenzene	1	-	-	-	<1	NA
n-propyl benzene	1	-	-	-	<1	NA
2-chlorotoluene	1	-	-	-	<1	NA
4-chlorotoluene	1	-	-	-	<1	NA
1,3,5-trimethyl benzene	1	-	-	-	<1	NA
Tert-butyl benzene	1	-	-	-	<1	NA
1,2,4-trimethyl benzene	1	-	-	-	<1	NA
1,3-dichlorobenzene	1	20	-	-	<1	NA
Sec-butyl benzene	1	-	-	-	<1	NA
1,4-dichlorobenzene	1	40	-	-	<1	NA
4-isopropyl toluene	1	-	-	-	<1	NA
1,2-dichlorobenzene	1	1500	-	-	<1	NA
n-butyl benzene	1	-	-	-	<1	NA
1,2-dibromo-3-chloropropane	1	-	-	-	<1	NA
1,2,4-trichlorobenzene	1	30	-	-	<1	NA
1,2,3-trichlorobenzene	1		-	-	<1	NA
Hexachlorobutadiene	1	7	-	-	<1	NA

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE G3
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES	
			MW8	WDUP1
Inorganic Compounds and Parameters				
pH		6.5 - 8.5	7.1	NA
Electrical Conductivity (µS/cm)	1	NSL	**6100**	NA
Turbidity (NTU)		NSL	NA	NA
Metals and Metalloids				
Arsenic (As III)	1	100	**48**	**47**
Cadmium	0.1	20	<0.1	<0.1
Chromium (total)	1	500	<1	<1
Copper	1	20000	<1	<1
Lead	1	100	<1	<1
Total Mercury (inorganic)	0.05	10	<0.05	<0.05
Nickel	1	200	**25**	**25**
Zinc	1	30000	**9**	**11**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)				
Benzene	1	10	<1	<1
Toluene	1	8000	<1	<1
Ethylbenzene	1	3000	<1	<1
m+p-xylene	2	NSL	<2	<2
o-xylene	1	NSL	<1	<1
Total xylenes	2	6000	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs				
Dichlorodifluoromethane	10	NSL	<10	NA
Chloromethane	10	NSL	<10	NA
Vinyl Chloride	10	3	<10	NA
Bromomethane	10	NSL	<10	NA
Chloroethane	10	NSL	<10	NA
Trichlorofluoromethane	10	NSL	<10	NA
1,1-Dichloroethene	1	300	<1	NA
Trans-1,2-dichloroethene	1	600	<1	NA
1,1-dichloroethane	1	NSL	<1	NA
Cis-1,2-dichloroethene	1	600	<1	NA
Bromochloromethane	1	2500	<1	NA
Chloroform	1		<1	NA
2,2-dichloropropane	1	NSL	<1	NA
1,2-dichloroethane	1	30	<1	NA
1,1,1-trichloroethane	1	NSL	<1	NA
1,1-dichloropropene	1	NSL	<1	NA
Cyclohexane	1	NSL	<1	NA
Carbon tetrachloride	1	30	<1	NA
Benzene	1	10	<1	NA
Dibromomethane	1	NSL	<1	NA
1,2-dichloropropane	1	NSL	<1	NA
Trichloroethene	1	NSL	<1	NA
Bromodichloromethane	1	NSL	<1	NA
trans-1,3-dichloropropene	1	1000	<1	NA
cis-1,3-dichloropropene	1	1000	<1	NA
1,1,2-trichloroethane	1	NSL	<1	NA
Toluene	1	8000	<1	NA
1,3-dichloropropane	1	NSL	<1	NA
Dibromochloromethane	1	NSL	<1	NA
1,2-dibromoethane	1	NSL	<1	NA
Tetrachloroethene	1	500	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	NA
Chlorobenzene	1	3000	<1	NA
Ethylbenzene	1	3000	<1	NA
Bromoform	1	NSL	<1	NA
m+p-xylene	2	NSL	<2	NA
Styrene	1	300	<1	NA
1,1,2,2-tetrachloroethane	1	NSL	<1	NA
o-xylene	1	NSL	<1	NA
1,2,3-trichloropropane	1	NSL	<1	NA
Isopropylbenzene	1	NSL	<1	NA
Bromobenzene	1	NSL	<1	NA
n-propyl benzene	1	NSL	<1	NA
2-chlorotoluene	1	NSL	<1	NA
4-chlorotoluene	1	NSL	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	NA
Tert-butyl benzene	1	NSL	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	NA
1,3-dichlorobenzene	1	200	<1	NA
Sec-butyl benzene	1	NSL	<1	NA
1,4-dichlorobenzene	1	400	<1	NA
4-isopropyl toluene	1	NSL	<1	NA
1,2-dichlorobenzene	1	15000	<1	NA
n-butyl benzene	1	NSL	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	NA
1,2,4-trichlorobenzene	1	300	<1	NA
1,2,3-trichlorobenzene	1		<1	NA
Hexachlorobutadiene	1	7	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)				
Naphthalene	0.2	NSL	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G4
GROUNDWATER QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC		*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW8	2.07	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	48	<0.1	<1	<1	<1	<0.05	25	9
laboratory	WDUP1	2.07	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	47	<0.1	<1	<1	<1	<0.05	25	11
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	47.5	nc	nc	nc	nc	nc	25	10
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2%	nc	nc	nc	nc	nc	0%	20%
Field	TB-W1		NA	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	20/05/2020																																		
Trip	TS-W1		-	-	-	-	127%	117%	105%	106%	110%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spike	20/05/2020																																		

Result outside of QA/QC acceptance criteria Value

Appendix C: Site Information and Site History

Selected Site Photographs

Project Ref: E33177PArpt Glenmore Park
Site Address: 1-23 Forestwood Drive, Glenmore Park, NSW
Selected Site Photos Dated: 11 May 2020

Photograph 1: Looking west/north-west at the site area.

Photograph 2: Looking south-west at the site area**.**

Photographs 3: Looking at the north-eastern corner of the site area**.**

Photograph 4: Carpark and amenities to the east of the site.

Project Ref: E33177PArpt Glenmore Park
Site Address: 1-23 Forestwood Drive, Glenmore Park, NSW
Selected Site Photos Dated: 12 May 2020

Photograph 5: Groundwater monitoring well (BH8/MW8) installed at the site**.**

Photograph 6: Test pit excavation**.**

Photographs 7: Fill material profile observed within test pits.

Photograph 8: Example of extracted fill material from test pits.

Project Ref: E33177PArpt Glenmore Park
Site Address: 1-23 Forestwood Drive, Glenmore Park, NSW
Selected Site Photos Dated: 18 May 2020

Photograph 9: View of Surveyors Creek and surrounding areas.

Photograph 10: View of Bradley Street bridge over Surveyors Creek.

Photographs 11: View of Surveyors Creek and surrounding areas.

Photograph 12: View of Mulgoa Rise Field from Bradley Street.

Lotsearch Environmental Risk and Planning Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 08 May 2020 11:38:16

Reference: LS012255 EP

Address: 1-23 Forestwood Drive, Glenmore Park, NSW 2745

Dataset Listing

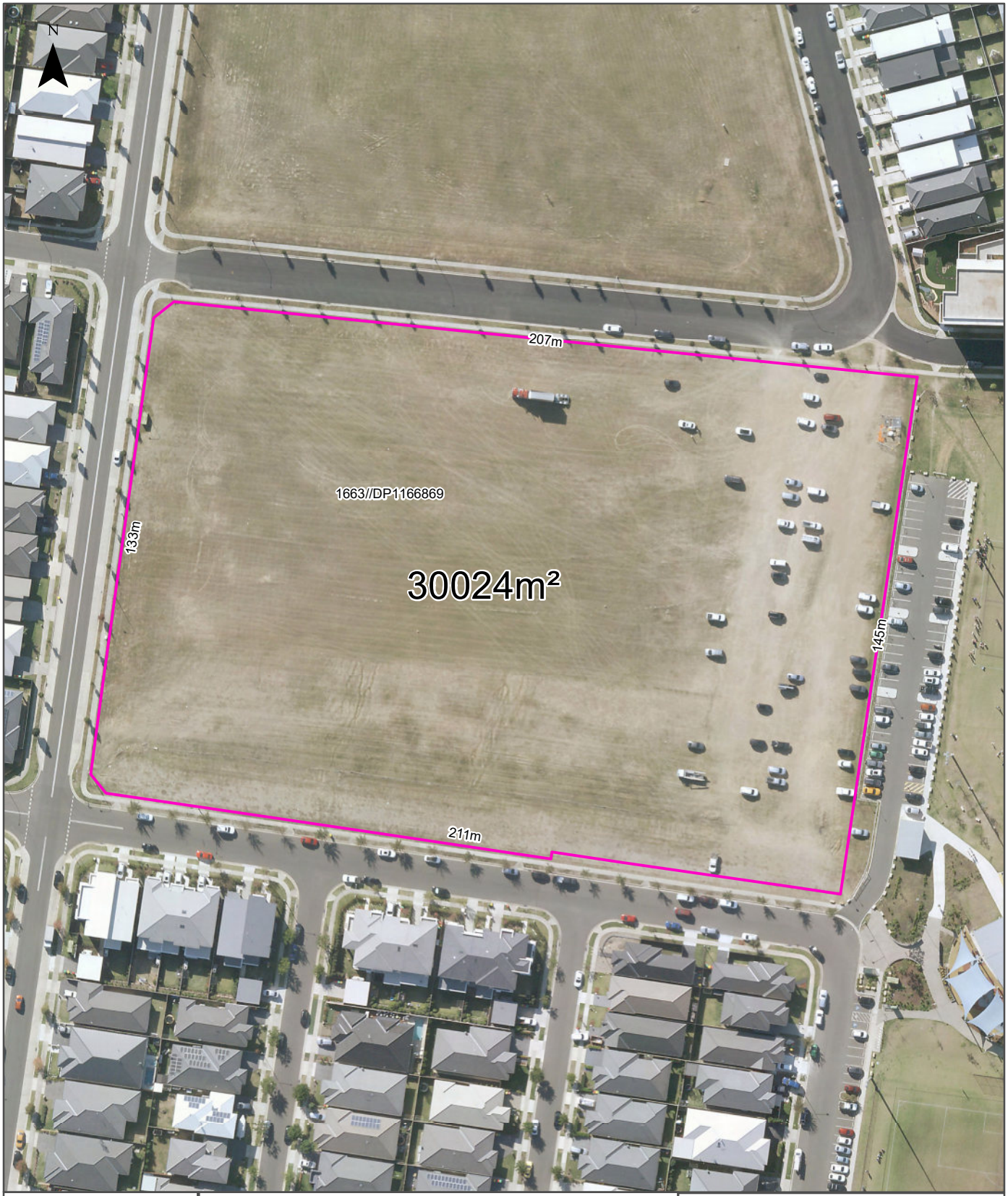
Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	13/03/2020	13/03/2020	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	15/04/2020	15/04/2020	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	21/04/2020	21/04/2020	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	21/04/2020	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	12/02/2020	07/03/2017	Quarterly	1000	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	05/02/2020	13/07/2012	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	22/04/2020	22/04/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	12/02/2020	12/02/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	12/02/2020	12/02/2020	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	22/04/2020	22/04/2020	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	04/05/2020	04/05/2020	Monthly	2000	0	0	1
EPA Other Sites with Contamination Issues	Environment Protection Authority	04/02/2020	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	09/04/2020	09/04/2020	Monthly	1000	0	0	0
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	09/04/2020	09/04/2020	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	09/04/2020	09/04/2020	Monthly	1000	0	1	4
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	19/02/2020	19/02/2020	Quarterly	1000	0	0	5
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/02/2020	19/02/2020	Quarterly	1000	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/02/2020	19/02/2020	Quarterly	1000	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	19/02/2020	19/02/2020	Quarterly	1000	0	0	3
State Forest	Forestry Corporation of NSW	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	21/01/2020	30/09/2019	Annually	1000	0	0	1
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Botany Groundwater Management Zones	NSW Department of Planning, Industry and Environment	15/03/2018	01/10/2005	As required	1000	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	18
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		None planned	1000	1	-	4
Geological Structures 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	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	1000	1	1	2
Soil Landscapes	NSW Department of Planning, Industry and Environment	12/08/2014		None planned	1000	2	-	3
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	24/04/2020	28/02/2020	Monthly	500	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	1
Dryland Salinity Potential of Western Sydney	NSW Department of Planning, Industry and Environment	12/05/2017	01/01/2002	None planned	1000	1	2	3
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/02/2020	19/02/2020	Quarterly	1000	0	0	0
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	24/04/2020	07/12/2018	Monthly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	26/03/2020	26/03/2020	Monthly	1000	1	3	20
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	04/02/2020	31/07/2018	Quarterly	1000	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	04/02/2020	20/11/2019	Quarterly	1000	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	12/02/2020	09/11/2018	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning, Industry and Environment	24/04/2020	17/04/2020	Monthly	1000	0	0	1
Bush Fire Prone Land	NSW Rural Fire Service	04/02/2020	14/12/2019	Quarterly	1000	0	1	3
Remnant Vegetation of the Cumberland Plain	NSW Office of Environment & Heritage	07/10/2014	04/08/2011	Unknown	1000	0	0	6
Ramsar Wetlands of Australia	Department of the Agriculture, Water and the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	2
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	5
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	06/05/2020	06/05/2020	Weekly	10000	-	-	-

Site Diagram

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 30024m^2

Total Perimeter: 703m

Scale: 0 25 50 Meters

Data Sources: Aerial Imagery: © Aerometrex Pty Ltd

Disclaimers:

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

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 08 May 2020

Contaminated Land

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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 (m)	Direction
N/A	No records in buffer								

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

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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 (m)	Direction
N/A	No records in buffer											

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

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

PFAS Investigation & Management Programs

1-23 Forestwood Drive, Glenmore Park, NSW 2745

EPA PFAS Investigation Program

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

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

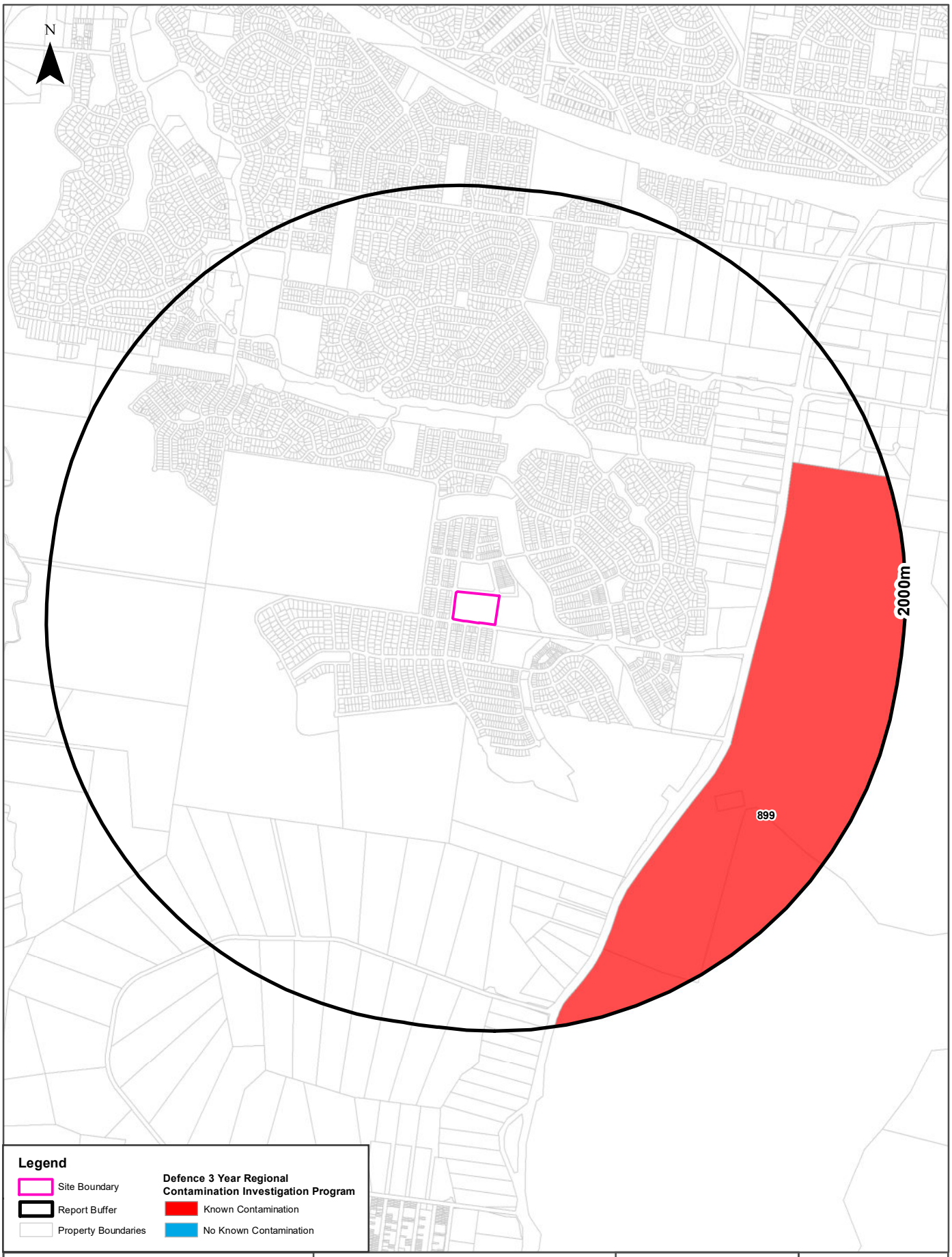
Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

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

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2020

Coordinate System: GDA 1994 MGA Zone 56

Date: 08 May 2020

Defence Sites

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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
899	Defence Establishment Orchard Hills	Mulgoa, New South Wales	YES	Premise Match	1268m	South East

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

EPA Other Sites with Contamination Issues

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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

EPA Activities

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Licensed Activities under the POEO Act 1997

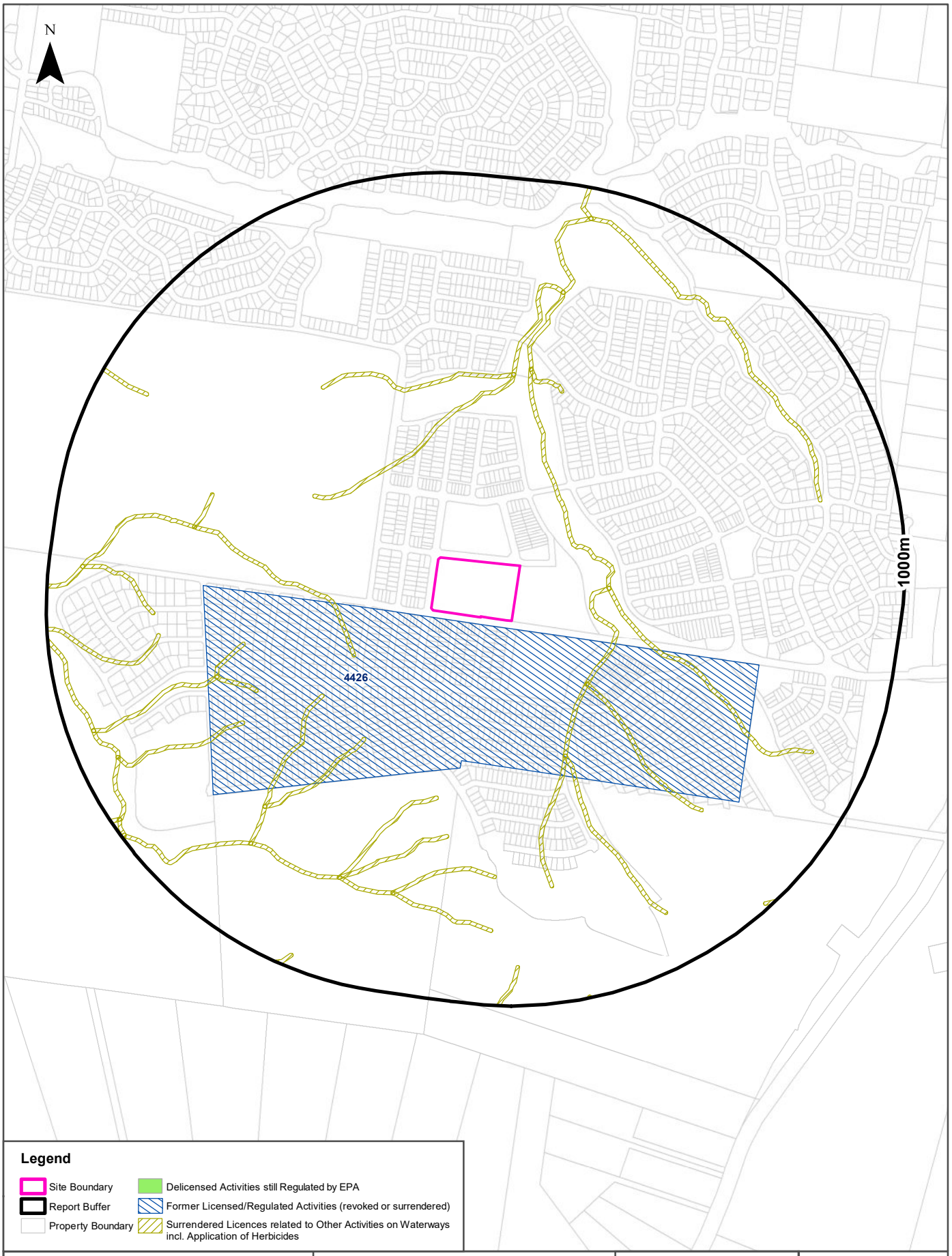
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

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

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

1-23 Forestwood Drive, Glenmore Park, NSW 2745



EPA Activities

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Delicensed Activities still regulated by the EPA

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

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

Delicensed Activities Data Source: Environment Protection Authority

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

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

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4426	MULGOA QUARRIES PTY LTD	LOT 1 BRADLEY STREET, ORCHARD HILLS, NSW 2748	Surrendered	03/05/2001	Other Land-Based Extraction	Premise Match	18m	South
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	144m	-
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	144m	-
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	144m	-

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1986, 1982, 1970, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

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

Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1986, 1982, 1970, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

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

Historical Business Directories

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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
	No records in buffer						

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
	No records in buffer					

Aerial Imagery 2019

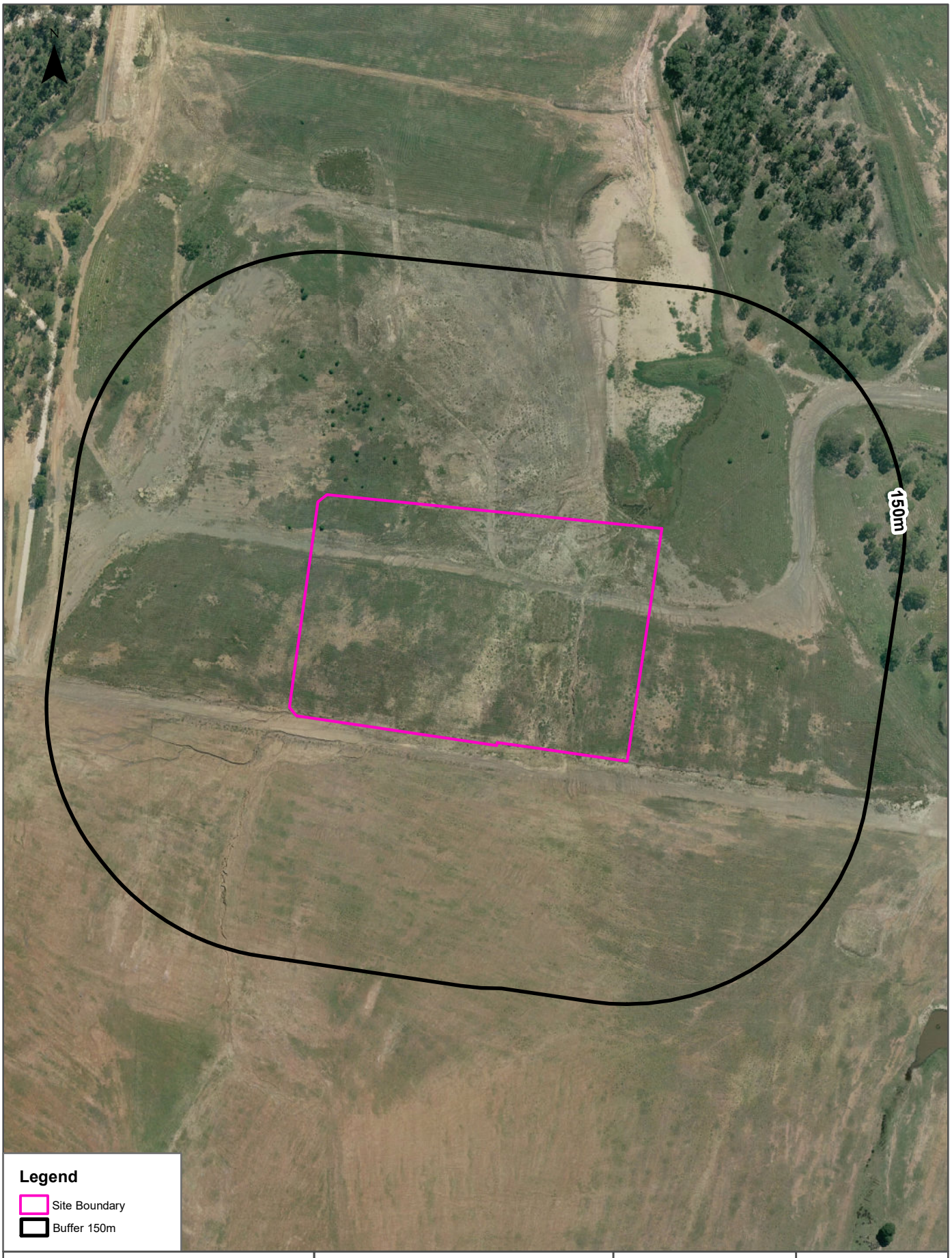
1-23 Forestwood Drive, Glenmore Park, NSW 2745

Aerial Imagery 2014

1-23 Forestwood Drive, Glenmore Park, NSW 2745

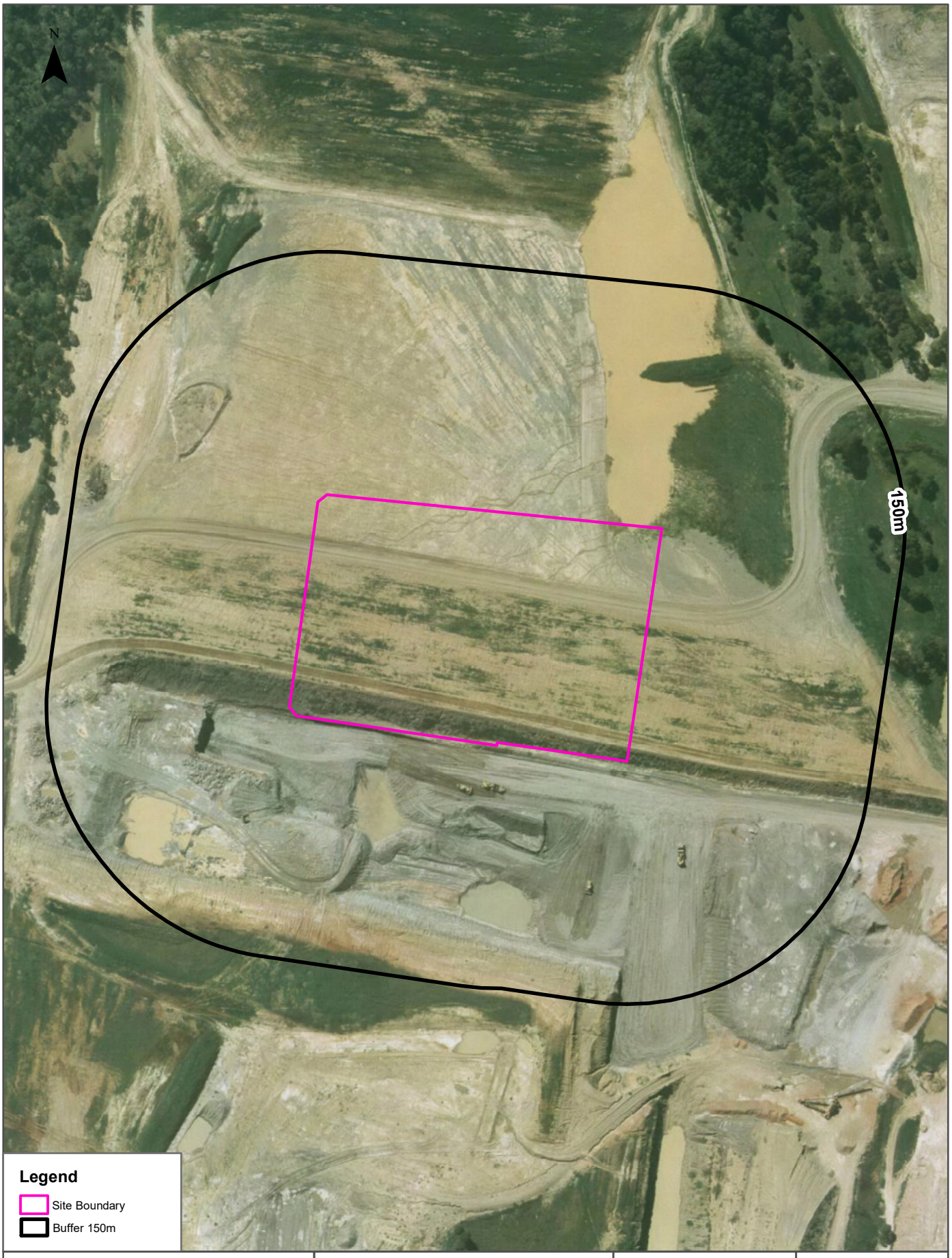
Aerial Imagery 2007

1-23 Forestwood Drive, Glenmore Park, NSW 2745



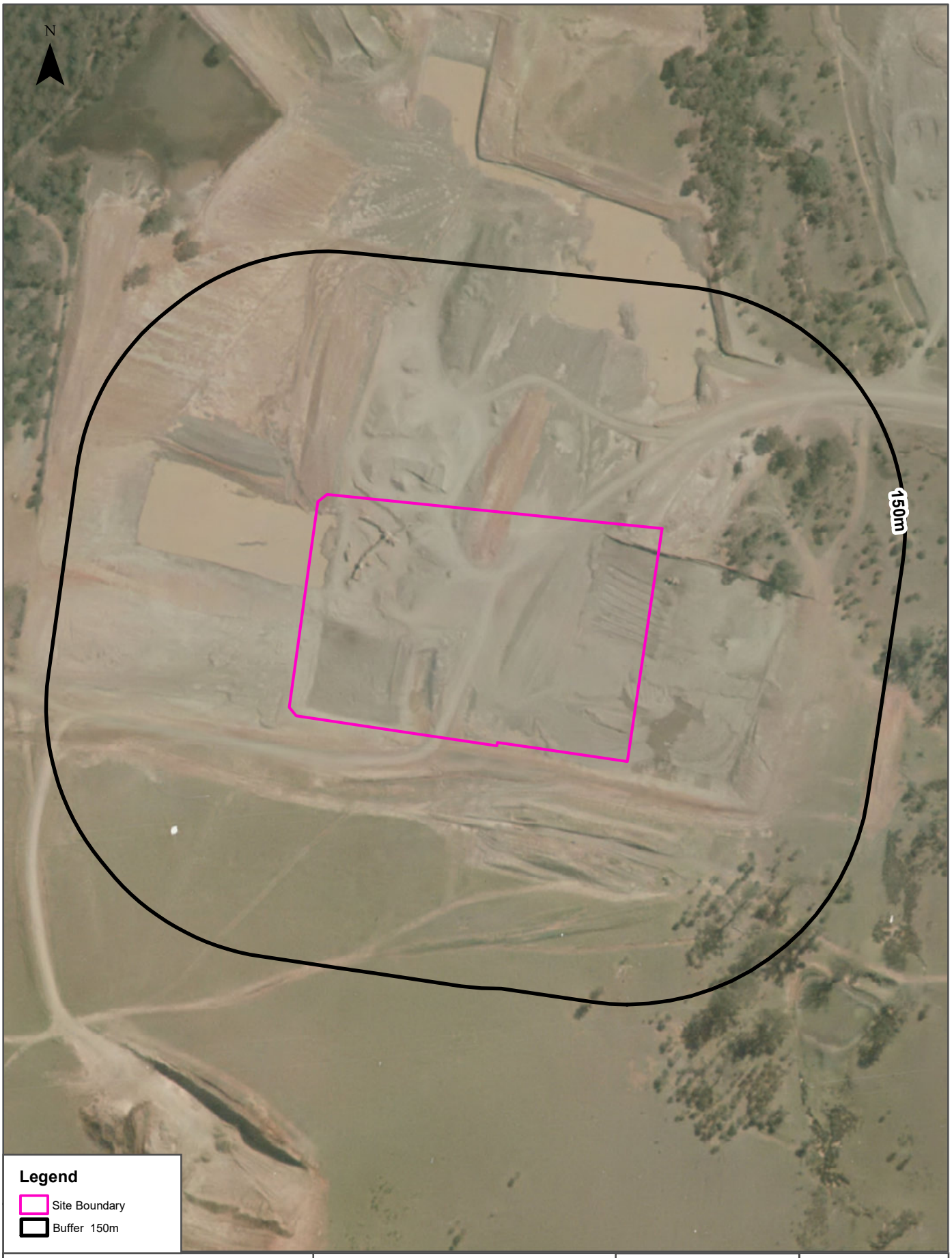
Aerial Imagery 2000

1-23 Forestwood Drive, Glenmore Park, NSW 2745



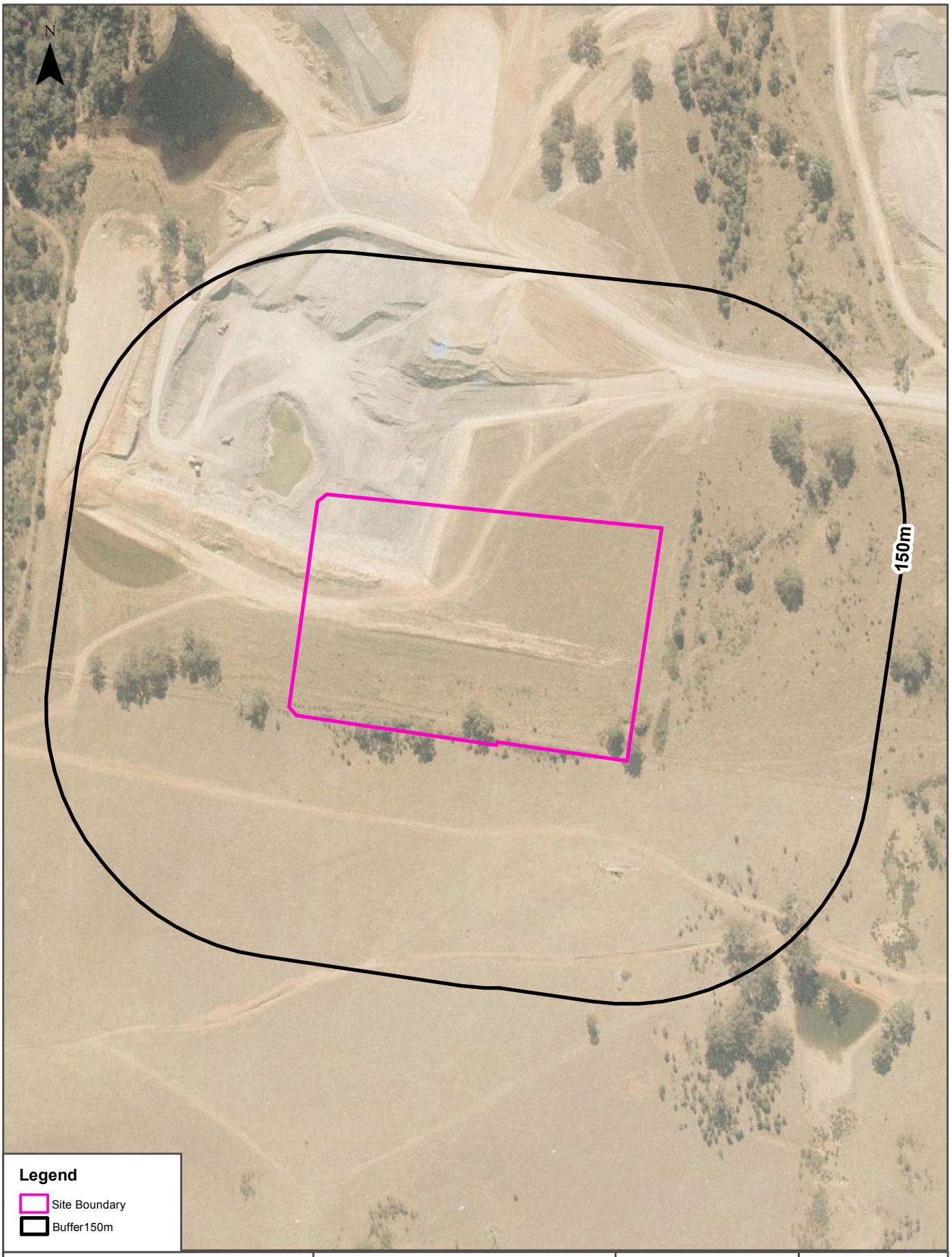
Aerial Imagery 1991

1-23 Forestwood Drive, Glenmore Park, NSW 2745



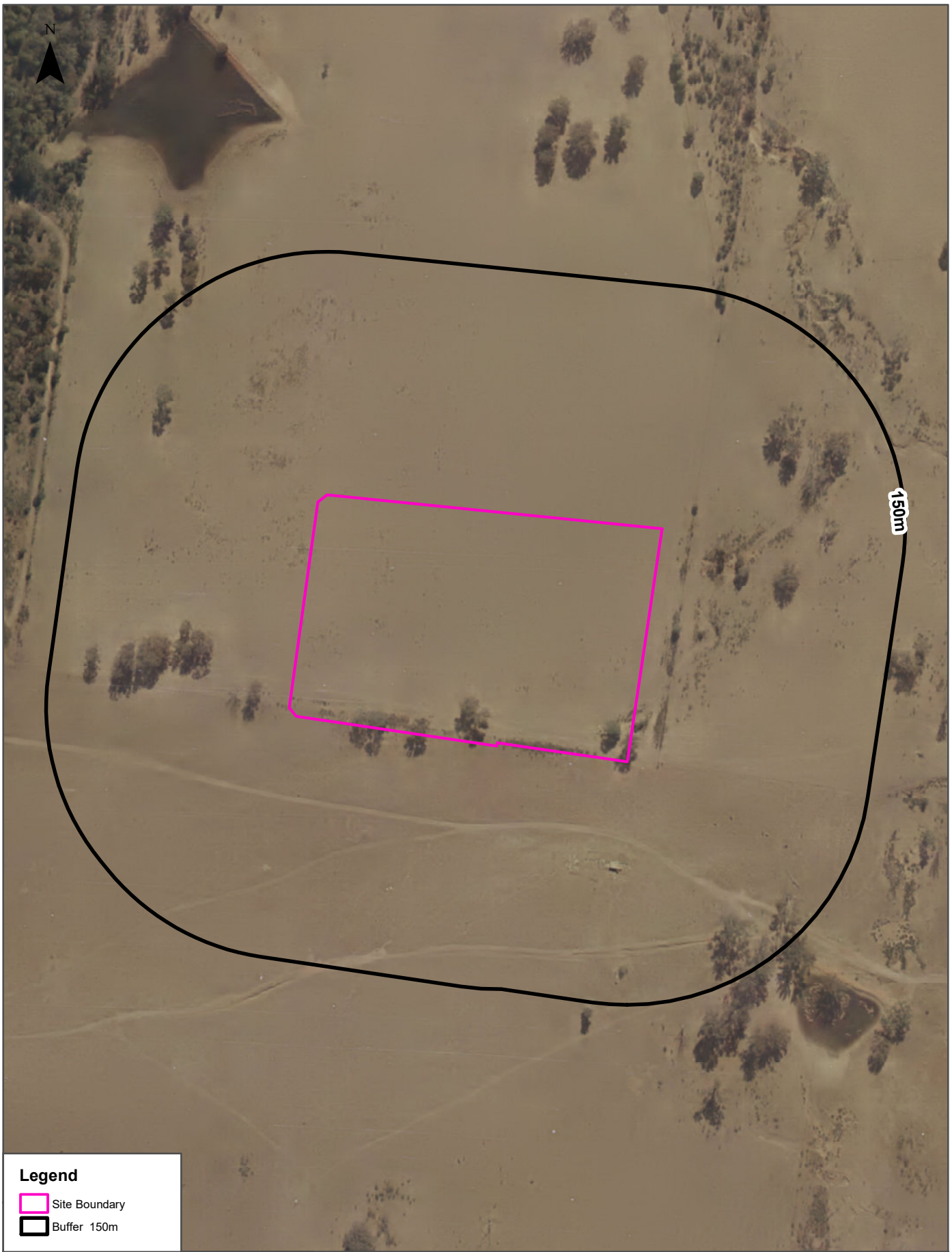
Aerial Imagery 1986

1-23 Forestwood Drive, Glenmore Park, NSW 2745



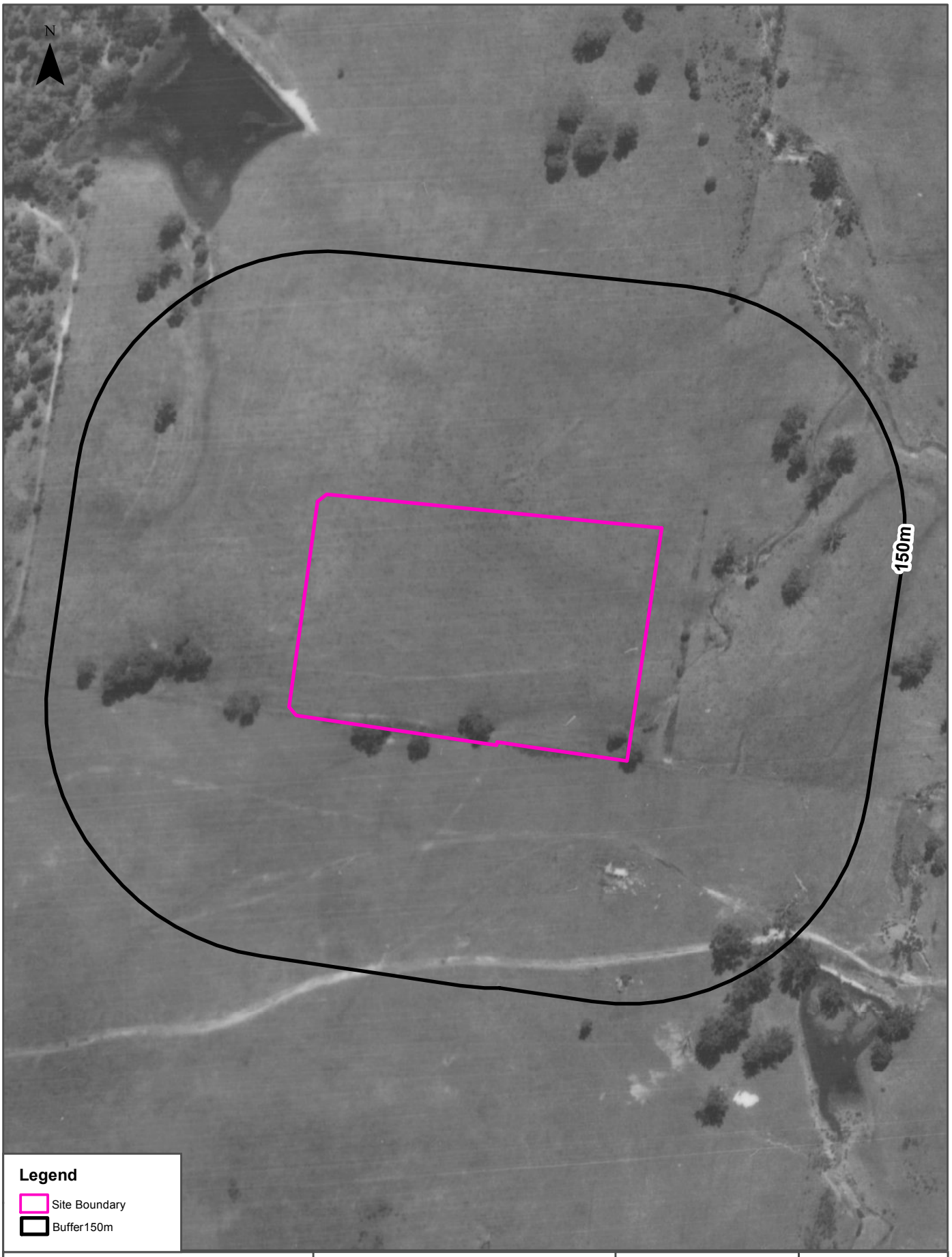
Aerial Imagery 1982

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Aerial Imagery 1978

1-23 Forestwood Drive, Glenmore Park, NSW 2745

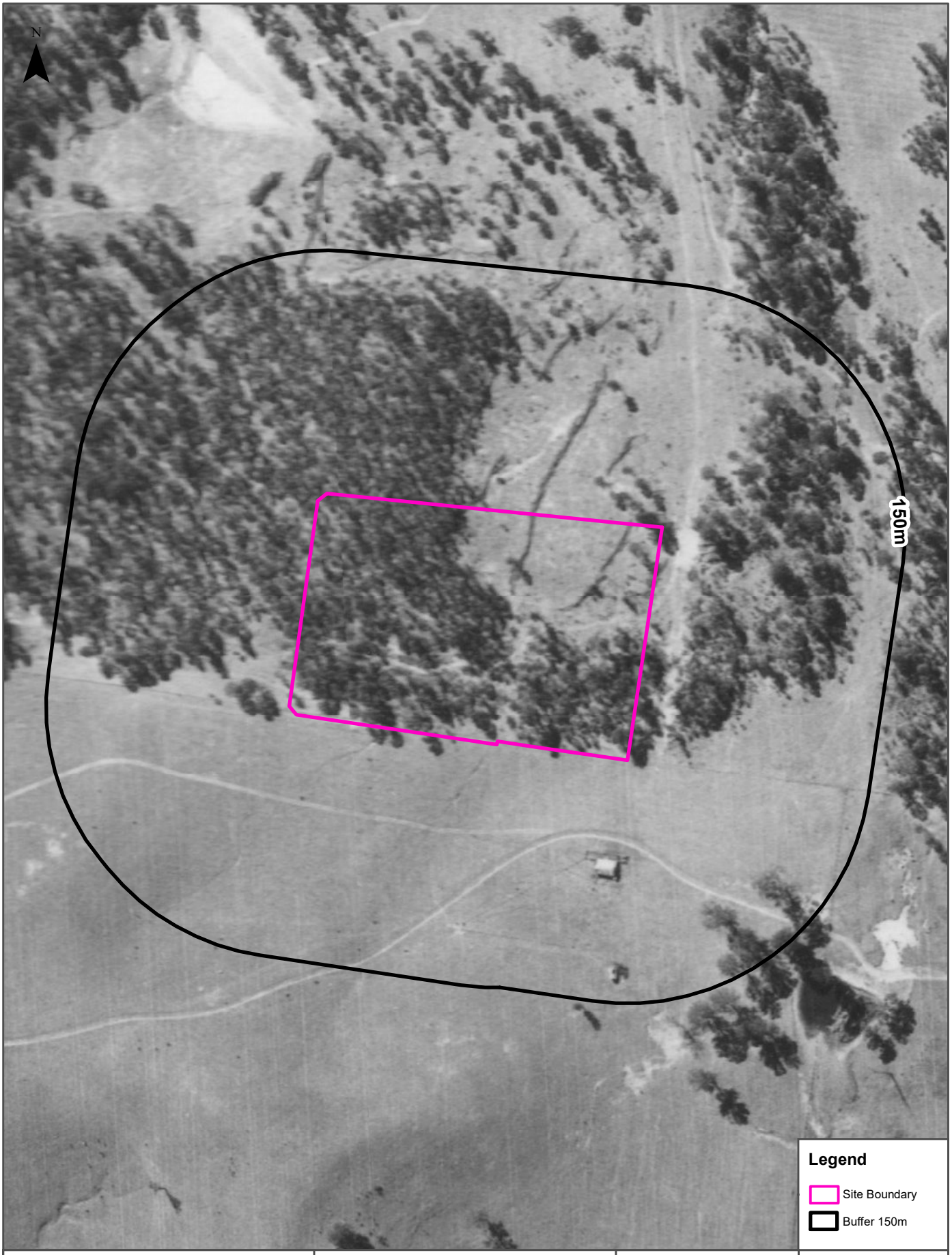


Aerial Imagery 1970

1-23 Forestwood Drive, Glenmore Park, NSW 2745

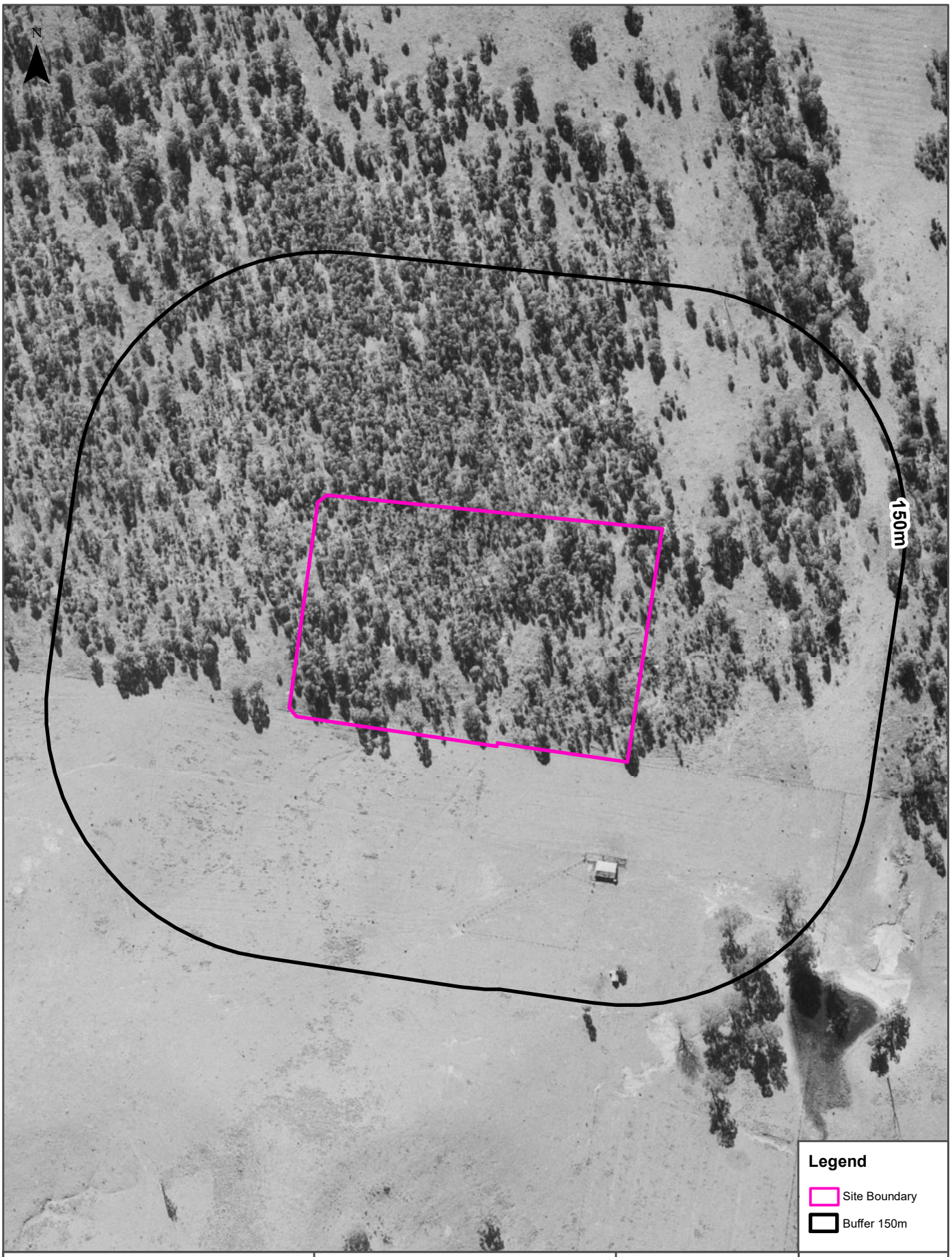
Aerial Imagery 1965

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Aerial Imagery 1961

1-23 Forestwood Drive, Glenmore Park, NSW 2745

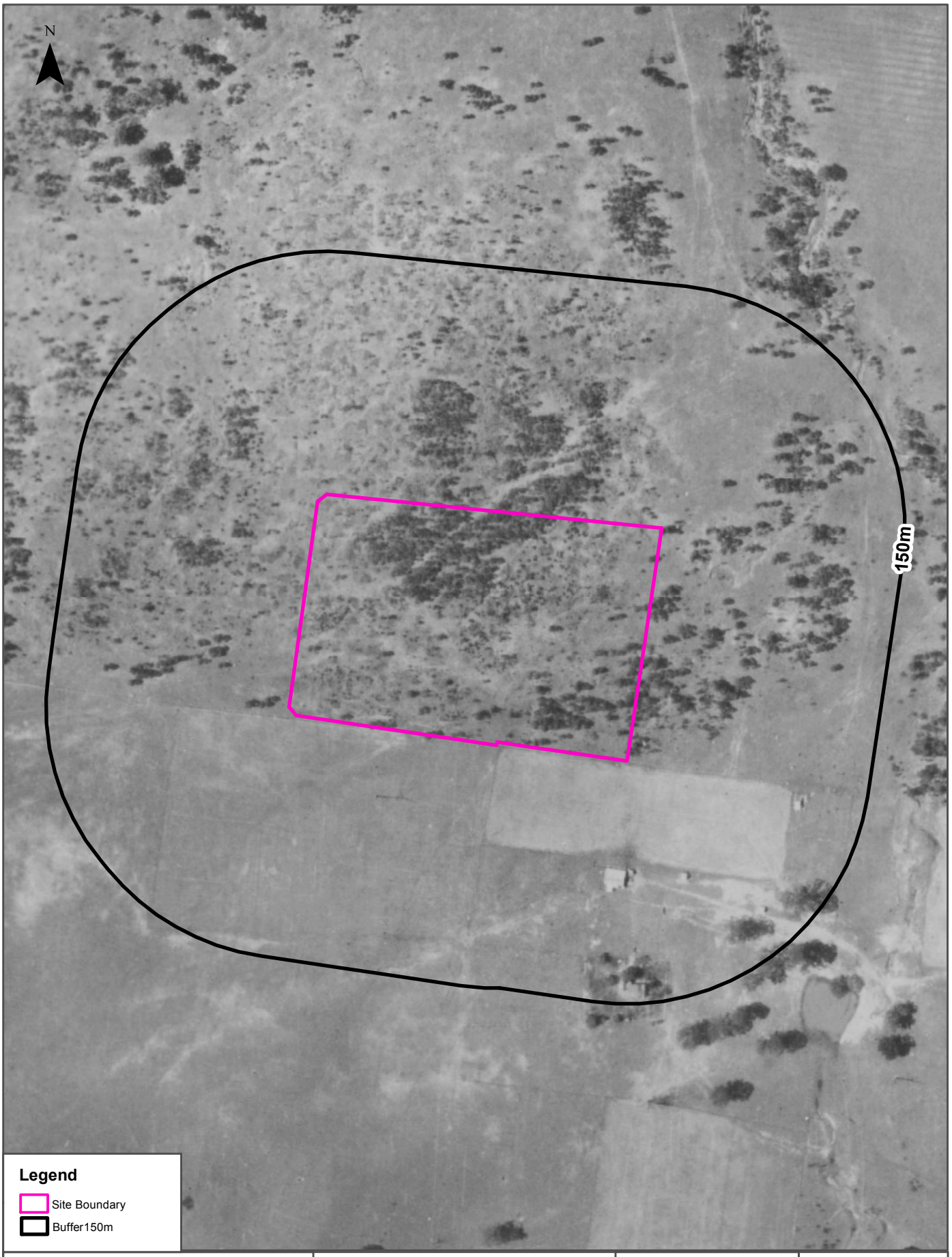


Aerial Imagery 1956

1-23 Forestwood Drive, Glenmore Park, NSW 2745

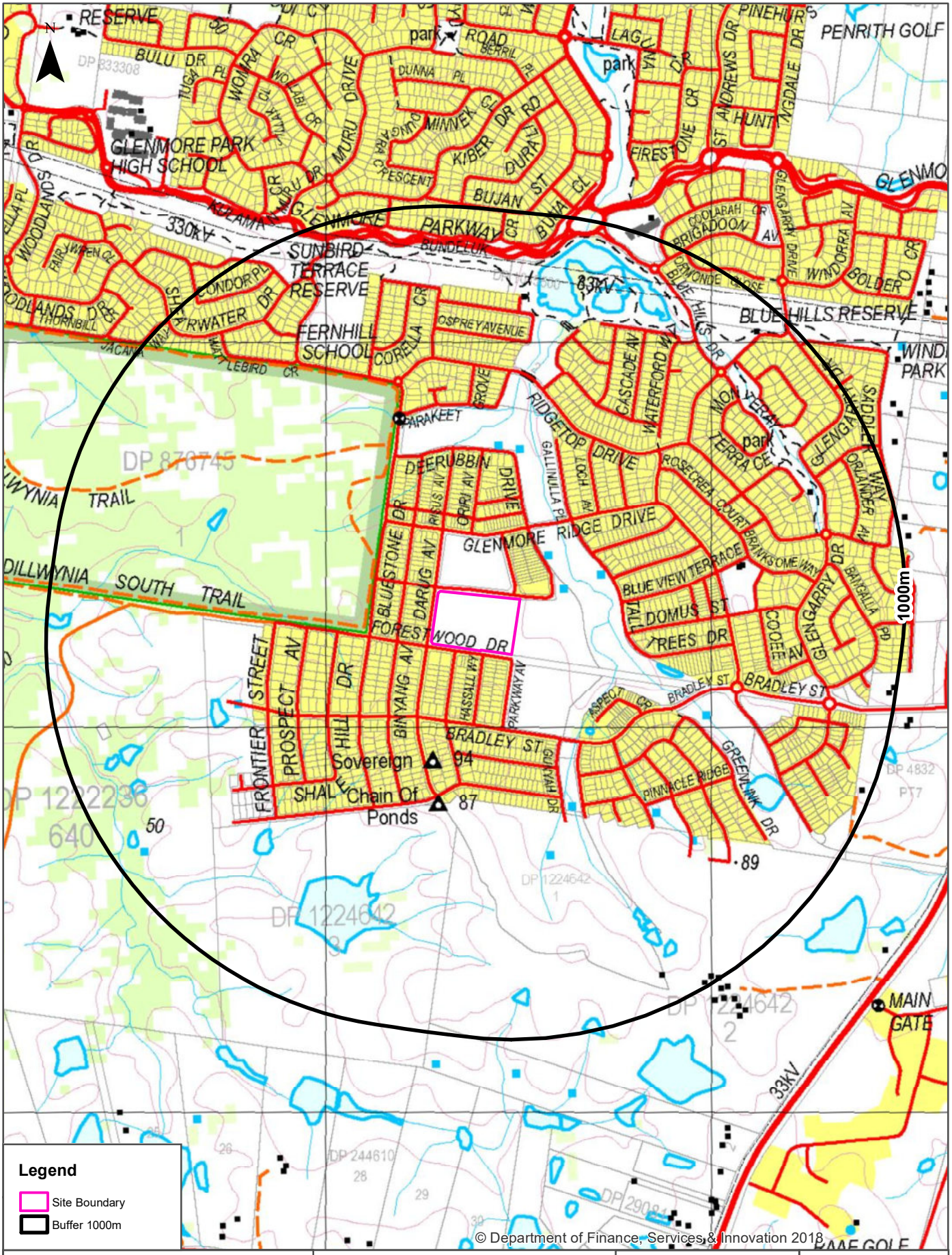
Aerial Imagery 1947

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Topographic Map 2015

1-23 Forestwood Drive, Glenmore Park, NSW 2745



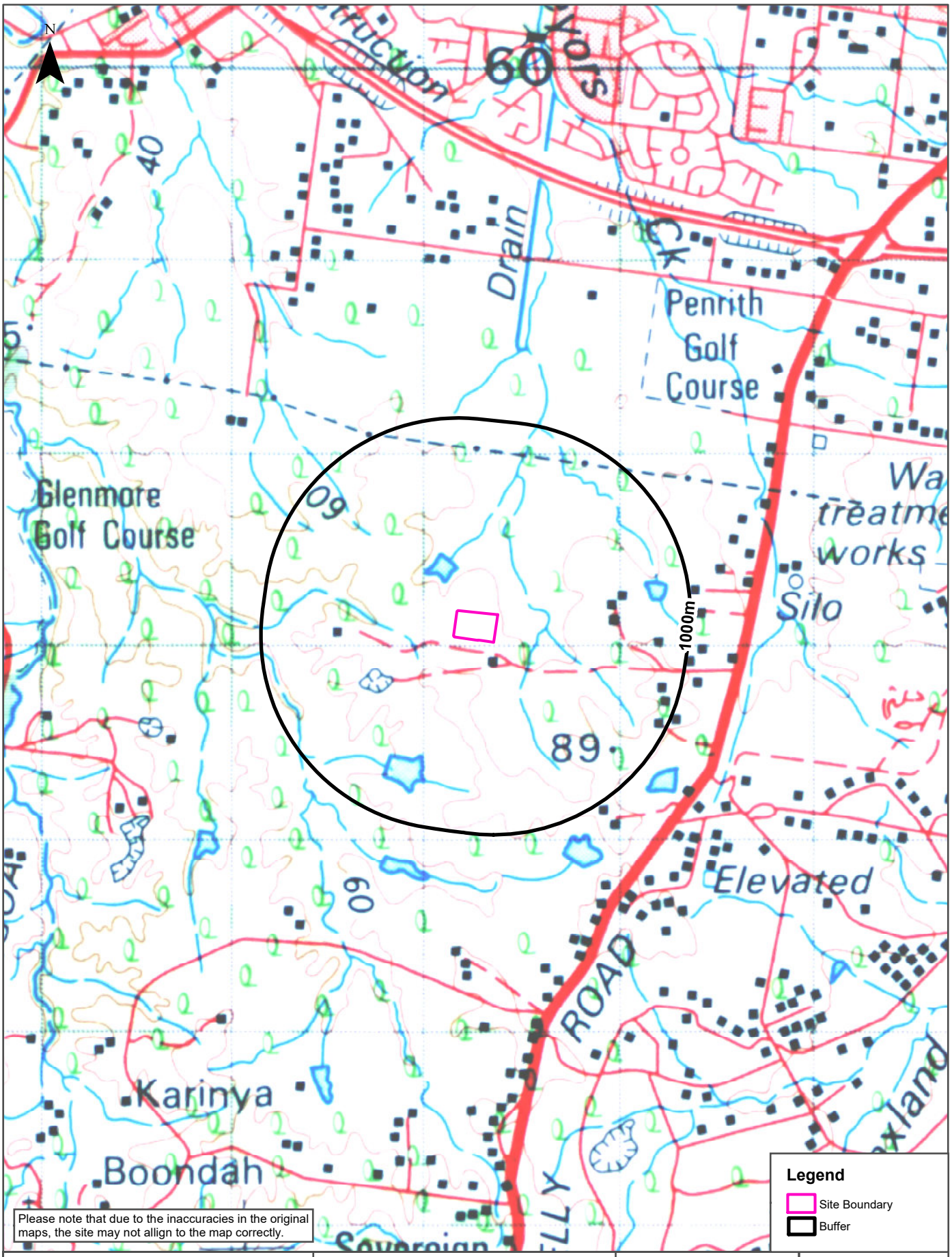
Legend

- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Topographic Map Data © NSW Land and Property Information	Coordinate System: GDA 1994 MGA Zone 56	Date: 08 May 2020

Historical Map 1975

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Scale: 0 125 250 500 750 1,000 1,250 Meters

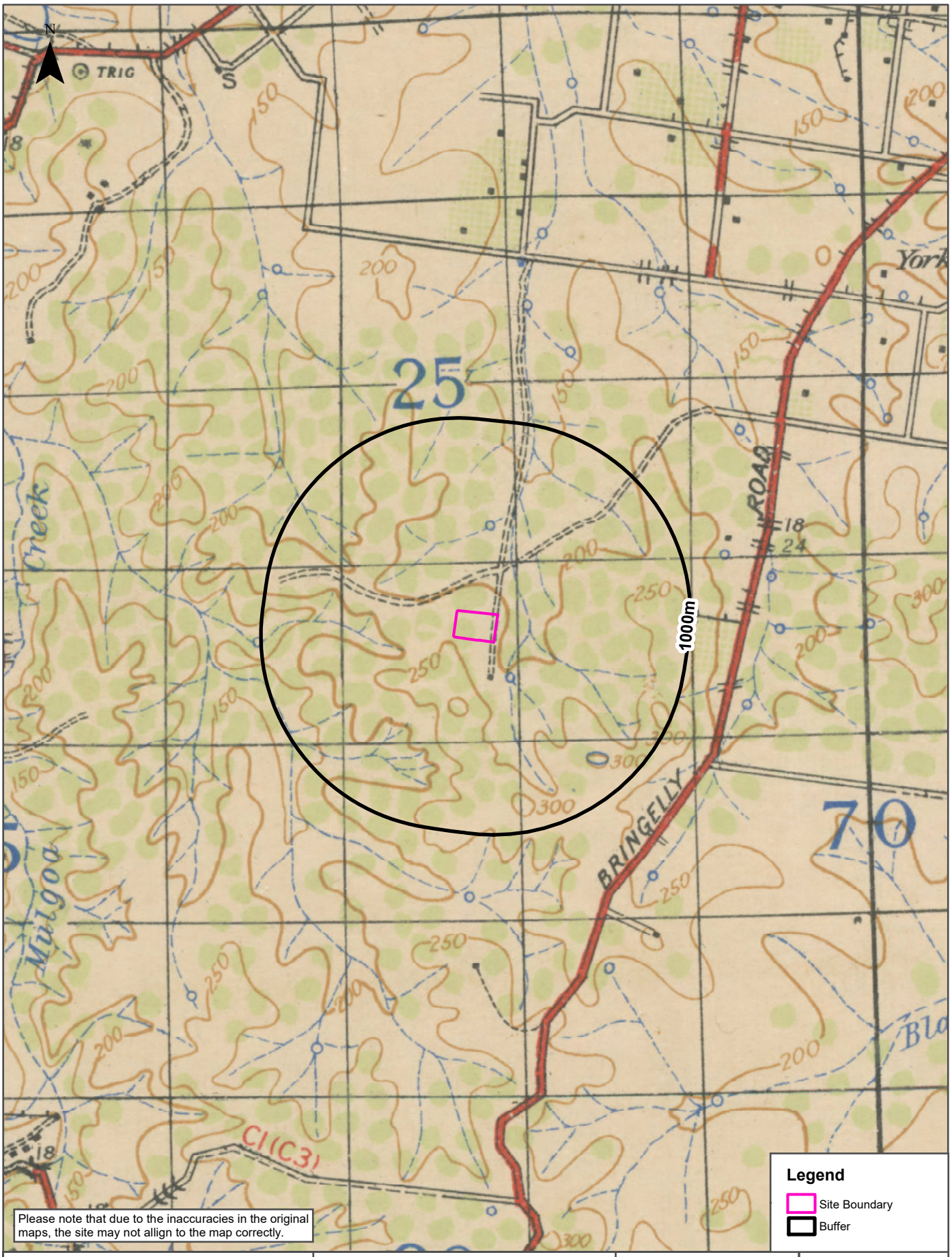
Data Sources: NATMAP 1:100,000
Topographic Maps Geoscience Australia

Coordinate System:
GDA 1994 MGA Zone 56

Date: 08 May 2020

Historical Map c.1942

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Scale: 0 125 250 500 750 1,000 1,250 Meters

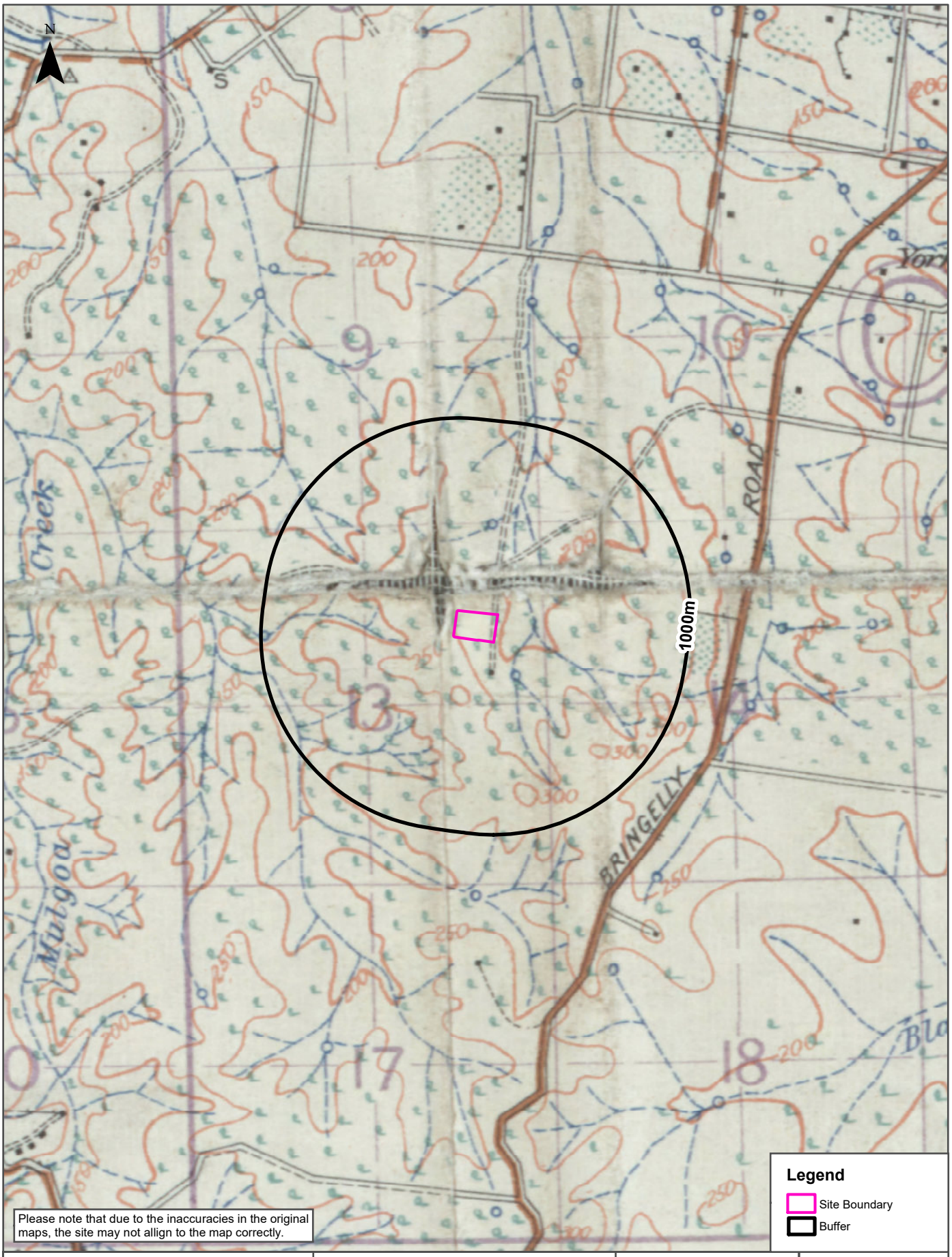
Data Sources: Australia 1:63360, Produced by Australian Section Imperial General Staff

Coordinate System: GDA 1994 MGA Zone 56

Date: 08 May 2020

Historical Map c.1929

1-23 Forestwood Drive, Glenmore Park, NSW 2745

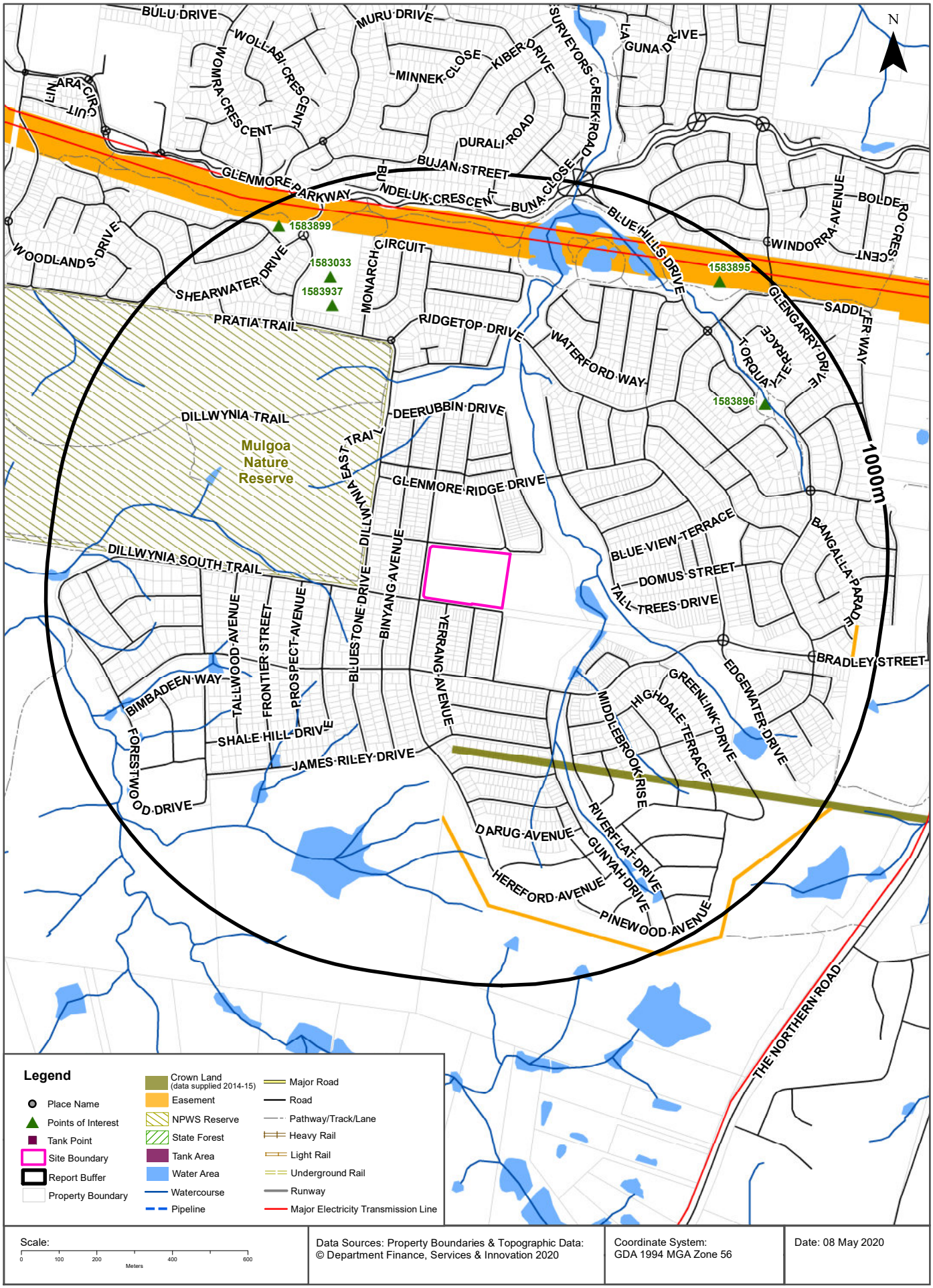


Scale:	Data Sources: Australia 1:63360, Produced by Australian Section Imperial General Staff	Coordinate System: GDA 1994 MGA Zone 56	Date: 08 May 2020

0 125 250 500 750 1,000 1,250 Meters

Topographic Features

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Legend

- Place Name
- Points of Interest
- Tank Point
- Site Boundary
- Report Buffer
- Property Boundary
- Crown Land (data supplied 2014-15)
- Easement
- NPWS Reserve
- State Forest
- Tank Area
- Water Area
- 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 2020

Coordinate System: GDA 1994 MGA Zone 56

Date: 08 May 2020

Topographic Features

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1583937	Parking Area	Parking Area	691m	North West
1583033	Special School	FERNHILL SCHOOL	764m	North West
1583896	Park	Park	783m	North East
1583895	Sports Field	BLUE HILLS RESERVE	911m	North East
1583899	Park	SUNBIRD TERRACE RESERVE	942m	North West

Topographic Features

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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
	No records in buffer					

Tanks (Points)

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

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

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
169846989	Primary	Right of way	5m	566m	South East
120115527	Primary	Undefined		785m	North
120118513	Primary	Undefined		933m	East

Topographic Features

1-23 Forestwood Drive, Glenmore Park, NSW 2745

State Forest

What State Forest exist within the dataset buffer?

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

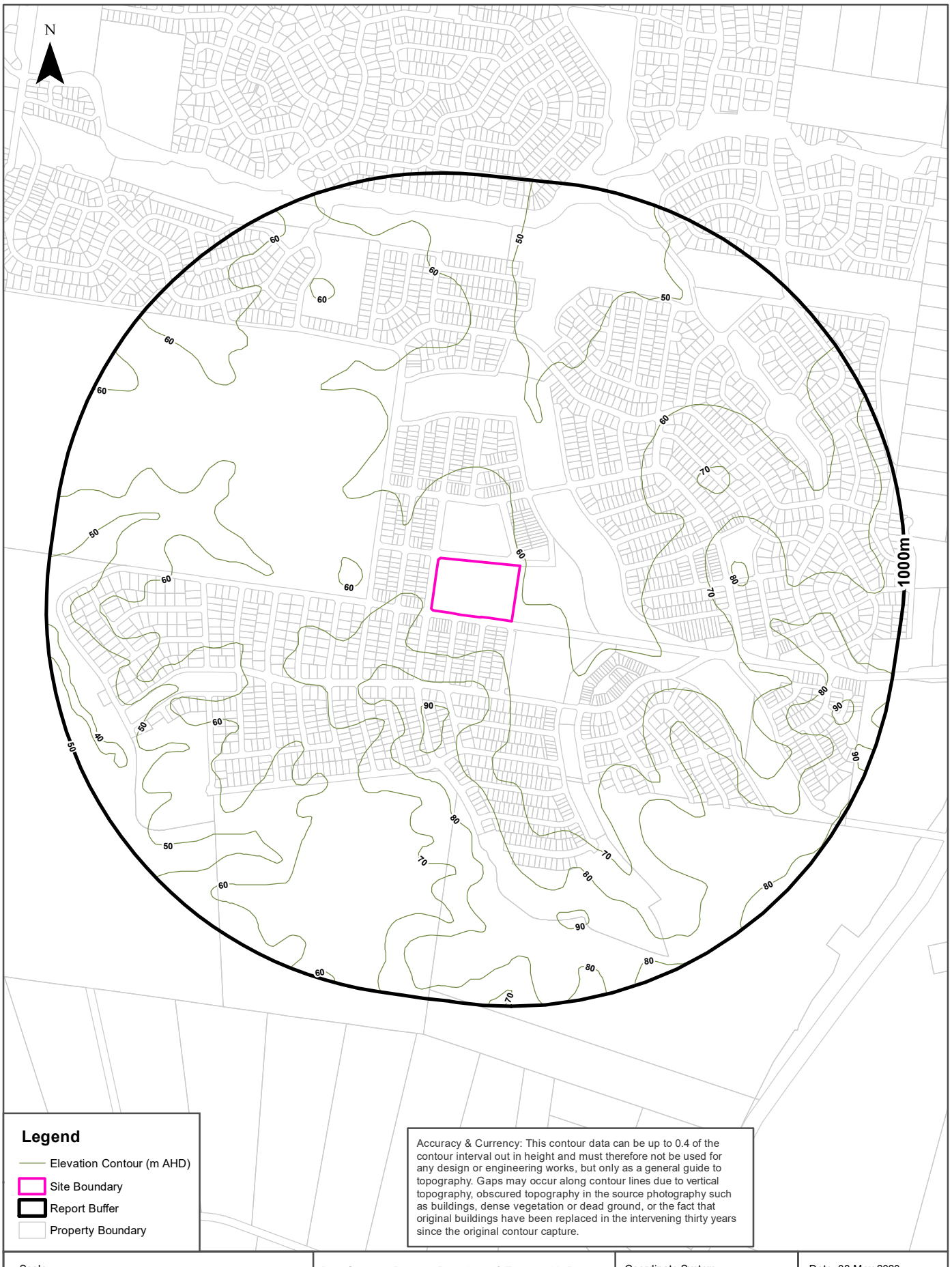
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N0712	NATURE RESERVE	Mulgoa Nature Reserve	23/12/1994	171m	North West

Elevation Contours (m AHD)

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Hydrogeology & Groundwater

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive highly productive aquifers

Description of aquifers within the dataset buffer:

Description
Porous, extensive highly productive aquifers

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

Botany Groundwater Management Zones

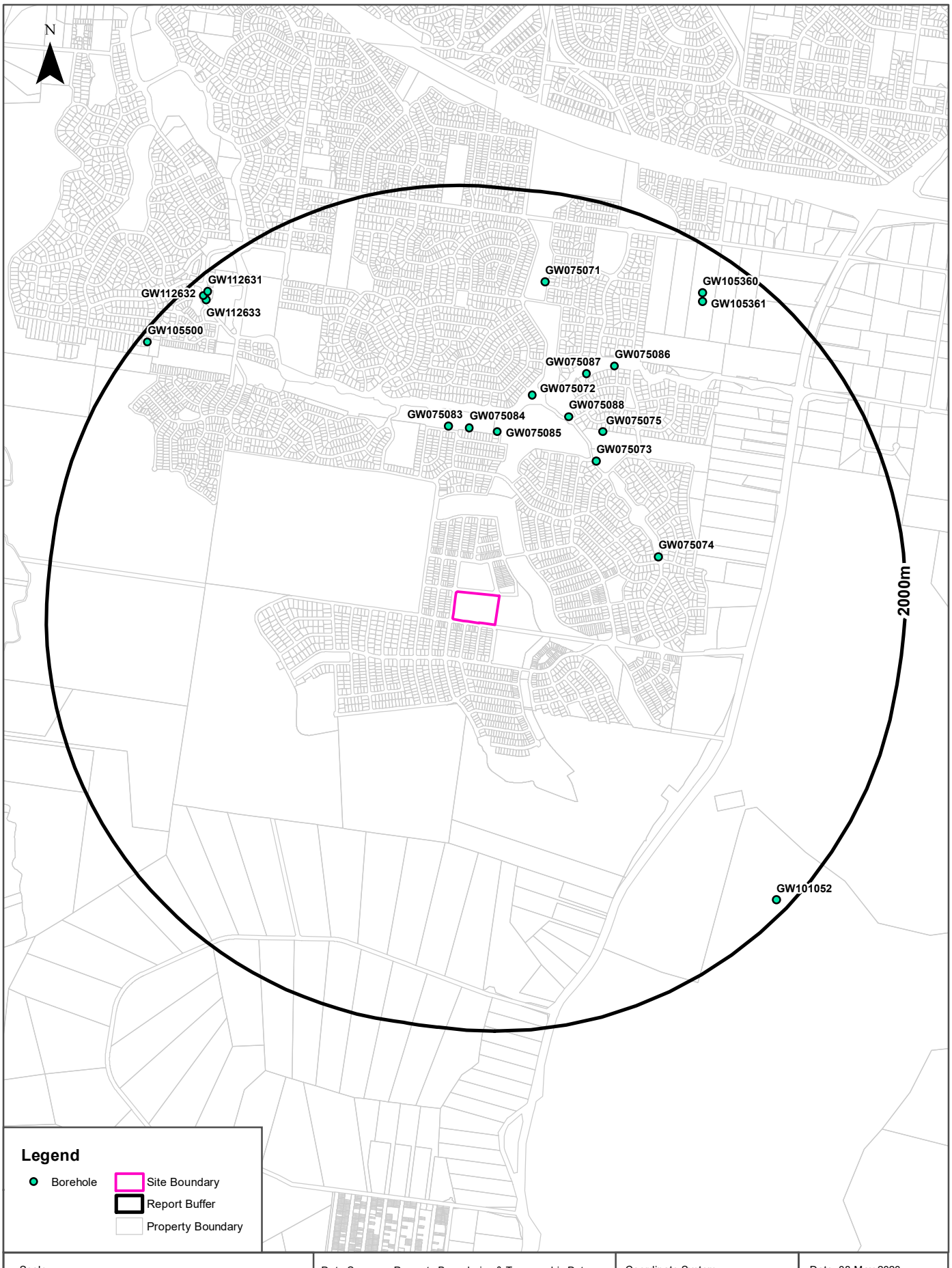
Groundwater management zones relating to the Botany Sand Beds aquifer within the dataset buffer:

Management Zone No.	Restriction	Distance	Direction
N/A	No records in buffer		

Botany Groundwater Management Zones Data Source : NSW Department of Primary Industries

Groundwater Boreholes

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Hydrogeology & Groundwater

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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
GW075085		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - LAKESIDE No.1	24/03/2003	5.30	5.50				50.35	801m	North
GW075084		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - LAKESIDE No.2	24/03/2003	5.50	6.00				55.03	807m	North
GW075074		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK AT GLENGARRY	14/08/2001	6.00	6.00				60.12	807m	East
GW075083		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - LAKESIDE No.3	24/03/2003	4.50	5.00				60.64	814m	North
GW075073		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE AT LAKESIDE	14/08/2001	6.50	6.50				51.11	816m	North East
GW075088		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - BLUE HILLS R/ABOUT	25/03/2003	8.90	8.90				49.15	945m	North East
GW075075		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK AT BLUE HILLS OVAL	14/08/2001	2.50	2.50				53.44	955m	North East
GW075072		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE AT THUNDER DOME	13/08/2001	6.50	6.50				45.83	1001m	North
GW075087		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - NADA PLACE	25/03/2003	1.60	1.60				53.88	1175m	North East
GW075086		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK BORE - MANDALONG TCE	24/03/2003	3.80	4.00				59.31	1265m	North East
GW075071		Bore	NSW Office of Water		Monitoring Bore	GLENMORE PARK AT ENGLEWOOD RESERVE	13/08/2001	7.20	7.20				41.99	1560m	North
GW105361	10BL160480	Bore		Monitoring Bore	Monitoring Bore		06/03/2004	7.00	7.00					1761m	North East
GW105360	10BL160480	Bore		Monitoring Bore	Monitoring Bore		06/03/2003	2.00	2.00					1795m	North East
GW112633	10BL603226	Bore	Private	Monitoring Bore	Monitoring Bore	Woolworths	03/09/2009	9.00	9.00					1894m	North West

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
GW112632	10BL603226	Bore	Private	Monitoring Bore	Monitoring Bore	Woolworths	03/09/2009	9.00	9.00					1916m	North West
GW112631	10BL603226	Bore	Private	Monitoring Bore	Monitoring Bore	Woolworths	03/09/2009	9.00	9.00					1920m	North West
GW101052	10BL158231	Bore	Private	Monitoring Bore	Monitoring Bore		05/08/1997	32.20	32.20	6560	13.60		69.41	1938m	South East
GW105500	10BL162542, 10WA108629	Bore		Domestic	Domestic		12/12/2003	144.00	144.00	1020		1.100		1955m	North West

Hydrogeology & Groundwater

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Driller's Logs

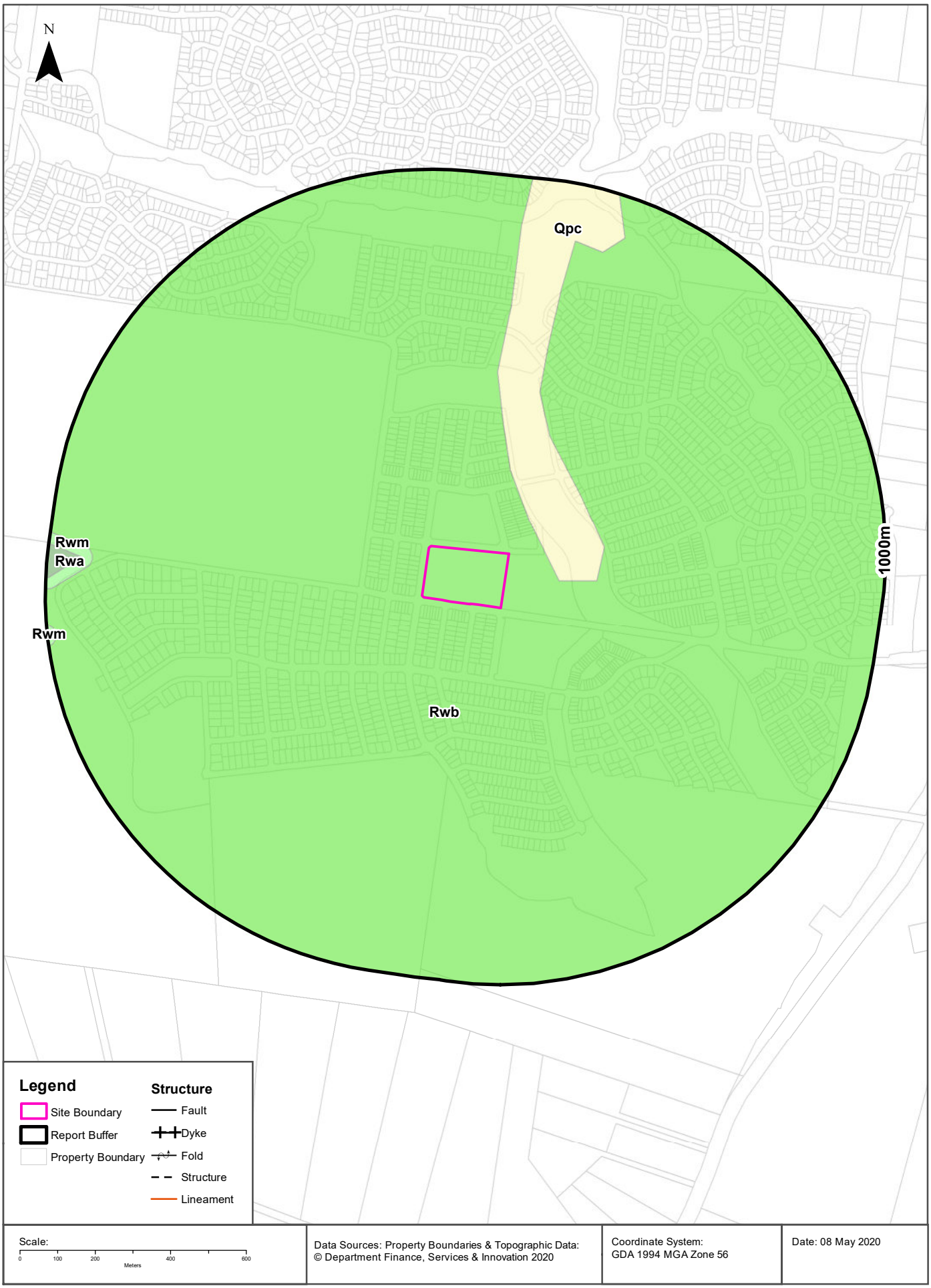
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW075085	0.00m-2.00m CLAY, BROWN 2.00m-4.00m CLAY, LIGHT BROWN 4.00m-5.50m SHALE, BROWN	801m	North
GW075074	0.00m-0.50m TOPSOIL 0.50m-3.00m CLAY, BROWN 3.00m-4.50m CLAY, GREY 4.50m-6.00m SHALE	807m	East
GW075084	0.00m-1.00m CLAY, BROWN 1.00m-3.50m SHALE, BROWN 3.50m-6.00m SHALE, GREY	807m	North
GW075083	0.00m-1.00m CLAY, BROWN 1.00m-3.50m SHALE, BROWN 3.50m-5.00m SHALE, GREY	814m	North
GW075073	0.00m-0.50m TOPSOIL 0.50m-6.00m CLAY, BROWN 6.00m-6.50m SHALE	816m	North East
GW075088	0.00m-1.00m CLAY, BROWN 1.00m-6.00m SHALE, BROWN 6.00m-8.90m SHALE, GREY	945m	North East
GW075075	0.00m-0.30m TOPSOIL 0.30m-1.50m CLAY, BROWN 1.50m-2.50m SHALE	955m	North East
GW075072	0.00m-0.50m TOPSOIL 0.50m-4.00m CLAY, BROWN 4.00m-6.50m SANDY CLAY	1001m	North
GW075087	0.00m-1.00m CLAY, WEATHERED 1.00m-1.50m SHALE, BROWN 1.50m-1.60m IRONSTONE	1175m	North East
GW075086	0.00m-1.00m CLAY, BROWN 1.00m-3.00m SHALE, BROWN 3.00m-4.00m SHALE, GREY	1265m	North East
GW075071	0.00m-0.50m TOPSOIL 0.50m-4.50m CLAY, BROWN 4.50m-7.20m SANDY CLAY	1560m	North
GW105361	0.00m-6.70m BROWN CLAY 6.70m-7.00m SHALE	1761m	North East
GW105360	0.00m-2.00m TOPSOIL DARK CHOCOLATE	1795m	North East
GW112633	0.00m-4.00m SILT AND SHALE GREY 4.00m-9.00m SILT AND SHALE WET AND GREY	1894m	North West
GW112632	0.00m-4.00m SILT AND SHALE GREY 4.00m-9.00m SILT AND SHALE WET/ GREY	1916m	North West
GW112631	0.00m-4.00m SILT AND SHALE GREY 4.00m-9.00m SILT AND SHALE WET GREY	1920m	North West

Groundwater No	Drillers Log	Distance	Direction
GW101052	0.00m-1.20m FILL: brown and brown-red, some iron stone gravel plastic, reworked material, slight moisture. 1.20m-3.00m CLAY: light grey with red-brown streaks, silty low plasticity, firm, slight moisture. 3.00m-4.00m SHALE/SILTSTONE: brown-grey, moderately weathered semi-competent and friable, trace of brown clay bands. 4.00m-6.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, minor fine grained sandstone, partly ferruginised 6.00m-7.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, some brown-grey massive claystone, softer 7.00m-9.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 9.00m-10.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competent 10.00m-11.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 11.00m-14.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, base of weathering at 12 m, increasing hardness 14.00m-15.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competen 15.00m-22.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 22.00m-23.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 23.00m-24.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competent 24.00m-25.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 25.00m-27.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent 27.00m-28.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent, some brown-grey massive claystone, softer 28.00m-29.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent 29.00m-30.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent, some brown-grey massive claystone, softer 30.00m-32.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competen	1938m	South East
GW105500	0.00m-4.00m CLAY 4.00m-65.00m SHALE 65.00m-110.00m SANDSTONE/SHALE 110.00m-144.00m SANDSTONE	1955m	North West

Geology 1:100,000

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Geology

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qpc	Gravel, sand, silt, clay	Cranebrook Formation			Quaternary		Penrith	1:100,000
Rwa	Dark-grey to black claystone-siltstone and fine sandstone -siltstone laminate	Ashfield Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000
Rwm	Fine to medium-grained quartz-lithic sandstone	Minchinbury Sandstone	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

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

Naturally Occurring Asbestos Potential

1-23 Forestwood Drive, Glenmore Park, NSW 2745

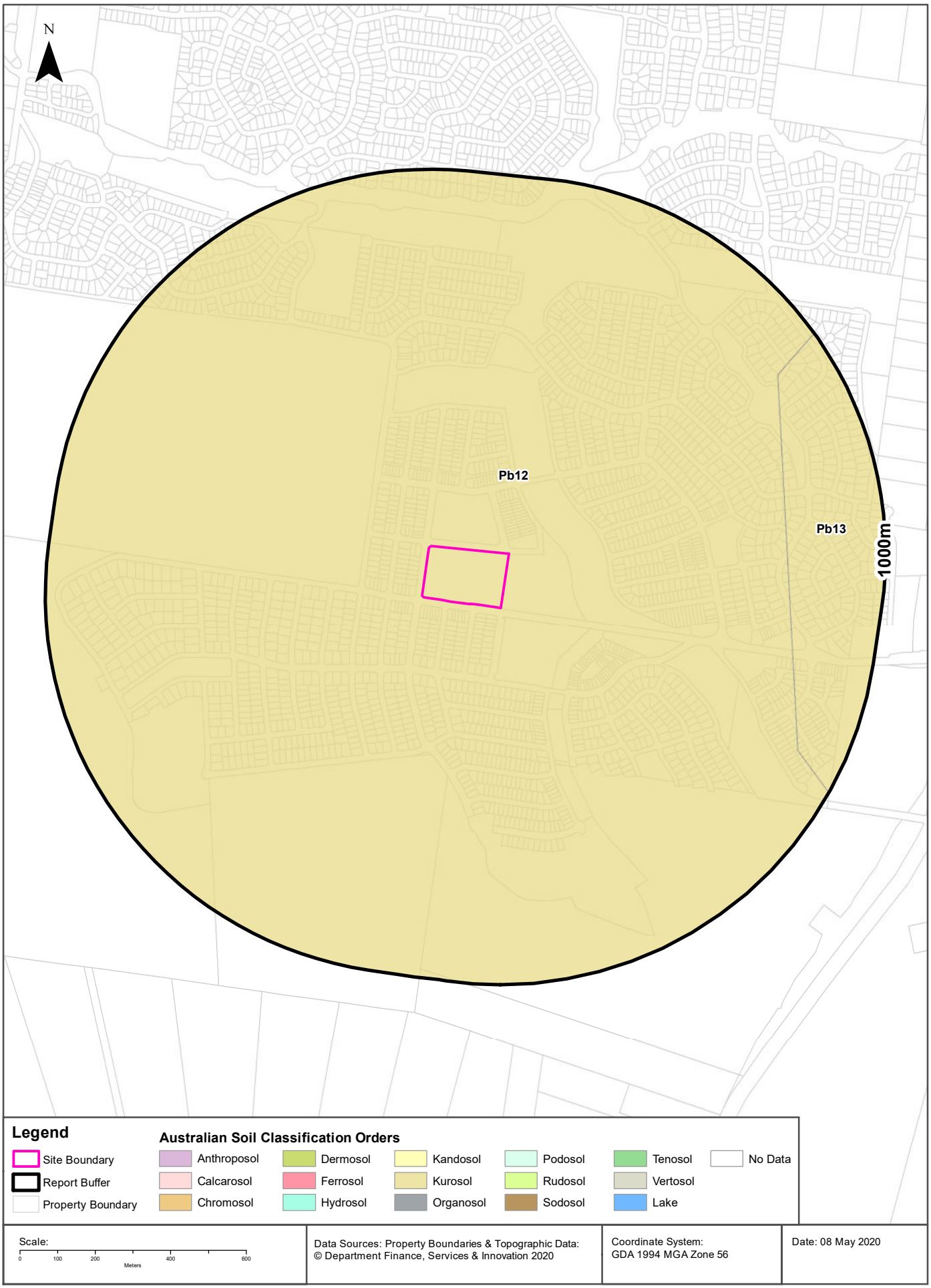
Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

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

Atlas of Australian Soils

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Soils

1-23 Forestwood Drive, Glenmore Park, NSW 2745

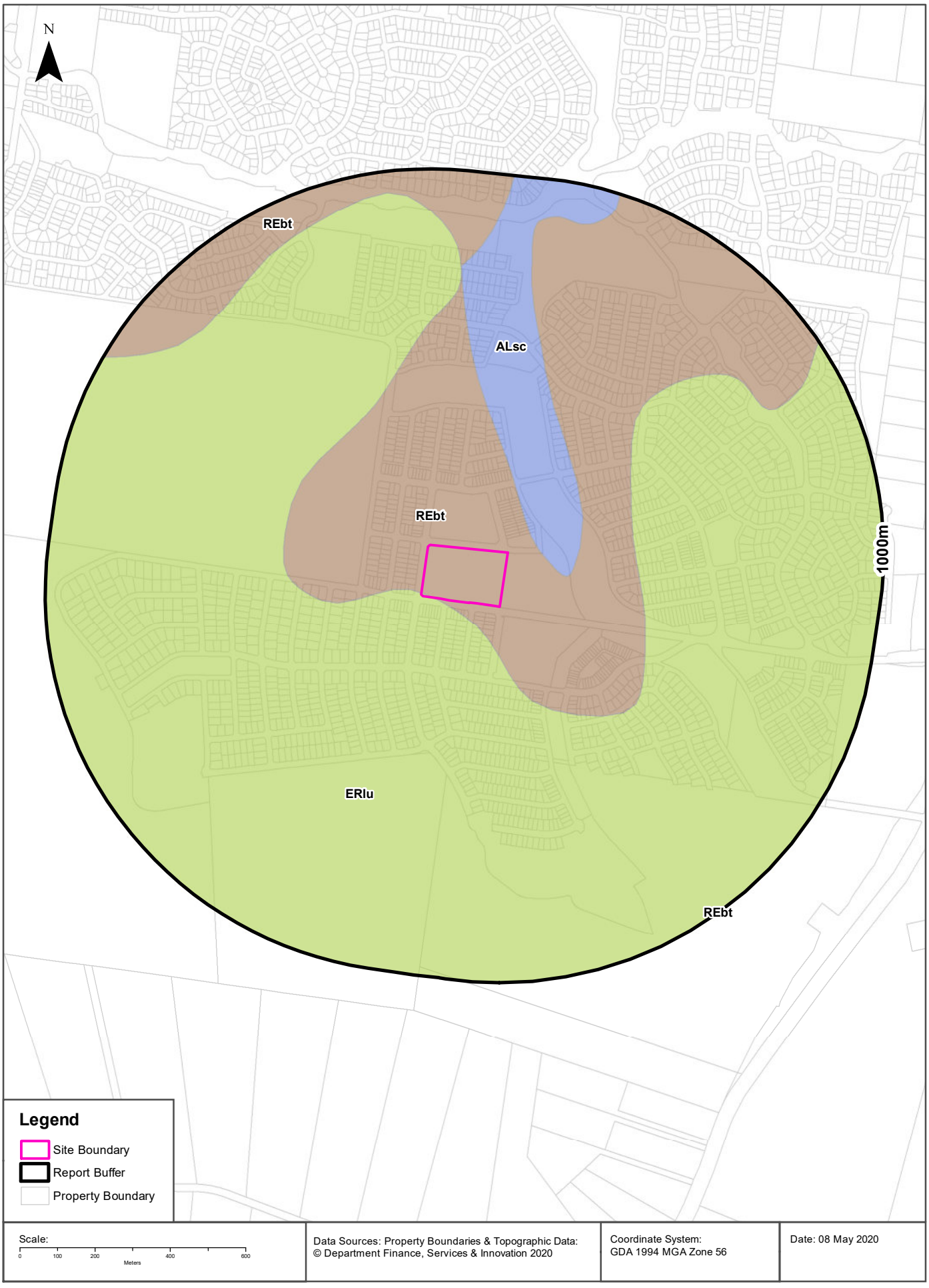
Atlas of Australian Soils

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

Map Unit Code	Soil Order	Map Unit Description	Distance
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m
Pb13	Kurosol	Ridge and valley country of gently undulating ridge tops and steep side slopes often with slumping, also rounded hilly to steep hilly areas and relatively narrow valleys: chief soils are hard acidic red soils (Dr2.21) with hard acidic yellow mottled soils (Dy3.41); in places some ironstone gravels occur in both these soils. Associated are hard neutral and alkaline red soils (Dr2.22 and Dr2.23) in saddles and some mid-slope positions; (Dy3.42 and Dy3.43) soils, usually in depressions; and small areas of undescribed soils in wet soaks and valley areas. Small areas of other soils are likely throughout.	737m

Soil Landscapes

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Soils

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
ERlu	LUDDENHAM		EROSIONAL	Penrith	1:100,000
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

What are the Soil Landscapes within the dataset buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALsc	SOUTH CREEK		ALLUVIAL	Penrith	1:100,000
ERlu	LUDDENHAM		EROSIONAL	Penrith	1:100,000
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

Acid Sulfate Soils

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Environmental Planning Instrument - Acid Sulfate Soils

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

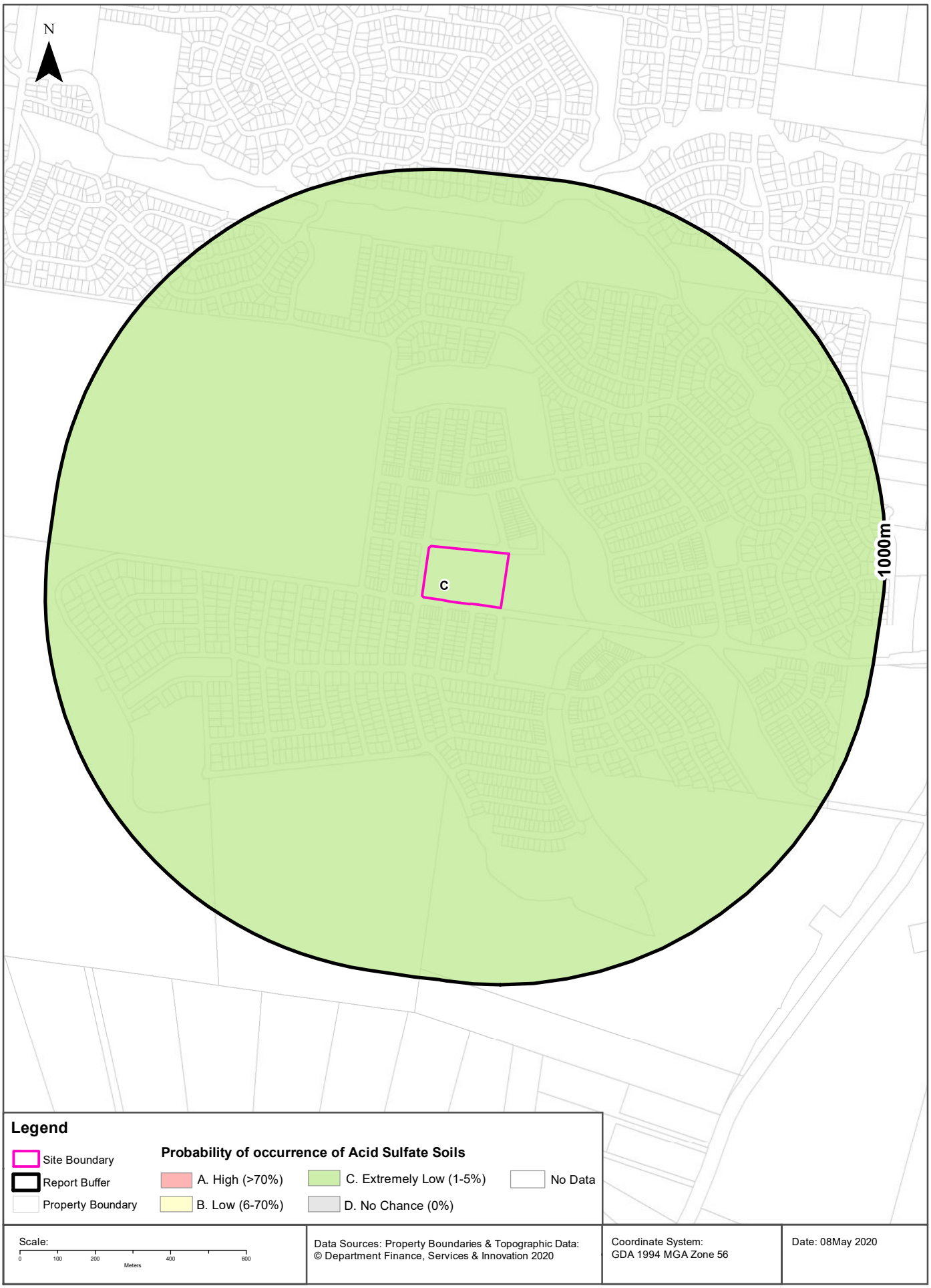
Soil Class	Description	EPI Name
N/A		

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

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Acid Sulfate Soils

1-23 Forestwood Drive, Glenmore Park, NSW 2745

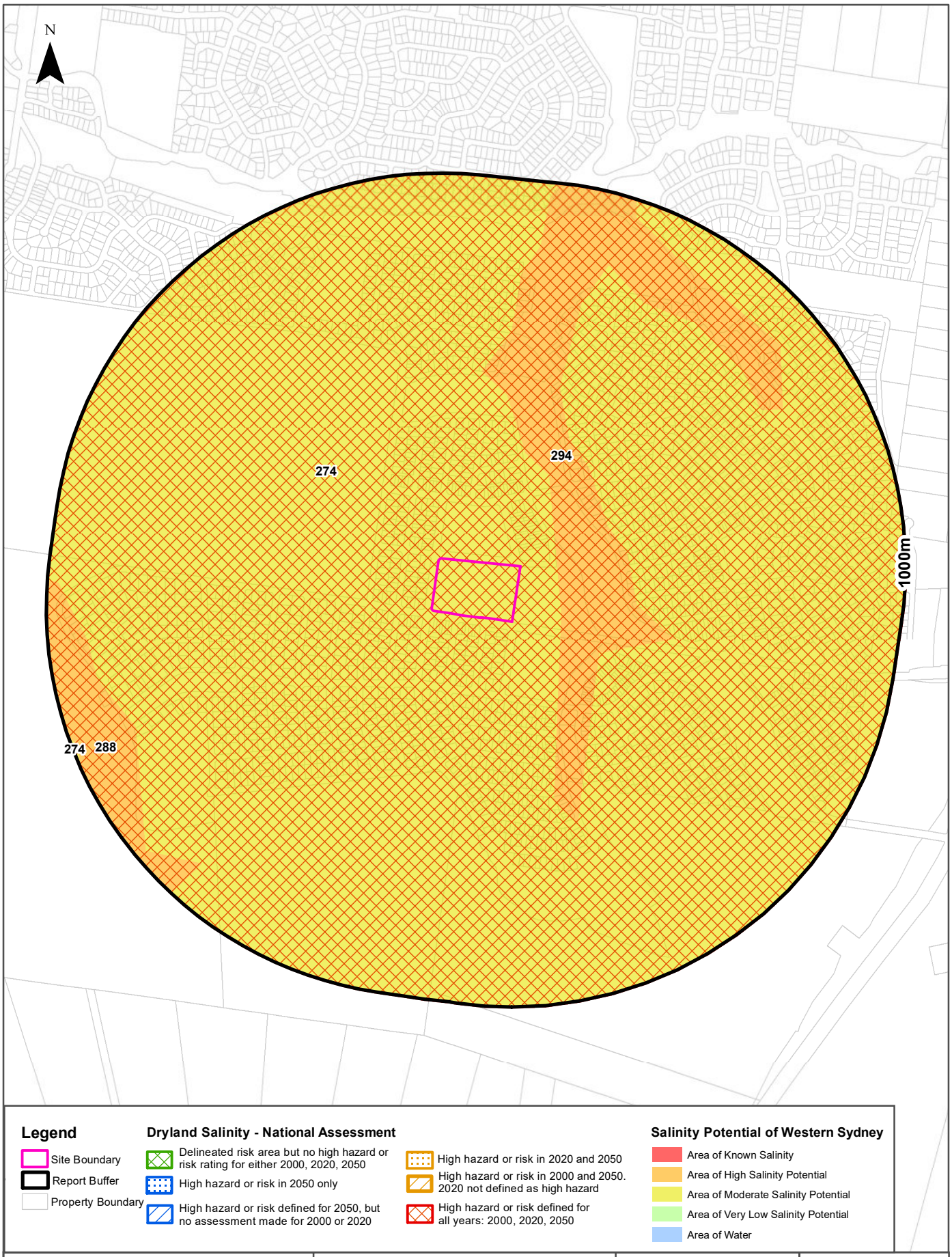
Atlas of Australian Acid Sulfate Soils

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

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Dryland Salinity

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Dryland Salinity

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

Yes

Is there Dryland Salinity - National Assessment data within the dataset buffer?

Yes

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
High hazard or risk	High hazard or risk	High hazard or risk	0m	Onsite

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.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
274	MODERATE	Area of Moderate Salinity Potential	0m	Onsite
294	HIGH	Area of High Salinity Potential	95m	North East
288	HIGH	Area of High Salinity Potential	827m	South West

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage

Mining Subsidence Districts

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

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

State Environmental Planning Policy

1-23 Forestwood Drive, Glenmore Park, NSW 2745

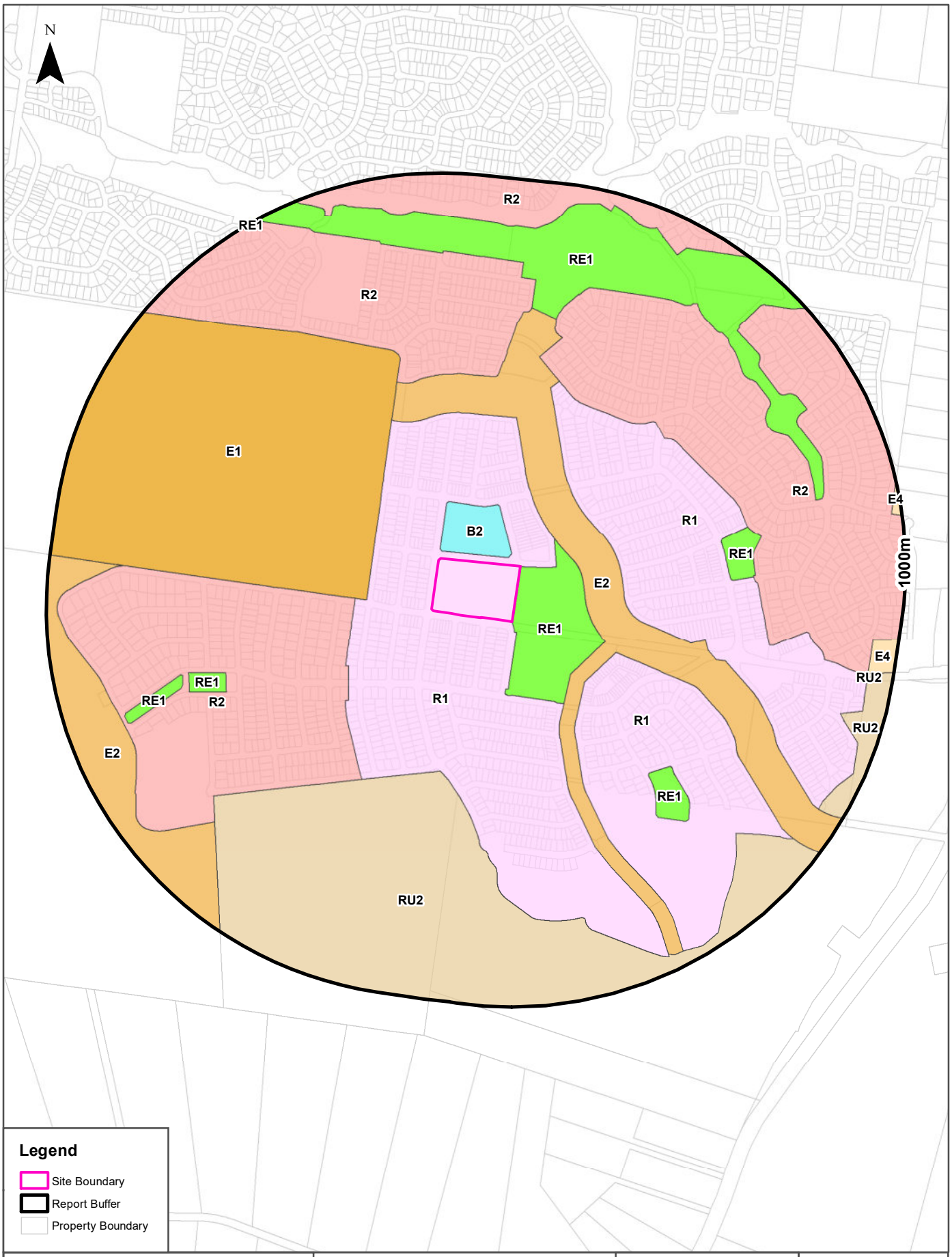
State Significant Precincts

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

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Environmental Planning Instrument

1-23 Forestwood Drive, Glenmore Park, NSW 2745

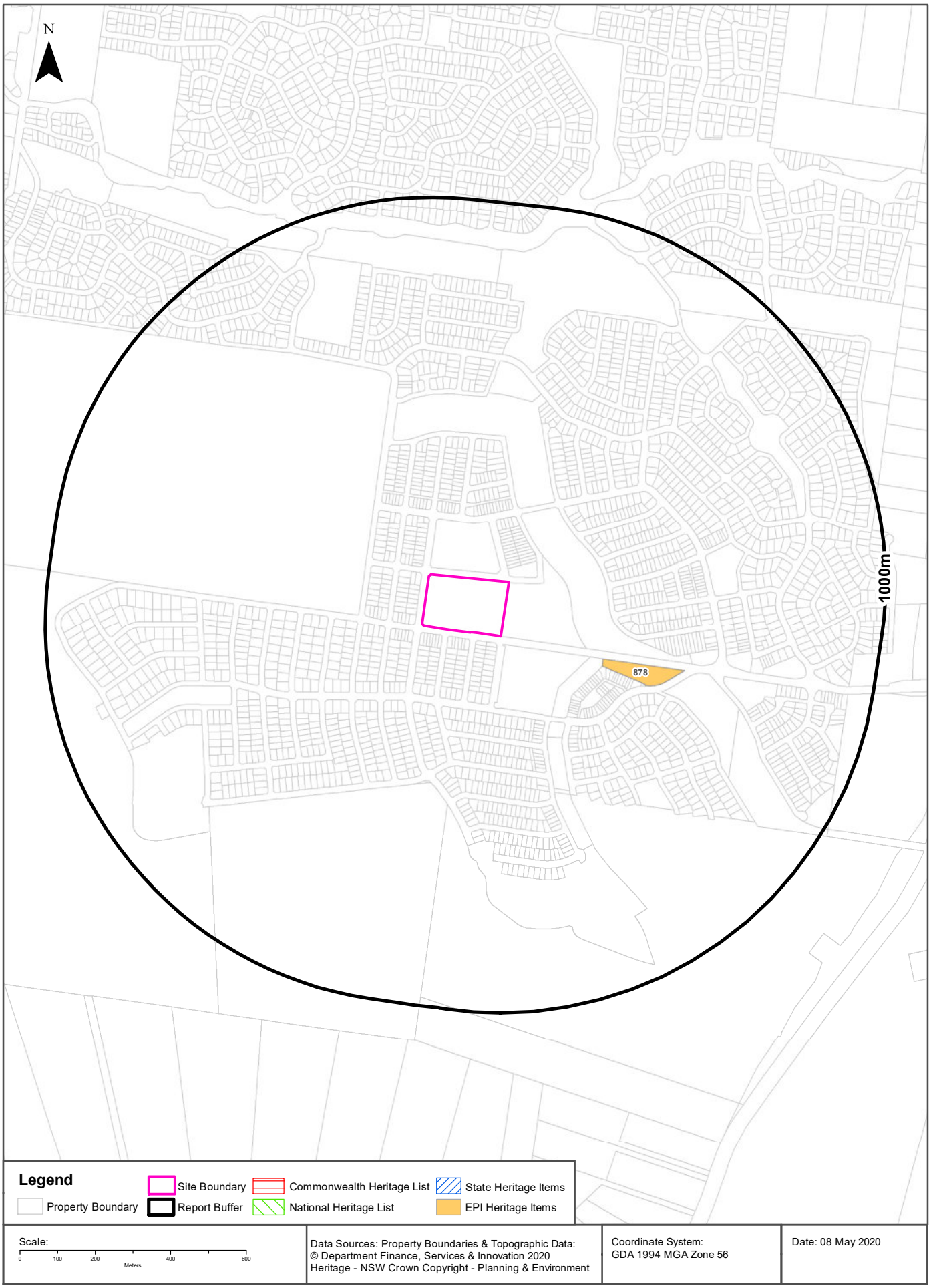
Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R1	General Residential		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	20/12/2019	Amendment No 23	0m	Onsite
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	0m	South East
B2	Local Centre		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	19m	North
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	114m	East
E1	National Parks and Nature Reserves		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	20/12/2019		171m	West
R2	Low Density Residential		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	20/12/2019	Amendment No 23	201m	West
R1	General Residential		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	215m	East
R1	General Residential		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	245m	South East
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	27/09/2019	27/09/2019	20/12/2019	Amendment No 22	409m	South
R2	Low Density Residential		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	453m	North East
R2	Low Density Residential		Penrith Local Environmental Plan 2010	27/09/2019	27/09/2019	20/12/2019	Amendment No 22	463m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	525m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	530m	South East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	560m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	650m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	669m	West
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	20/12/2019	Amendment No 23	788m	South West
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	20/12/2019		885m	East
E4	Environmental Living		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	933m	East
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	20/12/2019	Amendment No 4	933m	East

Heritage Items

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Heritage

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
878	Scarred tree and Aboriginal artefact scatter	Item - General	Local	Penrith Local Environmental Plan 2010	20/12/2019	20/12/2019	20/12/2019	279m	East

Natural Hazards - Bush Fire Prone Land

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2020. Property Boundaries: © Department Finance, Services & Innovation 2020

Coordinate System: GDA 1994 MGA Zone 56

Date: 08 May 2020

Natural Hazards

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Bush Fire Prone Land

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

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	13m	North East
Vegetation Category 1	113m	North East
Vegetation Category 2	169m	South East

Ecological Constraints - Remnant Vegetation of the Cumberland Plain

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Ecological Constraints

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Remnant Vegetation of the Cumberland Plain

What remnant vegetation of the Cumberland Plain exists within the dataset buffer?

Description	Crown Cover	Distance	Direction
11 - Alluvial Woodland	Crown cover less than 10%	126m	North East
10 - Shale Plains Woodland	Crown cover less than 10%	164m	East
9 - Shale Hills Woodland	Crown cover greater than 10%	186m	North West
11 - Alluvial Woodland	Crown cover greater than 10%	209m	North
9 - Shale Hills Woodland	Crown cover less than 10%	325m	East
10 - Shale Plains Woodland	Crown cover greater than 10%	509m	North

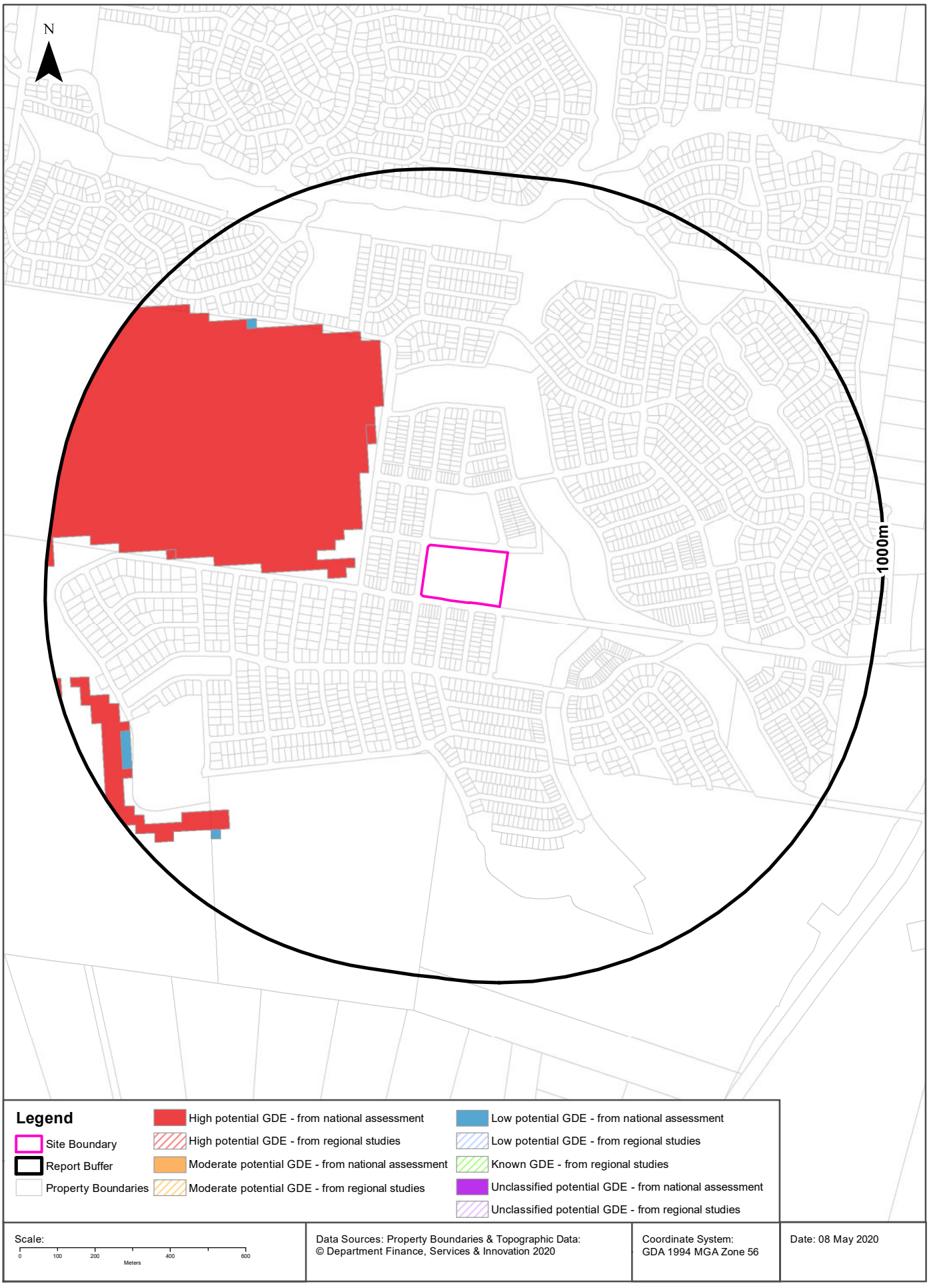
Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

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

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Ecological Constraints

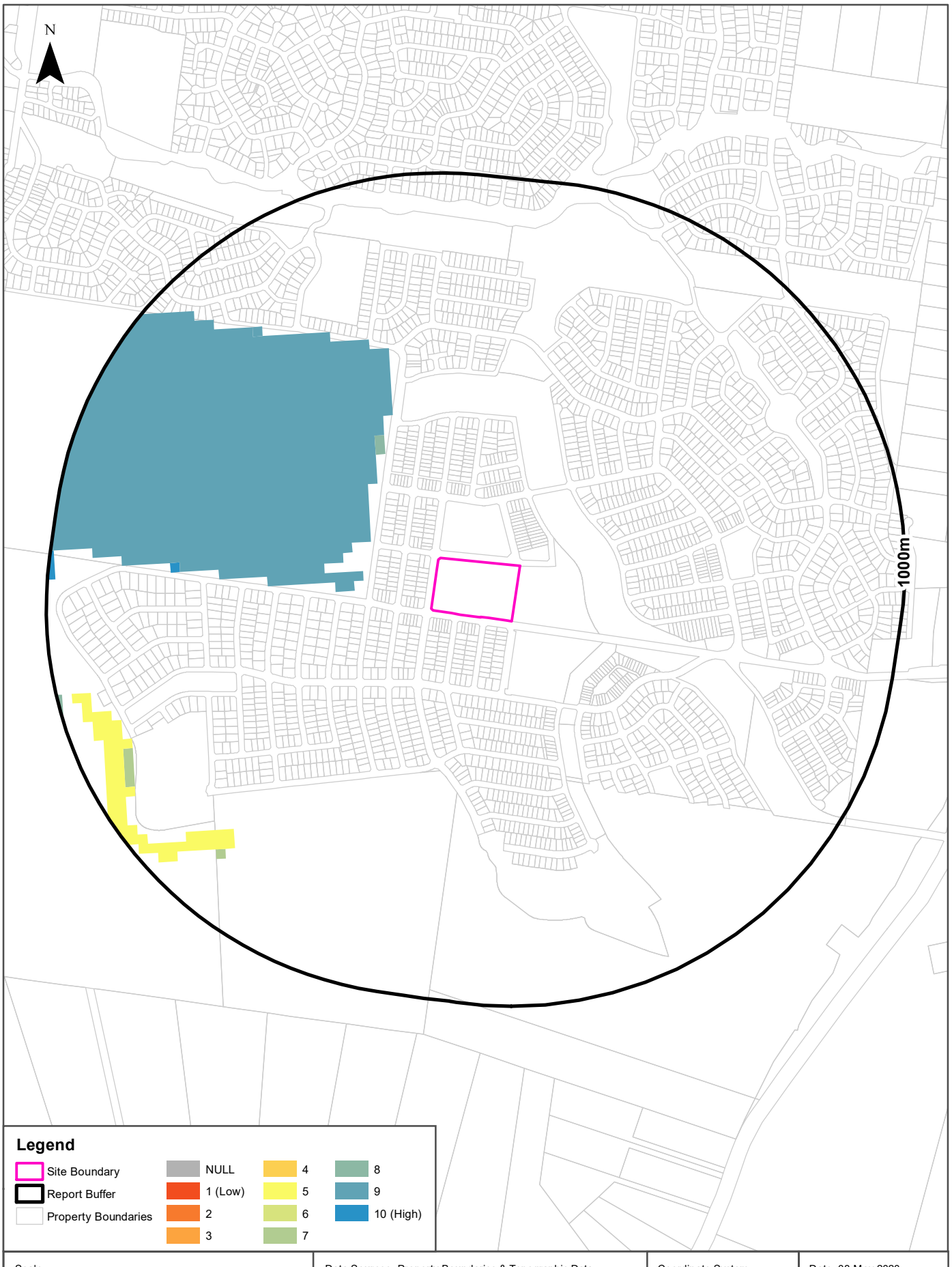
1-23 Forestwood Drive, Glenmore Park, NSW 2745

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	High potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	179m
Terrestrial	Low potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	737m

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

1-23 Forestwood Drive, Glenmore Park, NSW 2745



Ecological Constraints

1-23 Forestwood Drive, Glenmore Park, NSW 2745

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	179m
Terrestrial	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	304m
Terrestrial	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	658m
Terrestrial	5	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	767m
Terrestrial	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	820m

Ecological Constraints

1-23 Forestwood Drive, Glenmore Park, NSW 2745

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	Heleioporus australiacus	Giant Burrowing Frog	Vulnerable	Not Sensitive	Vulnerable	
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	Amaurornis moluccana	Pale-vented Bush-hen	Vulnerable	Not Sensitive	Not Listed	
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	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;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	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	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	
Animalia	Aves	Certhionyx variegatus	Pied Honeyeater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Charadrius veredus	Oriental Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; 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	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	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius minutus	Little Curlew	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pezoporus wallicus wallicus	Eastern Ground Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Sterna hirundo	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Thinornis rubricollis	Hooded Plover	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	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	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
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	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	Petrogale penicillata	Brush-tailed Rock-wallaby	Endangered	Not Sensitive	Vulnerable	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
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	
Animalia	Reptilia	Antaresia stimsoni	Stimson's Python	Vulnerable	Not Sensitive	Not Listed	
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	Eulamprus leuraensis	Blue Mountains Water Skink	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Hoplocephalus bungaroides	Broad-headed Snake	Endangered	Category 2	Vulnerable	
Animalia	Reptilia	Suta flagellum	Little Whip Snake	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus benthamii	Camden White Gum	Vulnerable	Not Sensitive	Vulnerable	
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 scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Hibbertia puberula		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
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	Marsdenia viridiflora subsp. viridiflora	Native Pear	Endangered Population	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Micromyrtus minutiflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Endangered	Category 3	Endangered	
Plantae	Flora	Persoonia nutans	Nodding Geebung	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pterostylis chaetophora		Vulnerable	Category 2	Not Listed	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Senna acclinis	Rainforest Cassia	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Tetratheca glandulosa		Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

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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
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

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Land Title Records

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Email: search@alsearchers.com.au

08th May 2020

JKENVIRONMENTS PTY LIMITED
115 Wicks Road,
MACQUARIE PARK NSW 2113

Attention Craig Ridley

RE: **1-23 Forestwood Drive,**
Glenmore Park
Job Reference: E33177PA

Current Search

Folio Identifier 1663/1166869 (title attached)
DP 1166869 (plan attached)
Dated 06th May 2020
Registered Proprietor:
THE MINISTER FOR EDUCATION

Title Tree
Lot 1663 DP 1166869

Folio Identifier 1663/1166869

(a)	(b)
Folio Identifier 1/222144	Folio Identifier 1801/1166848
CTVol 9919 Folio 8	Folio Identifier 1555/1161692
CTVol 6832 Folio 157	Folio Identifier 1400/1161693
CTVol 5789 Folio's 125 & 126	Folio Identifier 699/1155216
CTVol 4239 Folio 162	Folio Identifier 800/1155217
****	Folio Identifier 900/1155218
	Folio Identifier 1000/1153500
	Folio Identifier 500/1153499
	Folio Identifier 400/1153498
	Folio Identifier 200/1153497
	Folio Identifier 100/1153496
	Folio Identifier 8832/1109846
	Folio Identifier 8819/1089978
	Folio Identifier 2/1067073
	Folio Identifier 880/1060475
	Folio Identifier 8700/1046479
	Folio Identifier 3/1045500
	Folio Identifier 8918/1043708

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Folio Identifier 8800/1041192

Folio Identifier 8901/1040625

Folio Identifier 8650/1038337

Folio Identifier 8794/1036719

Folio Identifier 6840/1036203

Folio Identifier 6799/1013970

Folio Identifier 8397/1008395

Folio Identifier 8200/1002570

Folio Identifier 6699/882806

Folio Identifier 8099/876748

Folio Identifier 2/876745

Folio Identifier 8028/870626

Folio Identifier 7001/844976

Folio Identifier 5795/838775

Folio Identifier 361/836799

Folio Identifier 6197/834530

Folio Identifier 4/833308

Folio Identifier 5036/832635

Folio Identifier 5158/828256

Folio Identifier 5/222785

Cont.

Cont.

Certificate of Title Volume 9801 Folio 201

Certificate of Title Volume 9696 Folio's 222 & 223

Certificate of Title Volume 9608 Folio 182

Certificate of Title Volume 6747 Folio 31

Certificate of Title Volume 6458 Folio 185 & 186

Certificate of Title Volume 4933 Folio 28

Certificate of Title Volume 2548 Folio 179

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Summary of Proprietor(s)
Lot 1663 DP 1166869

Year	Proprietor(s)
	(Lot 1663 DP 1166869)
2014 – todate	The Minister for Education
2013 – 2014	Lensworth Glenmore Park Limited
2013 – 2013	Lensworth Glenmore Park Limited Holicombe Pty Limited

See Notes (a) & (b)

Note (a)

	(Lot 1 DP 222144)
1999 – 2013	Holicombe Pty Limited
1996 – 1999	JM & JA Wearn Pty Limited
1995 – 1996	Monier PGH Holdings Limited
1988 – 1995	Zacuba Pty Limited
	(Lot 1 DP 222144 – CTVol 9919 Fol 8)
1980 – 1988	Zacuba Pty Limited
1977 – 1980	Emu Plains (Rural Properties) Pty Limited
1974 – 1977	Bonds Furnishings (Liverpool) Pty Limited
1970 – 1974	Christro California Pty Limited
1965 – 1970	Garswood Pastoral Co Pty Limited
1965 – 1965	Cecil Herbert Roots, cattle dealer
	(Lots 8 to 11 DP 4832 – Area 459 Acres 1 Rood 32 Perches – CTVol 6832 Fol 157)
1954 – 1965	Cecil Herbert Roots, cattle dealer
	(Lots 8 to 11 DP 4832 & Portions 26, 28, 29 & 30 Parish Mulgoa – Area 829 Acres 1 Rood 12 Perches – CTVol 5789 Fol's 125 & 126)
1948 – 1954	Cecil Herbert Roots, cattle dealer Patricia Eve Trafford, spinster
	(Lots 8 to 11 DP 4832 & Portions 26, 28, 29 & 30 Parish Mulgoa – Area 829 Acres 1 Rood 12 Perches – CTVol 4239 Fol 162)
1934 – 1948	Lillie Jane Smith, widow
(1935 – 1947)	*(lease to Edgar Albert Tanner, dairy farmer)*
1929 – 1934	Leslie Rowling Smith, grazier

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Note (b)

	(Lot 1801 DP 1166848)
2012 – 2013	Lensworth Glenmore Park Limited
	(Lot 1555 DP 1161692)
2012 – 2012	Lensworth Glenmore Park Limited
	(Lot 1400 DP 1161693)
2012 – 2012	Lensworth Glenmore Park Limited
	(Lot 699 DP 1155216)
2011 – 2012	Lensworth Glenmore Park Limited
	(Lot 800 DP 1155217)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 900 DP 1155218)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 1000 DP 1153500)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 500 DP 1153499)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 400 DP 1153498)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 200 DP 1153497)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 100 DP 1153496)
2011 – 2011	Lensworth Glenmore Park Limited
	(Lot 8932 DP 1109846)
2010 – 2011	Lensworth Glenmore Park Limited
	(Lot 8819 DP 1089978)
2006 – 2010	Lensworth Glenmore Park Limited
	(Lot 2 DP 1067073)
2004 – 2006	Lensworth Glenmore Park Limited
2004 – 2004	Nergl Developments Pty Limited
2004 – 2004	Lensworth Glenmore Park Limited Nergl Developments Pty Limited
	(Lot 880 DP1060475)
2004 – 2004	Lensworth Glenmore Park Limited Nergl Developments Pty Limited
	(Lot 8700 DP 1046479)
2003 – 2004	Lensworth Glenmore Park Limited
	(Lot 3 DP 1045500)
2002 – 2003	Lensworth Glenmore Park Limited

Cont.

Cont.

	(Lot 8919 DP 1043708)
2002 – 2002	Lensworth Glenmore Park Limited
	(Lot 8800 DP 1041192)
2002 – 2002	Lensworth Glenmore Park Limited
	(Lot 8901 DP1040625)
2002 – 2002	Lensworth Glenmore Park Limited
	(Lot 8650 DP 1038337)
2002 – 2002	Lensworth Glenmore Park Limited
	(Lot 8794 DP 1036719)
2002 – 2002	Glenmore Park Estate Limited
	(Lot 6840 DP 1036203)
2002 – 2002	Glenmore Park Estate Limited
	(Lot 6799 DP 1013970)
2000 – 2002	Glenmore Park Estate Limited
	(Lot 8397 DP 1008395)
2000 – 2000	Glenmore Park Estate Limited
	(Lot 8200 DP 1002570)
1999 – 2000	Glenmore Park Estate Limited
	(Lot 6699 DP 882806)
1999 – 2000	Glenmore Park Estate Limited
	(Lot 8099 DP 876748)
1998 – 1999	Glenmore Park Estate Limited
	(Lot 2 DP 876745)
1998 – 1998	Glenmore Park Estate Limited
	(Lot 8028 DP 870626)
1998 – 1998	Glenmore Park Estate Limited
1998 – 1998	The New South Wales Land and Housing Corporation
	(Lot 7001 DP 844976)
1994 – 1998	The New South Wales Land and Housing Corporation
	(Lot 4 DP 833308)
1993 – 1994	The New South Wales Land and Housing Corporation
	(Lot 5036 DP 832635)
1993 – 1993	The New South Wales Land and Housing Corporation
	(Lot 5 DP 222785)
1988 – 1993	The New South Wales Land and Housing Corporation

Cont.

Cont.

	(Lot 5 DP 222785 – CTVol 9801 Fol 201)
1974 – 1988	The Housing Commission of New South Wales
1967 – 1974	Tatmar Pastoral Co Pty Limited
1964 – 1967	Clifford Charles White, grazier
	(Lots 3 & 4 DP 221553 – CTVol 9696 Fol's 222 & 223)
1964 – 1964	Clifford Charles White, grazier
	(Part Portion 37 and Portion 38 Parish Mulgoa – Area 899 Acres 2 Roods – CTVol 6747 Fol 31)
1953 – 1964	Clifford Charles White, grazier
	(Part Portion 37 and Portion 38 Parish Mulgoa – Area 899 Acres 2 Roods – CTVol 6458 Fol's 185 & 186)
1953 – 1953	Clement Lorne Chapman, medical practioner Clifford Charles White, grazier
	(Part Portion 37 and Portion 38 Parish Mulgoa – Area 899 Acres 2 Roods – CTVol 4933 Fol 28)
1938 – 1953	The Scottish Australian Investment Company Limited
	(Part Portion 37 and Portion 38 Parish Mulgoa and other lands – Area 1007 Acres 1 Roods 39 Perches – CTVol 2548 Fol 179)
1915 – 1938	The Scottish Australian Investment Company Limited
(1919 – 1938)	*(lease to Frederick Alexander Mackenzie, dairy farmer)*
	(Part Portion 37 and Portion 38 Parish Mulgoa and other lands – Area 1504 Acres 1 Roods 36 Perches – CTVol 1252 Fol 181)
1898 – 1915	The Scottish Australian Investment Company Limited

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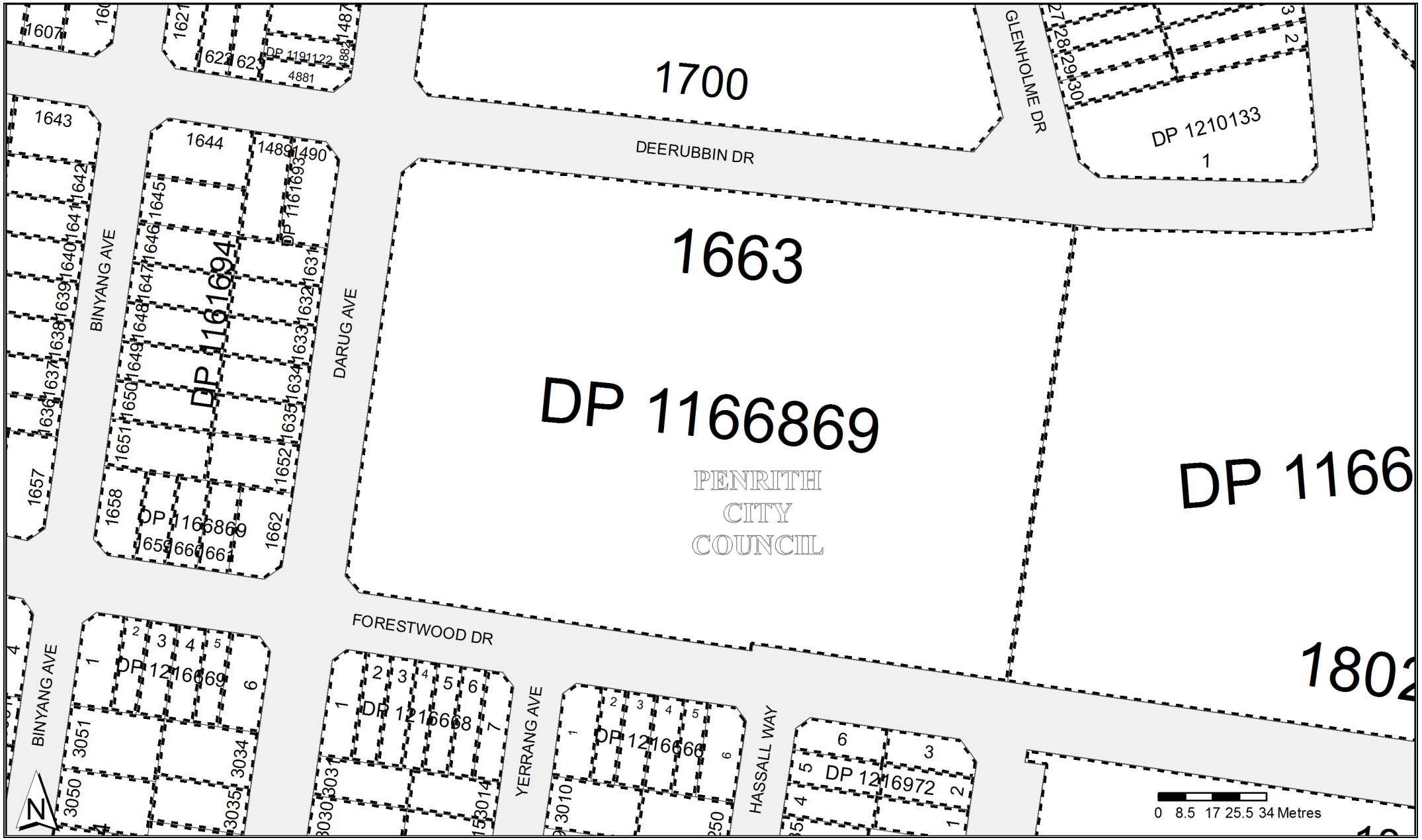
Cadastral Records Enquiry Report : Lot 1663 DP 1166869

Ref : NOUSER

Locality : GLENMORE PARK
Parish : MULGOA
LGA : PENRITH
County : CUMBERLAND



This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP1155005			
Lot(s): 18			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1162982	REGISTERED	SURVEY	SUBDIVISION
DP1161692			
Lot(s): 1500			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1186348	WITHDRAWN	UNAVAILABLE	SUBDIVISION
DP1194668	REGISTERED	COMPILATION	EASEMENT

	Status	Surv/Comp	Purpose
DP1161693			
Lot(s): 1487, 1489, 1490			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1161694			
Lot(s): 1606, 1607, 1608, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1163177			
Lot(s): 235, 250			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1159120	HISTORICAL	SURVEY	SUBDIVISION
DP1162982	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1165172			
Lot(s): 3010, 3014, 3015, 3030, 3031, 3034, 3035, 3036			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1165174			
Lot(s): 3049, 3050, 3051, 3060, 3061			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1165172	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1166371			
Lot(s): 1700			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1166848			
Lot(s): 1802			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1166869			
Lot(s): 1663			
DP1166848	HISTORICAL	SURVEY	SUBDIVISION
Lot(s): 1656, 1657, 1658, 1659, 1660, 1661, 1662			
DP1161694	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
Lot(s): 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663			
DP222144	HISTORICAL	COMPILATION	SUBDIVISION
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1191122			
Lot(s): 4881, 4882			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1197216			
Lot(s): 4			
DP222144	HISTORICAL	COMPILATION	SUBDIVISION
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1165172	HISTORICAL	SURVEY	SUBDIVISION
DP1165174	HISTORICAL	SURVEY	SUBDIVISION
DP1165176	HISTORICAL	SURVEY	SUBDIVISION
DP1166869	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1180358	HISTORICAL	SURVEY	SUBDIVISION
DP1186025	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1210133			
Lot(s): 1			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1166371	HISTORICAL	SURVEY	SUBDIVISION
DP1211385	REGISTERED	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
DP1211385			
Lot(s): 2, 3, 4, 27, 28, 29, 30			
DP222785	HISTORICAL	SURVEY	SUBDIVISION
DP521093	HISTORICAL	COMPILATION	SUBDIVISION
DP597243	HISTORICAL	COMPILATION	SUBDIVISION
DP882806	HISTORICAL	SURVEY	SUBDIVISION
DP1002570	HISTORICAL	SURVEY	SUBDIVISION
DP1008395	HISTORICAL	SURVEY	SUBDIVISION
DP1013970	HISTORICAL	SURVEY	SUBDIVISION
DP1026769	HISTORICAL	SURVEY	SUBDIVISION
DP1036203	HISTORICAL	SURVEY	SUBDIVISION
DP1036719	HISTORICAL	SURVEY	SUBDIVISION
DP1038337	HISTORICAL	SURVEY	SUBDIVISION
DP1040625	HISTORICAL	SURVEY	SUBDIVISION
DP1041192	HISTORICAL	SURVEY	SUBDIVISION
DP1043708	HISTORICAL	SURVEY	SUBDIVISION
DP1045500	HISTORICAL	SURVEY	SUBDIVISION
DP1046479	HISTORICAL	SURVEY	SUBDIVISION
DP1050042	HISTORICAL	SURVEY	SUBDIVISION
DP1060475	HISTORICAL	SURVEY	SUBDIVISION
DP1067073	HISTORICAL	SURVEY	SUBDIVISION
DP1089978	HISTORICAL	SURVEY	SUBDIVISION
DP1109846	HISTORICAL	SURVEY	SUBDIVISION
DP1153496	HISTORICAL	SURVEY	SUBDIVISION
DP1153497	HISTORICAL	SURVEY	SUBDIVISION
DP1153498	HISTORICAL	SURVEY	SUBDIVISION
DP1153499	HISTORICAL	SURVEY	SUBDIVISION
DP1153500	HISTORICAL	SURVEY	SUBDIVISION
DP1155216	HISTORICAL	SURVEY	SUBDIVISION
DP1155217	HISTORICAL	SURVEY	SUBDIVISION
DP1155218	HISTORICAL	SURVEY	SUBDIVISION
DP1161692	HISTORICAL	SURVEY	SUBDIVISION
DP1161693	HISTORICAL	SURVEY	SUBDIVISION
DP1166371	HISTORICAL	SURVEY	SUBDIVISION
DP1210133	HISTORICAL	SURVEY	SUBDIVISION
DP1216666			
Lot(s): 1, 2, 3, 4, 5, 6			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1165172	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1216668			
Lot(s): 1, 2, 3, 4, 5, 6, 7			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1165172	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1216669			
Lot(s): 1, 2, 3			
DP1165174	HISTORICAL	SURVEY	SUBDIVISION

	Status	Surv/Comp	Purpose
Lot(s): 1, 2, 3, 4, 5, 6			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1165172	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION
DP1216972			
Lot(s): 1, 2, 3, 4, 5, 6			
DP541090	HISTORICAL	SURVEY	SUBDIVISION
DP1150906	HISTORICAL	SURVEY	SUBDIVISION
DP1155005	HISTORICAL	SURVEY	SUBDIVISION
DP1159120	HISTORICAL	SURVEY	SUBDIVISION
DP1162982	HISTORICAL	SURVEY	SUBDIVISION
DP1163177	HISTORICAL	SURVEY	SUBDIVISION
DP1171501	HISTORICAL	SURVEY	SUBDIVISION

Plan	Surv/Comp	Purpose
DP1155005	UNRESEARCHED	SUBDIVISION
DP1155005	SURVEY	SUBDIVISION
DP1161692	SURVEY	SUBDIVISION
DP1161692	UNRESEARCHED	SUBDIVISION
DP1161693	UNRESEARCHED	SUBDIVISION
DP1161693	SURVEY	SUBDIVISION
DP1161694	UNRESEARCHED	SUBDIVISION
DP1161694	SURVEY	SUBDIVISION
DP1163177	UNRESEARCHED	SUBDIVISION
DP1163177	SURVEY	SUBDIVISION
DP1165172	UNRESEARCHED	SUBDIVISION
DP1165172	SURVEY	SUBDIVISION
DP1165174	UNRESEARCHED	SUBDIVISION
DP1165174	SURVEY	SUBDIVISION
DP1166371	UNRESEARCHED	SUBDIVISION
DP1166371	SURVEY	SUBDIVISION
DP1166848	SURVEY	SUBDIVISION
DP1166848	UNRESEARCHED	SUBDIVISION
DP1166869	UNRESEARCHED	SUBDIVISION
DP1166869	SURVEY	SUBDIVISION
DP1191122	UNRESEARCHED	SUBDIVISION
DP1191122	SURVEY	SUBDIVISION
DP1197216	UNRESEARCHED	SUBDIVISION
DP1197216	SURVEY	SUBDIVISION
DP1210133	UNRESEARCHED	SUBDIVISION
DP1210133	SURVEY	SUBDIVISION
DP1211385	UNRESEARCHED	SUBDIVISION
DP1211385	SURVEY	SUBDIVISION
DP1216666	SURVEY	SUBDIVISION
DP1216666	UNRESEARCHED	SUBDIVISION
DP1216668	SURVEY	SUBDIVISION
DP1216668	UNRESEARCHED	SUBDIVISION
DP1216669	SURVEY	SUBDIVISION
DP1216669	UNRESEARCHED	SUBDIVISION
DP1216972	UNRESEARCHED	SUBDIVISION
DP1216972	SURVEY	SUBDIVISION

M

NEW SOUTH WALES

(For Grant and title reference prior to first edition see Deposited Plan.)

CERTIFICATE OF TITLE

PERTY ACT, 1900, as amended.

Vol. 9608 Fol. 182

M/A 1st Edition issued 30-12-1963

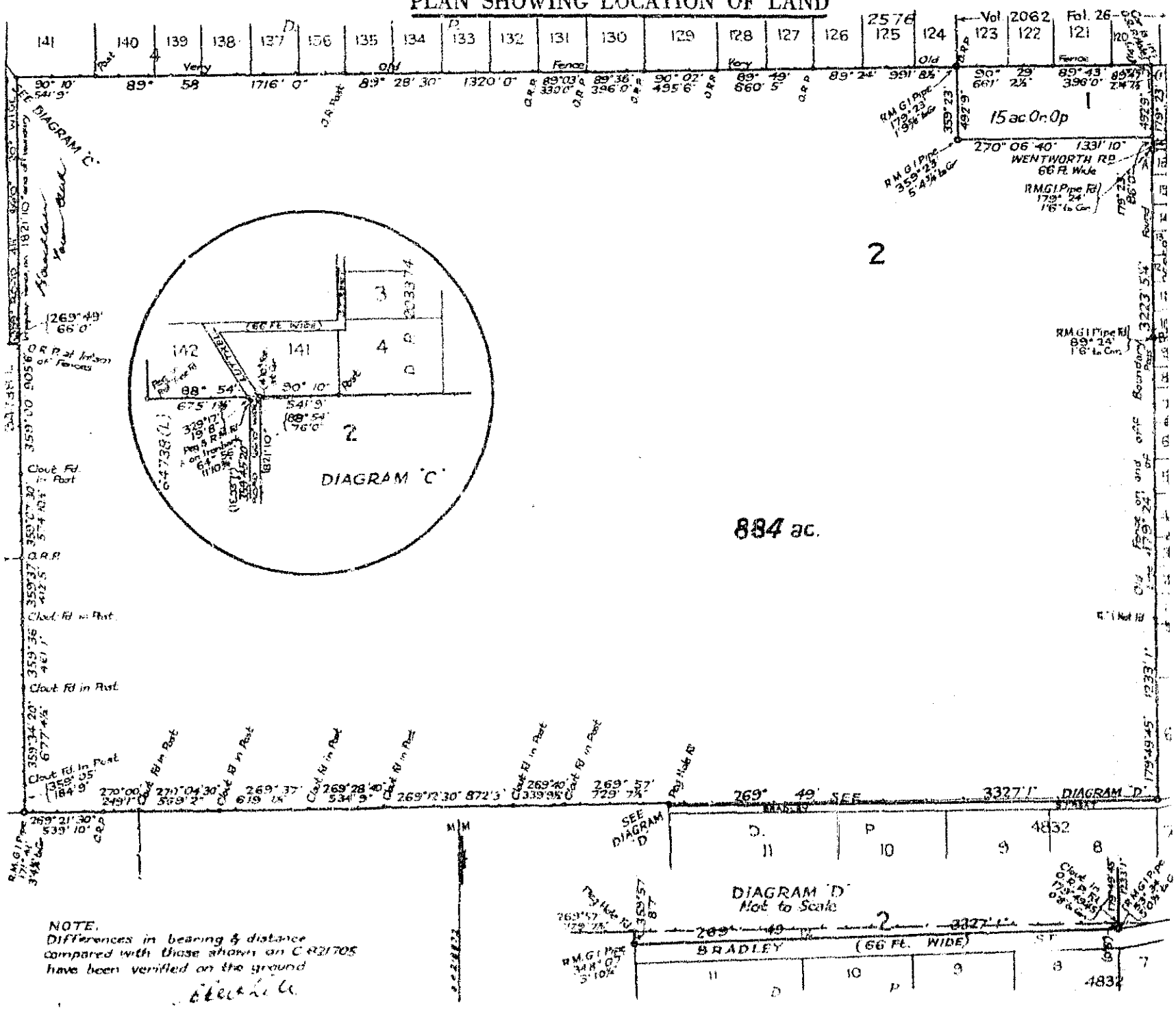
CANCELLED

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness B.B. Bailey

Registrar-General.

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 2 in Deposited Plan 218872 at Kingswood in the City of Penrith Parish of Mulgoa and County of Cumberland.

FIRST SCHEDULE (continued overleaf)

~~METROPOLITAN BUILDING INVESTMENTS LIMITED, as to that part of the land above described formerly comprised in Certificate of Title Volume 1078 Folio 186 and CLIFFORD CHARLES WHITE, of Kingswood, Grazier, as to that part formerly comprised in Certificate of Title Volume 6747 Folio 31.~~

Registrar General.

SECOND SCHEDULE (continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant(s) referred to in the said Deposited Plan.

Registrar General.

ST 1609 V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 9608 Fol 182

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
Clifford Charles White, of Kingswood, Grazier. This deed is cancelled as to the Whole New Certificates of Title have issued for lots in Deposited Plan No. 221553 as follows:- Lots 3 & 21 Vol. 9696 Fol. 222223 respectively REGISTRAR GENERAL	Transfer	J382536	20.6.1963	21.1.1964	

DP 221553

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		

FORM No. 184A

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

[redacted]

TIFICATE OF TITLE

NEW SOUTH WALES — PERTY ACT, 1900, as amended.

Vol. 9616 Fol. 223

CANCELLED

Prior Title Vol. 9608 Fol. 182
For Application and Grant particulars see Deposited Plan.

1st Edition issued 1-5-1964.

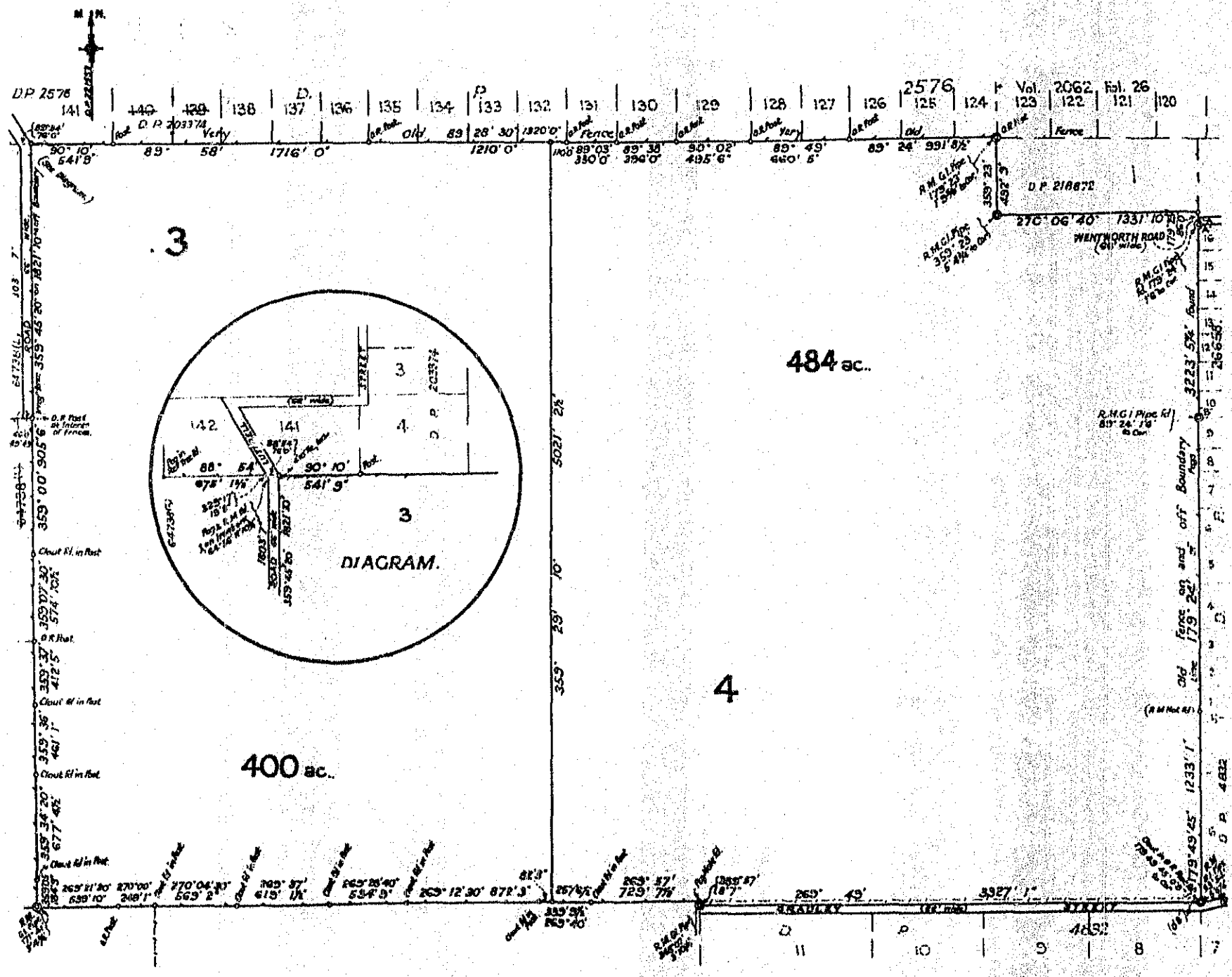
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness B Bailey

J Watson
Registrar General.

REGISTRAR GENERAL NEW SOUTH WALES

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO.

Estate in Fee Simple in Lot 4 in Deposited Plan 221553 at Kingswood in the City of Penrith Parish of Mulgoa and County of Cumberland.

FIRST SCHEDULE (Continued overleaf)

CLIFFORD CHARLES WHITE, of Kingswood, Grazier.

J Watson
Registrar General.

SECOND SCHEDULE (Continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant(s) referred to in the said Deposited Plan.

J Watson
Registrar General.

ST 1608 V. C. N. BLIGHT, GOVERNMENT PRINTER

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
This deed is cancelled as to the Whole New Certificates of Title have issued for lots in Deposited Plan No. 222785 as follows:- Lots 5 & 6 Vol. 9801 Fol. 201 & 202 respectively J. Watson REGISTRAR GENERAL [Seal: REGISTRAR GENERAL NEW SOUTH WALES]					

DP 222785
(5)
J220C4
Prog. prep'd for lots in DP 222785 being whole

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
			Sep CsT to issue on DP 222785			

FORM No. 62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

[redacted]

TIFICATE OF TITLE

NEW SOUTH WALES . 222 [redacted] PERTY ACT, 1900, as amended.

Prior Titles Volume 9696 Folios 22 and 2323

For Applications and Grant particulars see Deposited Plan.

Vol. 3801 Fol. 201

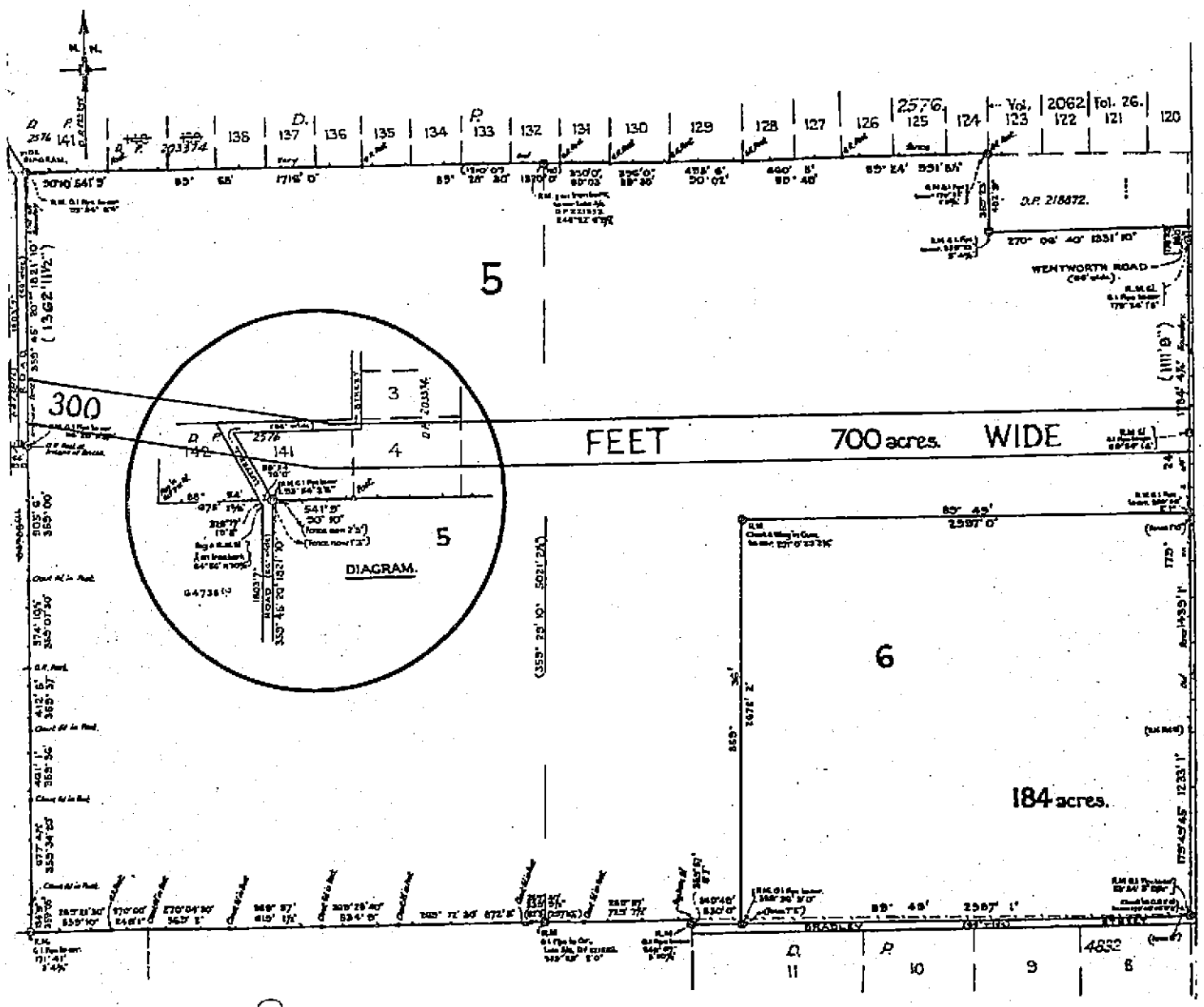
ID 1st Edition issued 10-9-1964.

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness Elabor

Registrar General.

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 5 in Deposited Plan 222785 at Kingswood in the City of Penrith Parish of Mulgoa and County of Cumberland.

FIRST SCHEDULE (continued overleaf)

~~CLIFFORD CHARLES WHITE, of Kingswood, Grazier~~.

Registrar General

SECOND SCHEDULE (continued overleaf)

GRY

1. Reservations and conditions, if any, contained in the Crown Grant(s) referred to in the said Deposited Plan.

Registrar General

ST 1608 V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 3801 Fol. 201

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
~~TATHAR Taimea Pastoral Co Pty Limited~~	~~Transfer~~	~~J825610~~	~~18-9-1964~~	~~23-11-1964~~	~~[signature]~~
The Housing Commission of New South Wales	Resumption	N575660	13-11-1973	2-1-1974	[signature]

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
~~Mortgage~~	~~K825101~~	~~27-9-1964~~	~~to The Commercial Bank of Australia Limited~~	~~11-10-1964~~	[signature]	Cancelled	N575660	[signature]
Resumption	L892485		easement for transmission line affecting the piece of land 300 feet wide shown in the plan hereon WITH L.892485	23-7-1970	[signature]			

FORM No. 62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

ET

K825101 Discharged 11-10-1964 Resumption Easement Transmission ... Gaz ... L892485 MRK ... Transmission

Resumed ? Housing Purposes Gaz 31-8-... Fol 3723

N575660N (7 Pt)

Ref:13612/1 /Src:T

[redacted]

IFICATE OF TITLE

NEW SOUTH WALES — ERTY ACT, 1900, as amended.

Application No.1692
Prior Title Vol.6832 Fol.157

Vol. 9919 Fol. 8

MA — 1st Edition issued 5-2-1965

Vol. 9919 Fol. 8 (Page 1)

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

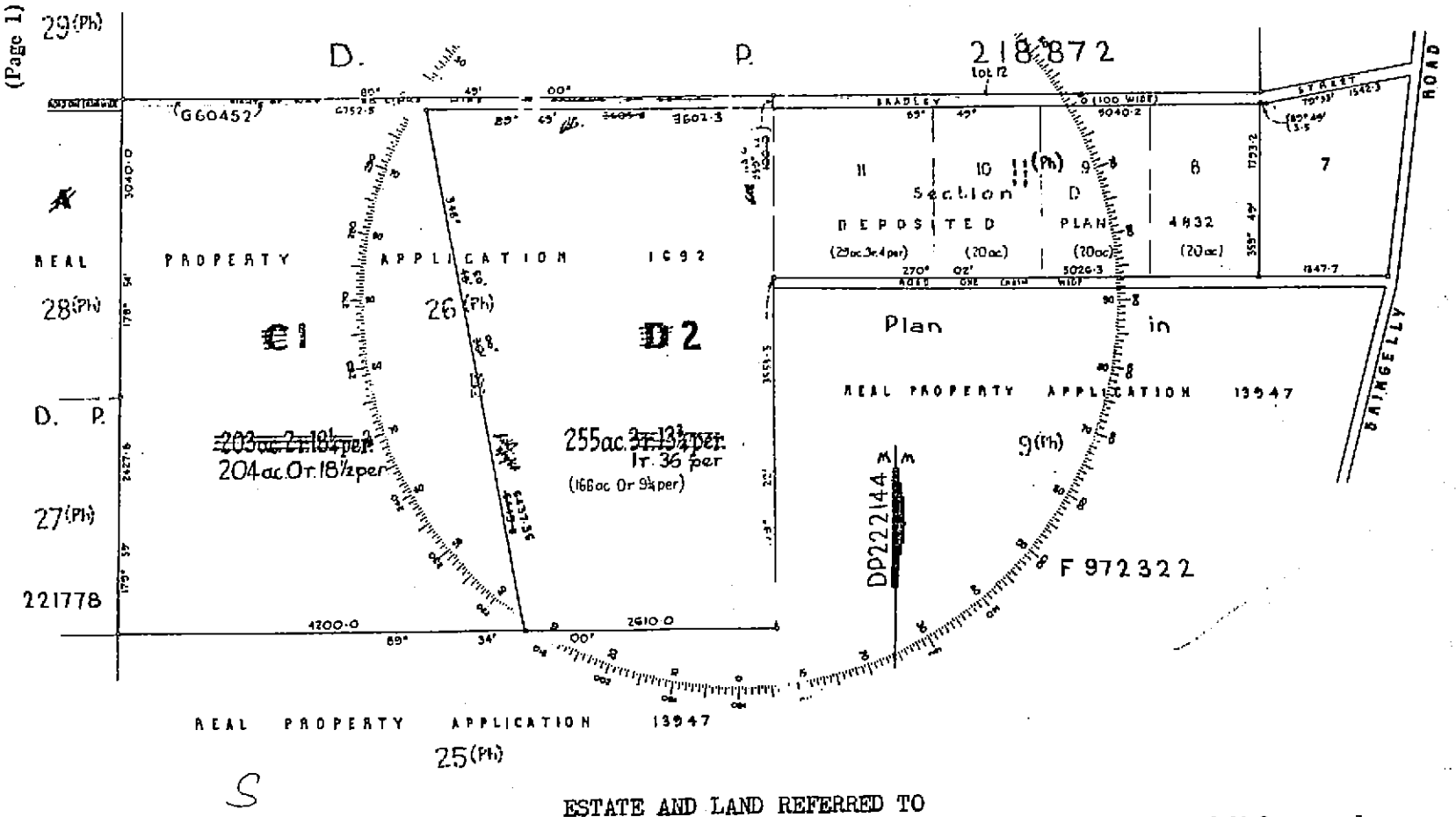
Witness *A Cohen*

CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND



S

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 222144 in the City of Penrith Parish of Mulgoa and County of Cumberland being part of Portion 26 granted to Sir John Jamison on 9-7-1822.

FIRST SCHEDULE (continued overleaf)

~~CECIL HERBERT ROOTS, of Penrith Cattle Dealer~~.

Registrar General.

SECOND SCHEDULE (continued overleaf)

GRY
1. Reservations and conditions if any contained in the Crown Grant above referred to.
RW(S82) 2. Right of Way created by Transfer No.G60452 affecting the piece of land 50 links wide shown in the plan hereon.
3. ~~Mortgage No.G60455 to The Commercial Banking Company of Sydney Limited. Entered 30-7-1954.~~ discharged K40306

Registrar General.

ST 16CB V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 9919 Fol 8

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
~~Garswood Pastoral Co. Pty. Limited~~	~~Transfer~~	~~K106698~~	~~14-9-1965~~	~~23-9-1965~~	[signature]
~~Alstree California Pty. Limited~~	~~Transfer~~	~~M5618~~	~~5-8-1970~~	~~1-10-1970~~	[signature]
~~Bonds Furnishings (Liverpool) Pty. Limited.~~	Transfer	N966231	2-8-1974	19-8-1974	[signature]
~~Emu Plains (Rural Properties) Pty. Limited.~~	~~Application~~	~~Q283781~~		~~29-7-1977~~	[signature]
Zacuba Pty. Limited	Transfer	R771588	-----	30-4-1980	[signature]

CANCELLED

SEE AUTO FOLIO

M5618 R
M64 Pg 1
M345190 Change of name for Service of notices
N870965 W/-
N874211 W/-
N966229 W/X 230 D/M 231 Fe
Q283781 M Change of name
R771587 D/M 88 T

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
~~Mortgage~~	~~M5619~~	~~5-8-1970~~	~~To Garswood Pastoral Co. Pty. Limited~~	~~1-10-1970~~	[signature]	Discharged	N966230	[signature]
~~Caveat~~	~~M646319~~	~~[illegible]-1972~~		~~22-5-1972~~	[signature]	Withdrawn	N874211	[signature]
~~Caveat~~	~~N870965~~	~~27-5-1974~~		~~19-6-1974~~	[signature]	Withdrawn	N966229	[signature]
~~Mortgage~~	~~Q283781~~		~~to Commonwealth Trading Bank of Australia~~	~~29-7-1977~~	[signature]	Discharged	R771587	[signature]

(Page 2 of 2 pages)

FORM No. 62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Form: 01T
Release: 2
www.lpi.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

AB186093V

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP Office of State Revenue use only
Office of State Revenue
NSW Treasury
YEAR 2000 - 2005
Duty $941,133-51
Asst details: Vendor duty
ID 2373577

NEW SOUTH WALES DUTY
24-12-2004 0002373577 001
TRANSFER- TRANSFER
DUTIABLE AMOUNT $ *****18,299,287.00
DUTY $ ********991,951.50

(A) **TORRENS TITLE** FOLIO IDENTIFIER: 2/1067073

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
591D ~~491A~~	~~LLPN: 123350H~~ ~~Lincoln Smith & Company~~ ~~DX 968 Sydney~~ ~~Tel: 9283 3330~~ MINTER ELLISON LLPN: 1234385 Reference: ~~Lensworth/Nergl~~ JPS 263873192	T TW (Sheriff)

(C) **TRANSFEROR** NERGL DEVELOPMENTS PTY LIMITED (ACN 008 527 697)

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 1.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** LENSWORTH GLENMORE PARK LIMITED (ACN 007 533 888)

(I) **TENANCY:**

(J) **DATE** 25 November 2004

Common Seal
NERGL DEVELOPMENTS PTY. LIMITED
A.C.N.
008 645 734

Certified correct for the purposes of the Real Property Act 1900 by the corporation named below the common seal of which was affixed pursuant to the authority specified and in the presence of the authorised person(s) whose signature(s) appear(s) below.
Corporation: Nergl Developments Pty Limited (ACN 008 527 697)
Authority:

Signature of authorised person: [signature] Signature of authorised person: [signature]
Name of authorised person: LENKO JOHN SATARA Name of authorised person: ENID JUNE SATARA
Office held: DIRECTOR Office held: SECRETARY

LENSWORTH GLENMORE PARK LIMITED ACN 007 533 888
THE COMMON SEAL OF

Certified correct for the purposes of the Real Property Act 1900 by the corporation named below the common seal of which was affixed pursuant to the authority specified and in the presence of the authorised person(s) whose signature(s) appear(s) below.
Corporation: Lensworth Glenmore Park Limited (ACN 007 533 888)
Authority: S. 127 CORPORATIONS ACT

Signature of authorised person: [signature] Signature of authorised person: [signature]
Name of authorised person: GERARD PAUL DEMPSEY Name of authorised person: DAVID MAURICE NEUFELD
Office held: DIRECTOR Office held: COMPANY SECRETARY

All handwriting must be in block capitals.

Form: 97-01T
Licence: 026CN/0526/96

TRANSFER

New South Wales

Real Property Act 1900

5552277V

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

OFFICE OF STATE REVENUE
STAMP DUTY (N.S.W. TREASURY) P28
1996/97
DUTY $ 10.00
1ST REC Nº 2015/0573

$10

(A) **LAND TRANSFERRED**
Show no more than 20 titles. If appropriate, specify the share or part transferred.

1/222144

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
374	WBC REFERENCE (15 character maximum): 7337S385-W

(C) **TRANSFEROR** JM & JA WEARN PTY LIMITED (A.C.N. 000 838 068)

(D) acknowledges receipt of the consideration of transfer from old trustee to new trustee and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable) 1. 2. 3.

(F) **TRANSFEREE**

(G)

T **TS** (s713 LGA) **TW** (Sheriff)	HOLICOMBE PTY LIMITED (A.C.N. 082 657 609)

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** 11 September 1998
Signed in my presence by the transferor who is personally known to me.

Executed for and on behalf of **JM & JA WEARN PTY LIMITED** (A.C.N. 000 838 068) by authority of the Directors in the presence of:

Witness

MICHAEL PATRICK HERAGHTY
Name of Witness

7 Cove Ave Manly
Address of Witness

Signature of Director

ADRIAN COLIN WEARN
Name of Director

CHECKED BY (LTO use)

Witness

Signature of Secretary

MICHAEL PATRICK HERAGHTY

Name of Witness

ROBERT JOHN WEARN

Name of Secretary

7 Cove Ave Manly

Address of Witness

Signed in my presence by the transferee who is personally known to me.

Executed for and on behalf of **HOLICOMBE PTY LIMITED** (A.C.N. 082 657 609) by authority of the Directors in the presence of:

Witness

Signature of Director

MICHAEL PATRICK HERAGHTY

Name of Witness

ADRIAN COLIN WEARN

Name of Director

7 Cove Ave Manly

Address of Witness

Witness

Signature of Secretary

MICHAEL PATRICK HERAGHTY

Name of Witness

ROBERT JOHN WEARN

Name of Secretary

7 Cove Ave Manly

Address of Witness

1:MPH-A6168.DOC.EDL

CHECKED BY (LTO use).....

Form: 01T
Edition: 1111
Licence: 04-08-425
Licensee: Corrs Chambers Westgarth

TRANSFER

New South Wales
Real Property Act 1900

AH787680D

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY NO ALTERATION NOTED

Office of State Revenue use only

NEW SOUTH WALES DUTY
11-04-2013 0007051165-001
SECTION 18(2)
DUTY $ **********10.00

(A) **TORRENS TITLE** If appropriate, specify the part transferred

PARTS - Folio Identifiers 1658/1166869, 1659/1166869, 1660/1166869, 1661/1166869, 1662/1166869 and 1663/1166869 as formerly comprised in Folio Identifier 1/222144

(B) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone and Customer Account Number if any	CODES
898S	Customer Account Number: 123648F Corrs Chambers Westgarth Level 36, Governor Phillip Tower 1 Farrer Place Sydney NSW 2000 (02) 9210 6500 Reference (optional): JM:9085618	T TW

(C) **TRANSFEROR** HOLICOMBE PTY LIMITED ACN 082 657 609

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $NIL and as regards

(E) **ESTATE** the folio of the Register specified above transfers to the transferee an estate in fee simple.

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable:) 1. 2. 3.

(H) **TRANSFEREE** LENSWORTH GLENMORE PARK LIMITED ABN 59 007 533 888

TENANCY:

DATE 07-06-2013
dd mm yyyy

(J) Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

Corporation: HOLICOMBE PTY LIMITED ACN 082 657 609
Authority: Section 127(1) of the Corporations Act 2001

Signature of authorised person: R30 ..... Signature of authorised person: admi .....

Name of authorised person: ROBERT WEARN Name of authorised person: ADRIAN COLIN WEARN
Office held: DIRECTOR Office held: DIRECTOR

SEE PAGE 2 FOR EXECUTON BY THE TRANSFEREE

(K) The transferee / transferee's solicitor / transferee's agent certifies that the eNOS data relevant to this dealing has been submitted and stored under eNOS ID No. Full name: Signature:

* *s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.*

ALL HANDWRITING MUST BE IN BLOCK CAPITALS

8120291/1

11 pages = 19

Deliver to - 3026

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature: .....

Signatory's name: Julie Meakes

Signatory's capacity: Solicitor for the Transferee

* *s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.*

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

FILM WITH AH787680

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref:

5 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir/Madam

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1658/1166869

We refer to the multi entitlement delivery notice (copy **attached**).

Westpac Banking Corporation (**Westpac**) is one of the controlling parties of folio identifier 1658/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1658/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

FILM WITH AH787680

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref:

5 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir/Madam,

RE: Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1659/1166869

We refer to the multi entitlement delivery notice (copy attached).

Westpac Banking Corporation (Westpac) is one of the controlling parties of folio identifier 1659/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1. Discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2. Transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

(a) folio identifier 1658/1166869;
(b) folio identifier 1659/1166869;
(c) folio identifier 1660/1166869;
(d) folio identifier 1661/1166869;
(e) folio identifier 1662/1166869; and
(f) folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1659/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

FILM WITH AH 787680

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref: .

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

5 June 2013

Dear Sir/Madam

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1660/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Westpac Banking Corporation (**Westpac**) is one of the controlling parties of folio identifier 1660/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

(a) folio identifier 1658/1166869;

(b) folio identifier 1659/1166869;

(c) folio identifier 1660/1166869;

(d) folio identifier 1661/1166869;

(e) folio identifier 1662/1166869; and

(f) folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1660/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

FILM WITH AH787680

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref:

5 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir/Madam

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1661/1166869

We refer to the multi entitlement delivery notice (copy **attached**).

Westpac Banking Corporation (**Westpac**) is one of the controlling parties of folio identifier 1661/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1661/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

FILM WITH AH787680

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref:

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

5 June 2013

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1662/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Westpac Banking Corporation (**Westpac**) is one of the controlling parties of folio identifier 1662/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

(a) folio identifier 1658/1166869;

(b) folio identifier 1659/1166869;

(c) folio identifier 1660/1166869;

(d) folio identifier 1661/1166869;

(e) folio identifier 1662/1166869; and

(f) folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1662/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

Westpac
Australia's First Bank

Westpac Banking Corporation ABN 33 007 457 141

FILM WITH AH787680

Business Loan Centre NSW
1 King Street
Concord West NSW 2138

Telephone: 0297670529
Facsimile: 0297671040
Our Ref: Z:91572561
Your Ref: .

5 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir/Madam

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited
Property: Dual Entitlement Folio Identifier 1663/1166869

We refer to the multi entitlement delivery notice (copy **attached**).

Westpac Banking Corporation (**Westpac**) is one of the controlling parties of folio identifier 1663/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1663/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully,

Michael Harrington
Securities Portfolio Manager

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1658/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1658/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1658/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1659/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1659/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1659/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1660/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1660/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1660/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1661/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1661/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1661/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1662/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1662/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

2 transfer between Lensworth Glenmore Park Limited as transferee and Holicombe Pty Limited as transferor, in respect of the part formerly in folio identifier 1/222144, in respect of the following titles:

folio identifier 1658/1166869;

folio identifier 1659/1166869;

folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1662/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seaton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

FILM WITH AH787680

LegalStream
strategic legal outsourcing

4 June 2013

The Duty Registrar
Land and Property Information New South Wales
Queens Square
SYDNEY NSW 2000

Dear Sir

Lensworth Glenmore Park Limited purchase from Holicombe Pty Limited Property: Dual Entitlement Folio Identifier 1663/1166869

We refer to the multi entitlement delivery notice (copy **attached**).
Legal Stream Australia Pty Ltd (**Legal Stream**) is one of the controlling parties of folio identifier 1663/1166869 and authorises the lodgement for registration of the following documents in connection with that folio identifier:

1 discharge of mortgage no. AB995609 from Westpac Banking Corporation of the part formerly in folio identifier 1/222144; and

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folio identifier 1658/1166869;

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folio identifier 1660/1166869;

folio identifier 1661/1166869;

folio identifier 1662/1166869; and

folio identifier 1663/1166869.

Following registration of the documents numbered 1 and 2 mentioned above, you are authorised and directed to issue folio identifier 1663/1166869 to Legal Stream Australia Pty Ltd.

Yours faithfully

Kylie Seton
Legal Stream Australia Pty Ltd

LegalStream Australia Pty Ltd – formerly Burkhart & Company Pty Ltd ACN 002 801 498 ABN 80 002 801 498
Address Level 15, 115 Pitt Street Sydney NSW 2000 **DX** 654 Sydney
T 02 9231 0122 **F** 02 9233 6411 **E** mail@legalstream.com.au **www**.legalstream.com.au

97-01T

TRANSFER
Real Property Act, 1900

0
514297 E

Office of State Revenue use only

OFFICE OF STATE REVENUE
(N.S.W. TREASURY)
1994/95 P3
NO STAMP DUTY IS PAYABLE ON THIS INSTRUMENT $2.32

(A) LAND TRANSFERRED
Show no more than 20 References to Title.
If appropriate, specify the share transferred.

FOR REFERENCES TO TITLE SEE ANNEXURE A

(B) LODGED BY

L.T.O. Box	Name, Address or DX and Telephone
~~47J~~ 4IJ	MALLESONS STEPHEN JAQUES 1 FARRER PLACE SYDNEY DX 113 SYDNEY ALBCSR0001-361 Reference (max. 15 characters): ~~ALB:P104822(19)~~

(C) TRANSFEROR ZACUBA PTY LIMITED (ACN 000 742 030)

(D) ~~acknowledges receipt of the consideration of~~ pursuant to a corporate reconstruction ~~and~~ as regards the land specified above transfers to the transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

(F) TRANSFEREE

T

MONIER PGH HOLDINGS LIMITED (ACN 008 631 356)

(G) TENANCY: 5

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900

DATE 18 AUGUST 1995

~~Signed in my presence by the transferor who is personally~~ known to me

FOR EXECUTION CLAUSES SEE ANNEXURE

..... Signature of Witness

..... Name of Witness (BLOCK LETTERS)

..... Address of Witness

..... Signature of Transferor

Signed in my presence by the transferee who is personally known to me

..... Signature of Witness

..... Name of Witness (BLOCK LETTERS)

..... Address of Witness

..... ~~Signature of Transferee~~

☛ **INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE**

CHECKED BY (office use only)

H. C. MARTYN & SONS (AUST.) PTY. LTD. PH: (02) 699 2499

This is Annexure "A" to Transfer
Between:
ZACUBA PTY LIMITED (as Transferor)
And:
MONIER PGH HOLDINGS LIMITED (as Transferee)

References to title	NOW BEING
Volume 10913 Folio 190 –	4/236527
Volume 10913 Folio 191 –	5/236527
Volume 10913 Folio 192 –	6/236527
Volume 10913 Folio 193 –	7/236527
Volume 10913 Folio 194 –	8/236527
Volume 10913 Folio 196 –	10/236527
Volume 10913 Folio 197 –	11/236527
Volume 10913 Folio 198 –	12/236527
Volume 10913 Folio 199 –	13/236527
Volume 10913 Folio 200 –	14/236527
Volume 11014 Folio 175 –	1/533788
Volume 11014 Folio 176 –	2/533788
Volume 11325 Folio 118 –	25/653888
Volume 9919 Folio 8 –	1/222144

This is the annexure containing execution clauses to Transfer
Between:
ZACUBA PTY LIMITED (as Transferor)
And:
MONIER PGH HOLDINGS LIMITED (as Transferee)

We hereby certify this dealing correct for the purposes of the Real Property Act, 1900.

DATE 18 AUGUST 1995

THE COMMON SEAL of ZACUBA PTY LIMITED is affixed in accordance with its articles of association in the presence of:

ZACUBA PTY LIMITED COMMON SEAL 021 A.C.N. 000 742 030

Signature of authorised person	Signature of authorised person
DIRECTOR	SECRETARY
Office held	Office held
ANTHONY JOHN TANNER	DAVID CULLEN
Name of authorised person (block letters)	Name of authorised person (block letters)

THE COMMON SEAL of MONIER PGH HOLDINGS LIMITED is affixed in accordance with its articles of association in the presence of:

MONIER PGH HOLDINGS LIMITED A.C.N. 008 631 356 Common Seal 055

Signature of authorised person	Signature of authorised person
DIRECTOR	DIRECTOR
Office held	Office held
JOHN PURDIE-SMITH	DAVID CULLEN
Name of authorised person (block letters)	Name of authorised person (block letters)

SCHEDULE of SHORT & CURVED BOUNDARIES

No.	BEARING	CHORD	ARC	RADIUS
1	98°09'35"	11.025		
2	100°19'50"	15.155	15.16	200
3	100°28'30"	14.15	14.155	200

(E1) EASEMENT TO DRAIN WATER 2 WIDE
(E2) EASEMENT FOR ACCESS AND MAINTENANCE 0.9 WIDE
(E21) EASEMENT FOR ACCESS AND MAINTENANCE 0.9 WIDE (D.P.1161694)
(E4) EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE (D.P.1161694)
(E41) EASEMENT FOR RETAINING WALL SUPPORT 0.9 WIDE

BLUESTONE DRIVE (15.3 WIDE)
BINYANG AVENUE (15.6 WIDE)
DARUG AVENUE (19.6 WIDE)
FORESTWOOD DRIVE (VARIABLE WIDTH)

D P 1 1 6 6 8 6 9

1636 1637 1638 1639 1640 1650 1651 1652 1634 1635

1653 397.6m² 1654 309.8m² 1655 317.1m² 1656 324.3m² 1657 535.5m² 1658 375.7m² 1659 280.1m² 1660 280.1m² 1661 280.1m² 1662 449.1m²

RMDH&W FD. 93°41'30"-3.635&11.895 (D.P.1161694)
RMDH&W FD. 281°53'20"-3.665 (D.P.1161694)
RMDH&W FD. 92°10'20"-3.62&11.925 (D.P.1161694)
RMDH&W 275°27'-3.71
RMDH&W 109°20'35"-3.71&12.115
RMSSM180436 FD. 289°33'15"-1.91 (D.P.1161694
RMDH&W 14°51'10"-3.655&14.54
RMDH&W FD. 283°44'15"-3.695&12.05 (D.P.1161694)
RMDH&W 11°34'15"-3.595&14.405
RMDH&W 8°42'20"-3.595&14.385
RMDH&W 2°07'-14.525 265°01'-10.285
RMGIS FD. 137°42'-1.3 (D.P.1158921)
SSM180436 FD.

1664

SEE SHEET THREE

(X) RESTRICTION ON THE USE OF LAND - DP1002570
RESTRICTION ON THE USE OF LAND - DP1109847
RESTRICTION ON THE USE OF LAND (3) & (4) - DP1153497
RESTRICTION ON THE USE OF LAND (3) - DP1161692

BENEFITED BY:
EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1153498
EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1153499

(Y) BENEFITED BY EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1161694
(Z) RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

10 20 30 40 50 60 70 80 90 100 110 120 130 140

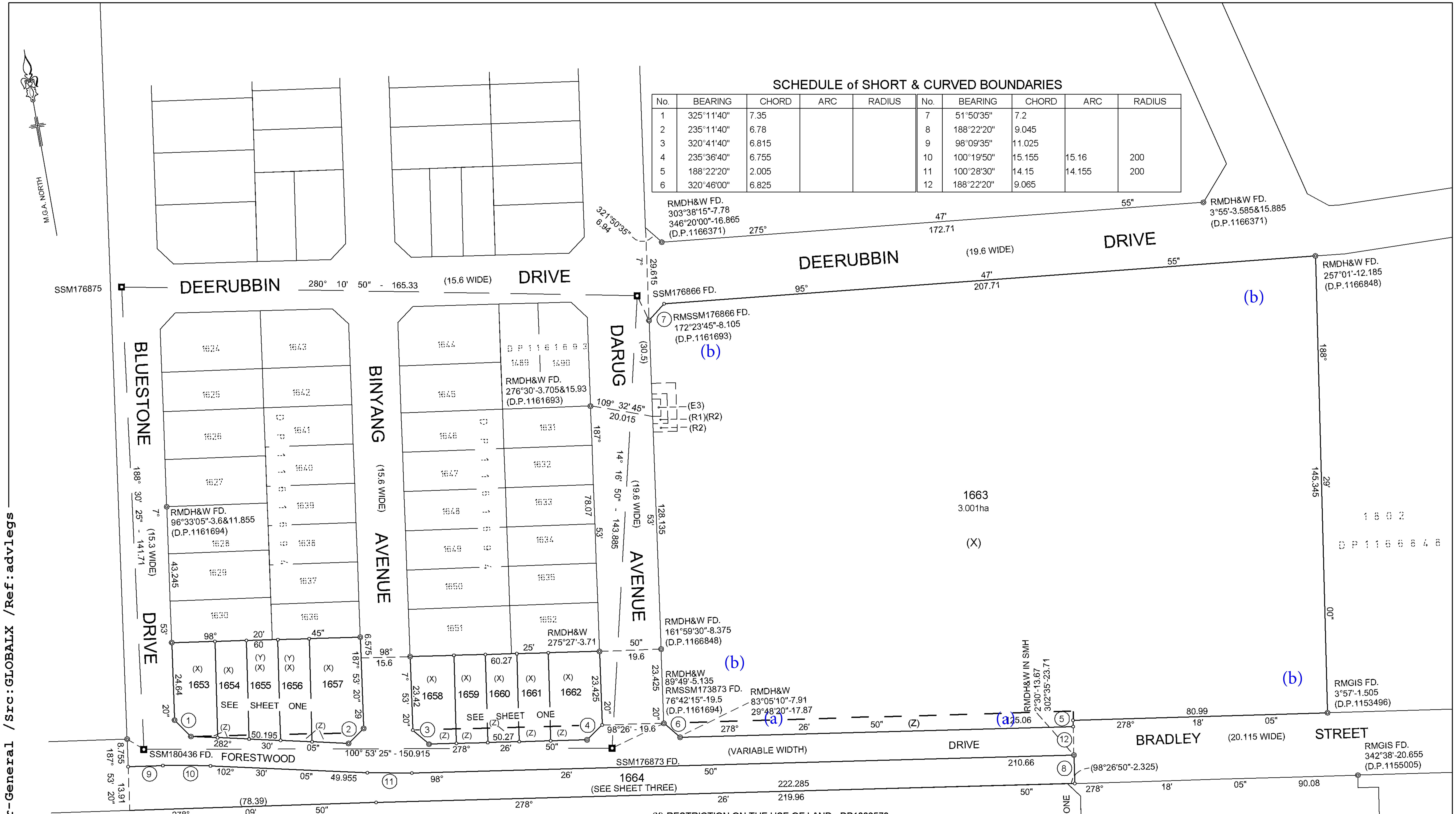
Surveyor: Ian Vincent Myers
Vince Morgan Surveyors
Ph.47215293. email: imyers@vmsurvey.com.au
Date of Survey: 6th November, 2012.
Surveyor's Reference: 15771-19C
2011M7100(49)Comp

PLAN OF SUBDIVISION OF
LOTS 1653 & 1654 D.P.1161694,
LOT 1801 D.P.1166848 &
LOT 1 D.P.222144

LGA: PENRITH
Locality: GLENMORE PARK / MULGOA
Subdivision No.: 087/12
Lengths are in metres. Reduction Ratio 1:300

Registered: 22.4.2013

D.P.1166869


M.G.A. NORTH
DEERUBBIN DRIVE (15.6 WIDE)
280° 10' 50" - 165.33
SSM176875
BLUESTONE DRIVE (15.3 WIDE)
188° 30' 25" - 141.71
BINYANG AVENUE (15.6 WIDE)
DARUG AVENUE (19.6 WIDE)
14° 16' 50" - 143.885
DEERUBBIN DRIVE (19.6 WIDE)
FORESTWOOD DRIVE (VARIABLE WIDTH)
BRADLEY STREET (20.115 WIDE)
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
SEE SHEET ONE
1663
3.001ha
(X)
1664
(SEE SHEET THREE)
SSM176866 FD.
SSM180436 FD.
SSM176873 FD.
RMSSM176866 FD.
172°23'45"-8.105
(D.P.1161693)
RMDH&W FD.
96°33'05"-3.6&11.855
(D.P.1161694)
RMDH&W FD.
276°30'-3.705&15.93
(D.P.1161693)
RMDH&W FD.
161°59'30"-8.375
(D.P.1166848)
RMDH&W FD.
303°38'15"-7.78
346°20'00"-16.865
(D.P.1166371)
RMDH&W FD.
3°55'-3.585&15.885
(D.P.1166371)
RMDH&W FD.
257°01'-12.185
(D.P.1166848)
RMGIS FD.
3°57'-1.505
(D.P.1153496)
RMGIS FD.
342°38'-20.655
(D.P.1155005)
RMDH&W IN SMH
2°30'-13.67
302°35'-23.71
RM GONE
(E3)
(R1)(R2)
(R2)
D.P.1161693
D.P.1155005
D.P.1166848
D.P.1162982

SCHEDULE of SHORT & CURVED BOUNDARIES

No.	BEARING	CHORD	ARC	RADIUS	No.	BEARING	CHORD	ARC	RADIUS
1	325°11'40"	7.35			7	51°50'35"	7.2		
2	235°11'40"	6.78			8	188°22'20"	9.045		
3	320°41'40"	6.815			9	98°09'35"	11.025		
4	235°36'40"	6.755			10	100°19'50"	15.155	15.16	200
5	188°22'20"	2.005			11	100°28'30"	14.15	14.155	200
6	320°46'00"	6.825			12	188°22'20"	9.065		

(X) RESTRICTION ON THE USE OF LAND - DP1002570
RESTRICTION ON THE USE OF LAND - DP1109847
RESTRICTION ON THE USE OF LAND (3) & (4) - DP1153497
RESTRICTION ON THE USE OF LAND (3) - DP1161692

BENEFITED BY:
EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1153498
EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1153499

(Y) BENEFITED BY EASEMENT FOR RETAINING WALL SUPPORT 0.5 WIDE - DP1161694
(Z) RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

(E3) EASEMENT FOR PADMOUNT SUBSTATION 2.75 WIDE (D.P.1161693)
(R1) RESTRICTION ON THE USE OF LAND (D.P.1161693) (9)
(R2) RESTRICTION ON THE USE OF LAND (D.P.1161693) (10)

Surveyor: Ian Vincent Myers
Vince Morgan Surveyors
Ph.47215293. email: imyers@vmsurvey.com.au
Date of Survey: 6th November, 2012.
Surveyor's Reference: 15771-19C
2011M7100(49)Comp

PLAN OF SUBDIVISION OF
LOTS 1653 & 1654 D.P.1161694,
LOT 1801 D.P.1166848 &
LOT 1 D.P.222144

LGA: PENRITH
Locality: GLENMORE PARK / MULGOA
Subdivision No.: 087/12
Lengths are in metres. Reduction Ratio 1: 800

Registered:
22.4.2013

D.P.1166869

Ⓐ RIGHT OF CARRIAGEWAY 10.06 WIDE (D.P.1179796)

94°52'04"-145.981 M.G.A.(GRD)
94°52'25"-145.982 SURVEY

SSM24448 FD.
123°24'15"-6.59
(D.P.876745)

PEG FD.

ROAD 20.115 WIDE

(2.6)

(0.3)

RMGIP FD.
180°10'30"-1.035
(D.P.876745)

SSM24447 FD.
(D.P.876745)
120°50'-26.835 BY ME

OLD PEG FD.

97° 51' 05" - 164.575

98°29'
75.955

98° 33' 30" - 173.55

98° 06' 00" - 188.785

102° 42' 26" - 470.840 M.G.A.(GRD)
102° 42' 18" - 470.794 SURVEY

POST ON COR.
SSM24446 FD.
354°22'15"-26.285
(D.P.876745)

SSM24446 FD
91°03'35"-24.305
TO COR
(D.P.1150906)

97°58'15" 163.06

97°42'05" 265.975

98°09'35"-25.08

(0.4)

97° 58' 30" 132.85

97° 42' 25" 265.97

103.41

98° 09' 50"

98° 26' 50" 222.285

306° 56' 42" - 794.046 M.G.A.(GROUND)
306° 56' 35" - 794.063 SURVEY

19°51'16"
M.G.A. & SURVEY
TO T.S.10866
CRANEBROOK RES.(P)

TS10879 FD.
89°00'10"-57.015
TO COR

292.725 50" 15"

113.775
264°22'35"

PM57931 FD.
85°48'50"-48.71 TO COR. (D.P.1150906)
RMGIP FD.
187°55-1
(D.P.1150906)

238.8 37" 45" 263°

263°

(0.3)

RMGIP FD.
205°41'-0.485
(D.P.226490)

1663
SEE SHEET TWO

SEE SHEET ONE

BRADLEY STREET

1664
82.6ha BY DEDN

611.55

35"

21'

188°

357°

547

35"

545.48

548.34

488.4

55"

26'

188°

98° 01' 35" 844.9

D P 8 7 6 7 4 5

D P 1 1 5 5 0 0 5

D P 2 2 6 4 9 0

D P 2 2 4 8 6 1

D P 2 4 4 6 1 0

D P 8 0 4 4 0 5

D P 8 0 2 4 4 4

D P 8 0 2 5 5 2

D P 8 0 4 4 0 5

SURVEYING & SPATIAL INFORMATION REGULATION 2012 CLAUSE 61(2)

M.G.A. CO ORDINATES (ZONE 56)

MARK	EASTING	NORTHING	CLASS	ORDER	METHOD
TS10866	288 813.476	6 266 558.167	B	2	SCIMS
TS10879	285 291.513	6 256 804.570	B	2	"
PM57931	285 299.920	6 256 802.041	B	2	"
SSM24446	284 656.807	6 257 281.900	B	2	"
SSM24447	284 197.430	6 257 385.486	B	2	"
SSM24448	284 051.954	6 257 397.875	B	2	
SSM176866	285 289.66	6 257 356.56	D	4	
SSM176873	285 254.16	6 257 217.10	"	"	
SSM180436	285 105.93	6 257 245.62	"	"	
SSM176875	285 126.90	6 257 385.79	"	"	

COMBINED SEA LEVEL AND SCALE FACTOR 1.000150

SOURCE M.G.A. CO ORDINATES ADOPTED FOR ESTABLISHED MARKS FROM S.C.I.M.S. OCTOBER, 2012.

Surveyor: Ian Vincent Myers
Vince Morgan Surveyors
Ph.47215293. email: imyers@vmsurvey.com.au
Date of Survey: 6th November, 2012.
Surveyor's Reference: 15771-19C
2011M7100(49)Comp

PLAN OF SUBDIVISION OF
LOTS 1653 & 1654 D.P.1161694,
LOT 1801 D.P.1166848 &
LOT 1 D.P.222144

LGA: PENRITH
Locality: GLENMORE PARK / MULGOA
Subdivision No.: 087/12
Lengths are in metres. Reduction Ratio 1: 4000

Registered: 22.4.2013

D.P.1166869

10 20 30 40 50 60 70 80 90 100 110 120 130 140

PLAN FORM 6(2012) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Registered: 22.4.2013 Office Use Only

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

D.P.1166869

PLAN OF SUBDIVISION OF
LOTS 1653 & 1654 D.P.1161694,
LOT 1801 D.P.1166848 &
LOT 1 D.P.222144

L G A: PENRITH

Locality: GLENMORE PARK / MULGOA

Parish: MULGOA

County: CUMBERLAND

Crown Lands NSW/Western Lands Office Approval

I, ...in approving this plan certify
Authorised Officer
that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature .....

Date:.....

File No: .....

Office:.....

Survey Certificate

I, IAN VINCENT MYERS
of VINCE MORGAN SURVEYORS PTY.LTD.
Ph.47215293. email: imyers@vmsurvey.com.au
a surveyor registered under the Surveying & Spatial Information Act, 2002 certify that:

~~*(a) The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation, 2012, is accurate and the survey was completed on*~~

(b) The part of the land shown in the plan being Lots 1653 to 1663 was surveyed in accordance with the Surveying and Spatial Information Regulation, 2012, is accurate and the survey was completed on 6th November, 2012. the part not surveyed was compiled in accordance with that Regulation.

~~*(c) The land shown in the plan was compiled in accordance with the Surveying and Spatial Information Regulation, 2012.*~~

Signature: I Myers Dated: 6th November, 2012.

Surveyor ID: 1682

Datum Line:TS10879 TO TS10866

Type: URBAN

The terrain is level–undulating

Subdivision Certificate

SC12/0081

I PETER WOOD

*Authorised Person/~~General Manager/Accredited Certifier~~, certify that the provisions of s.109J of the Environmental Planning and Assessment Act, 1979 have been satisfied in relation to the proposed subdivision, new road or reserve set out herein

Signature: .....

Accreditation No. .....

Consent Authority PENRITH CITY COUNCIL

Date of endorsement 7/12/12

Subdivision Certificate No. 087/12

File No. DA10/1232

* strike through if inapplicable

Statements of intention to dedicate public roads, public reserves and drainage reserves.

IT IS INTENDED TO DEDICATE THE EXTENSIONS OF BLUESTONE DRIVE, BINYANG AVENUE AND DARUG AVENUE AND THE SPLAY CORNERS AND FORESTWOOD DRIVE TO THE PUBLIC AS PUBLIC ROAD.

Plans used :–

D.P.1161694
D.P.1166848
D.P.222144
D.P.1155005
D.P.1162982
D.P.1179796

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

SURVEYOR'S REFERENCE: 15771-19C 2011M7100(49)Comp

PLAN FORM 6A (2012) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 22.4.2013

Office Use Only

D.P.1166869

PLAN OF SUBDIVISION OF
LOTS 1653 & 1654 D.P.1161694,
LOT 1801 D.P.1166848 &
LOT 1 D.P.222144

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses – See 60(c) SSI Regulation 2012
- Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act, 1919.
- Signatures and seals – See 195D Conveyancing Act, 1919.
- Any information which cannot fit in the appropriate panel of sheet 1 of the Administration sheets.

Subdivision Certificate No.: 057/12

Date of Endorsement: 7/12/12

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919-1964 AS AMENDED IT IS INTENDED TO CREATE:-

1. RESTRICTIONS ON THE USE OF LAND
2. RESTRICTIONS ON THE USE OF LAND
3. RESTRICTIONS ON THE USE OF LAND
4. EASEMENT TO DRAIN WATER 2 WIDE (E1)
5. EASEMENT FOR ACCESS AND MAINTENANCE 0.9 WIDE (E2)
6. EASEMENT FOR RETAINING WALL SUPPORT 0.9 WIDE (E41)
7. RESTRICTIONS ON THE USE OF LAND

EXECUTED ON BEHALF OF HOLCOMBE PTY LTD ABN 76691030709 BY THE AUTHORISED PERSONS WHOSE SIGNATURES APPEAR BELOW PURSUANT TO SECTION 127 CORPORATIONS ACT 2001

ADRIAN SOUTHWELL - DIRECTOR

ROBERT JOHN WORN - DIRECTOR

Executed for and on behalf of Lensworth Glenmore Park Ltd ACN 007 533 888 by its duly authorised attorney under Power of Attorney registered in Book 4624 No. 95 who declares that he has no notification of revocation of the said Power of Attorney in the presence of:

Dan Sondersko/ Lunoe

Signature of Witness

DAVID COFFEY

Name of Witness

133 Castlereagh Street, Sydney

Address of Witness

Westpac Banking Corporation
ABN 33 007 457 141
Under Power of Attorney Book 4299 No. 332

By MICHAEL HARRINGTON

I certify that the Attorney for the Mortgage, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this in my presence.

Signature of Witness:

Name of Witness: GLYN CHONG

Address of Witness: KIM STREET CONCORD WEST

SIGNATORY MUST HAVE PRODUCED IDENTIFYING DOCUMENTATION

STREET ADDRESSES NOT AVAILABLE

SURVEYOR'S REFERENCE: 15771-19C 2011M7100(49)Comp

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
6/5/2020 2:08PM

FOLIO: 1/222144

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 9919 FOL 8

Recorded	Number	Type of Instrument	C.T. Issue
4/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
29/4/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
11/11/1993		AMENDMENT: LOCAL GOVT AREA	
6/9/1995	O514297	TRANSFER	EDITION 1
29/3/1996	2052356	TRANSFER	
29/3/1996	2052357	MORTGAGE	EDITION 2
28/1/1999	5552276	DISCHARGE OF MORTGAGE	
28/1/1999	5552277	TRANSFER	
28/1/1999	5552278	MORTGAGE	EDITION 3
4/5/2004	AA610672	DISCHARGE OF MORTGAGE	EDITION 4
19/12/2005	AB995609	MORTGAGE	EDITION 5
28/1/2011	AF964436	REQUEST	EDITION 6
26/10/2012	DP1179796	DEPOSITED PLAN	EDITION 7
26/2/2013	AH385279	CANCELLATION OR EXTINGUISHMENT OF AN EASEMENT	
26/2/2013	AH385280	CANCELLATION OR EXTINGUISHMENT OF AN EASEMENT	
26/2/2013	AH385281	CANCELLATION OR EXTINGUISHMENT OF AN EASEMENT	
26/2/2013	AH385282	CANCELLATION OF RECORDING OF ABANDONED EASEMENT	
22/4/2013	DP1166869	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

advlegs PRINTED ON 6/5/2020

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
6/5/2020 10:24AM

FOLIO: 2/1067073

First Title(s): OLD SYSTEM
Prior Title(s): 104/1050042 880/1060475

Recorded	Number	Type of Instrument	C.T. Issue
5/5/2004	DP1067073	DEPOSITED PLAN	FOLIO CREATED EDITION 1
28/10/2004	AB55927	DISCHARGE OF MORTGAGE	
28/10/2004	AB55928	TRANSFER	EDITION 2
24/12/2004	AB186093	TRANSFER	EDITION 3
31/1/2006	DP1089978	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

advlegs PRINTED ON 06/5/2020

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
6/5/2020 12:43PM

FOLIO: 1663/1166869

First Title(s): OLD SYSTEM
Prior Title(s): 1/222144 1801/1166848

Recorded	Number	Type of Instrument	C.T. Issue
22/4/2013	DP1166869	DEPOSITED PLAN	FOLIO CREATED EDITION 1
6/6/2013	AH783006	DEPARTMENTAL DEALING	
7/6/2013	AH787679	DISCHARGE OF MORTGAGE	
7/6/2013	AH787680	TRANSFER WITHOUT MONETARY CONSIDERATION	EDITION 2
1/8/2013	AH912367	REQUEST	EDITION 3
18/8/2014	AI814191	TRANSFER	EDITION 4
5/2/2015	AJ144168	RELEASE OR EXTINGUISHMENT OF RESTRICTION ON THE USE OF LAND	EDITION 5
14/7/2015	AJ650667	REQUEST	EDITION 6

*** END OF SEARCH ***

advlegs PRINTED ON 6/5/2020

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1663/1166869

SEARCH DATE	TIME	EDITION NO	DATE
6/5/2020	12:43 PM	6	14/7/2015

LAND

LOT 1663 IN DEPOSITED PLAN 1166869
AT GLENMORE PARK
LOCAL GOVERNMENT AREA PENRITH
PARISH OF MULGOA COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1166869

FIRST SCHEDULE

THE MINISTER FOR EDUCATION (T AI814191)

SECOND SCHEDULE (9 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S) WITHIN THE PART(S) SHOWN SO INDICATED IN THE TITLE DIAGRAM
2 DP1109846 RESTRICTION(S) ON THE USE OF LAND AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP1153497 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (3) IN THE S.88B INSTRUMENT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP1153497 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (4) IN THE S.88B INSTRUMENT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
5 DP1153498 EASEMENT FOR RETAINING WALL SUPPORT 0.5 METRE(S) WIDE APPURTENANT TO THE PART SHOWN SO BENEFITED IN THE TITLE DIAGRAM
6 DP1153499 EASEMENT FOR RETAINING WALL SUPPORT 0.5 METRE(S) WIDE APPURTENANT TO THE PART SHOWN SO BENEFITED IN THE TITLE DIAGRAM
7 DP1161693 EASEMENT FOR PADMOUNT SUBSTATION 2.75 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
8 DP1161693 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (9) IN THE S.88B INSTRUMENT AFFECTING THE SITE DESIGNATED (R1) IN THE TITLE DIAGRAM
9 DP1161693 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (10) IN THE S.88B INSTRUMENT AFFECTING THE SITE DESIGNATED (R2) IN THE TITLE DIAGRAM

NOTATIONS

END OF PAGE 1 - CONTINUED OVER

NOTATIONS (CONTINUED)

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Appendix D: Borehole & Test pit Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP1 **1/1**

SDUP1: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown and grey brown, trace of igneous and siltstone gravel, ash and root fibres.	w<PL			8.8kg BUCKET NO FCF
	■		■		■									12.63kg BUCKET NO FCF
	■				■		0.5			FILL: Silty clay, low to medium plasticity, brown and red brown mottled grey, trace of igneous siltstone and sandstone gravel.				
	■				■									12.66kg BUCKET NO FCF
							1			FILL: Silty clay, low to medium plasticity, brown, with siltstone gravel.				
										END OF TEST PIT AT 1.3m				EXCAVATOR REFUSAL
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP3 **1/1**

SDUP3: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown, with siltstone gravel, trace of sandstone gravel.	w<PL			GRASS COVER 11.75kg BUCKET NO FCF 12.48kg BUCKET NO FCF
							0.5							
							1			FILL: Silty clay, low to medium plasticity, brown mottled red, orange and grey, trace of siltstone gravel and clay nodules.				12.21kg BUCKET NO FCF
							1.5							
										END OF TEST PIT AT 1.8m				'TC' BIT REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP5 **1/1**

SDUP5: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown and grey brown, trace of igneous and siltstone gravel, and root fibres.	w<PL			GRASS COVER 10.23kg BUCKET NO FCF
							0.5			FILL: Silty clay, low to medium plasticity, brown and grey brown mottled red, with igneous and siltstone gravel, trace of ash.				13.55kg BUCKET NO FCF
							1			FILL: Silty clay, low to medium plasticity, brown mottled red and grey, trace of siltstone gravel.				12.26kg BUCKET NO FCF
							1.5							
							2			END OF TEST PIT AT 2.0m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP7** **1/1**

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, grey mottled orange brown and red brown, trace of igneous and siltstone gravel.	w<PL			GRASS COVER 0.0-0.1 NO FCF 9.02kg BUCKET NO FCF
	■		■		■		0.5			FILL: Silty clay, low to medium plasticity, brown and grey mottled red and orange, with siltstone gravel, trace of timber fragments.				10.64kg BUCKET NO FCF
	■		■		■		1			FILL: Silty clay, low to medium plasticity, brown, with siltstone gravel.				12.31kg BUCKET NO FCF
							1.5			END OF TEST PIT AT 1.5m				EXCAVATOR REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP9 **1/1**

SDUP9: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel, ash and root fibres.	w<PL			12.26kg BUCKET NO FCF
										FILL: Silty clay, low to medium plasticity, brown and grey brown, trace of igneous, sandstone and siltstone gravel.				13.04kg BUCKET NO FCF
							0.5							
							1							11.96kg BUCKET NO FCF
							1.5							
							2			END OF TEST PIT AT 2.0m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP11 1/1

SDUP11: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown mottled red and grey, trace of ash, igneous gravel and root fibres.	w<PL			GRASS COVER 9.02kg BUCKET NO FCF
	■		■		■		0.5			FILL: Silty gravelly clay, low to medium plasticity, brown and grey, with siltstone gravel, trace of siltstone cobbles, glass and plastic.				14.52kg BUCKET NO FCF
	■		■		■		1							12.79kg BUCKET NO FCF
	■		■		■		1.5							
										END OF TEST PIT AT 1.8m				EXCAVATOR REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP13 1/1

SDUP13: 0.3m-0.5m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown and grey brown, trace of igneous and siltstone gravel, ash and root fibres.	w<PL			11.28kg BUCKET NO FCF
														12.28kg BUCKET NO FCF
							0.5			FILL: Silty gravelly clay, low to medium plasticity, brown and red brown, siltstone gravel.				
										FILL: Silty clay, low to medium plasticity, brown and red brown mottled grey, trace of sandstone and siltstone gravel.				13.46kg BUCKET NO FCF
							1							
							1.5							10.65kg BUCKET NO FCF
										END OF TEST PIT AT 1.8m				EXCAVATOR REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP15 1/1

SDUP15: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty gravelly clay, low to medium plasticity, brown and grey brown, siltstone gravel.	w<PL			12.68kg BUCKET NO FCF
										FILL: Silty clay, low to medium plasticity, brown, grey brown and orange brown, with siltstone gravel.				12.26kg BUCKET NO FCF
							0.5							
							1							11.78kg BUCKET NO FCF
							1.5			END OF TEST PIT AT 1.5m				EXCAVATOR REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP17 1/1

SDUP17: 0.2m-0.3m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown mottled brown and grey, trace of siltstone gravel, ash and root fibres.	w<PL			10.20kg BUCKET NO FCF
										FILL: Silty clay, low to medium plasticity, brown and red brown mottled orange and grey, trace of siltstone gravel.				10.12kg BUCKET NO FCF
							0.5							
							1							10.94kg BUCKET NO FCF
	■		■				1.5							
										END OF TEST PIT AT 1.8m				EXCAVATOR REFUSAL
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP19 **1/1**

SDUP19: 0.3m-0.5m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: E33177PA **Method:** TEST PIT EXCAVATOR **R.L. Surface:** N/A

Date: 12/5/20 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES 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			FILL: Silty clay, low to medium plasticity, brown and red brown, trace of igneous and siltstone gravel, ash and root fibres.	w<PL			13.24kg BUCKET NO FCF
	■		■		■					FILL: Silty clay, low to medium plasticity, brown mottled red and orange, trace of igneous, sandstone and siltstone gravel and plastic.				13.04kg BUCKET NO FCF
	■		■		■		0.5							
	■		■		■		1							12.86kg BUCKET NO FCF
	■		■		■		1.5							
							2			END OF TEST PIT AT 2.0m				
							2.5							
							3							
							3.5							

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BOREHOLE LOG

Borehole No. 2

1 / 1

SDUP2: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of medium to coarse grained igneous gravel.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 24 6,9,15					FILL: Silty clay, med plasticity, brown mottled red brown and light grey, trace of fine to medium grained igneous, ironstone and siltstone gravel, and ash.			>600 >600 >600	APPEARS WELL COMPACTED
						59	1							
					N = 15 6,6,9								370 360 240	
						58	2							
					N = 8 2,3,5	57	3			FILL: Silty clay, medium plasticity, grey and brown, with fine to medium grained igneous and siltstone gravel.	w~PL		150 120 140	APPEARS MODERATELY COMPACTED
										FILL: Silty clay, medium plasticity, brown mottled red brown, trace of fine to medium grained igneous and siltstone gravel.				
						56	4							
					N = 27 4,11,16								300 430 470	APPEARS WELL COMPACTED
▶						55	5			FILL: Gravelly silty clay, medium plasticity, light grey and grey, medium to coarse grained igneous and siltstone gravel.	w<PL w>PL			
					N = 13 5,5,8	54	6						200 400 470	
										END OF BOREHOLE AT 6.45 m				

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BOREHOLE LOG

Borehole No. 4 1 / 1

SDUP4: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~59.2 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						59				FILL: Silty clay, medium plasticity, brown, with medium to coarse grained igneous and siltstone gravel, trace of fine to medium grained sand, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED APPEARS WELL COMPACTED
					N = 29 9,16,13								>600 >600 >600	
						58	1			as above, but low to medium plasticity, brown mottled red brown.				
					N = 21 10,8,13								>600 >600 >600	
						57	2							
					N = 26 12,13,13	56	3						>600 >600 >600	
							4							
					N = 20 4,9,11	55				FILL: Silty clay, medium plasticity, brown and grey mottled red brown, with fine to coarse grained siltstone and igneous gravel.	w~PL		420 260 300	
						54	5							
					N = 20 8,8,12	53	6							
										END OF BOREHOLE AT 6.45 m				

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BOREHOLE LOG

Borehole No. 6 1 / 2

SDUP6: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60.9 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						60	1			FILL: Silty clay, medium plasticity, brown, trace of fine to coarse grained igneous, ironstone and siltstone gravel, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 26 8,14,12								>600 >600 >600	APPEARS WELL COMPACTED
					N = 14 5,6,8	59	2			FILL: Silty clay, medium plasticity, brown and grey, with coarse grained igneous and siltstone gravel, trace of fine grained sand.			480 500	
					N = 7 3,4,3	58	3				w~PL		480 190 450	APPEARS MODERATELY COMPACTED
ON COMPLETION					N > 10 2,4,6/ 10mm REFUSAL	57	4						320 380 390	APPEARS WELL COMPACTED
						56	5							
					N = 17 3,7,10	55	6			FILL: Silty clay, medium plasticity, grey and brown, with medium to coarse grained igneous and siltstone gravel.	w<PL		450 520 430	
						54					w>PL			APPEARS MODERATELY COMPACTED

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BOREHOLE LOG

Borehole No. 6 **2 / 2**

SDUP6: 0.0m-0.1m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60.9 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	■					53	8			FILL: Silty clay, medium plasticity, grey and brown, with medium to coarse grained igneous and siltstone gravel. *(continued)*	w>PL			APPEARS MODERATELY COMPACTED
	■					52	9							
	■					51	10							
				■	N = 9 5,4,5	50	11						70 40 60	
	■					49	12							
				■	N = 8 2,3,5								170 180 140	
						48	13			END OF BOREHOLE AT 12.45 m				
						47								

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BOREHOLE LOG

Borehole No. 8 1 / 1

SDUP8: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown mottled red brown, trace of medium to coarse grained igneous and siltstone gravel, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 20 3,10,10								>600 >600 >600	APPEARS WELL COMPACTED
						59	1							
					N = 25 8,8,17								>600 >600 >600	
AFTER 1 HR ON 7 DAYS						58	2							
					N = 15 9,8,7	57	3			FILL: Gravelly silty clay, medium plasticity, grey and brown, medium to coarse grained igneous and siltstone gravel.				
						56	4			FILL: Silty clay, medium plasticity, brown mottled orange brown and grey, trace of fine to medium grained siltstone gravel.	w>PL			GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.0m TO 6.0m. CASING 0.1m TO 3.0m. 2mm SAND FILTER PACK 2.4m TO 6.0m. BENTONITE SEAL 0.1m TO 2.4m. COMPLETED WITH A CONCRETED GATIC COVER.
					N = 12 2,5,7								210 220 260	
						55	5							
					N = 5 2,2,3	54	6			FILL: Gravelly silty clay, medium plasticity, grey, medium to coarse grained siltstone gravel.			150 160	APPEARS MODERATELY COMPACTED
										END OF BOREHOLE AT 6.45 m				

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BOREHOLE LOG

Borehole No. 10

1 / 2

SDUP10: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~59.3 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						59				FILL: Silty clay, medium plasticity, brown, trace of medium to coarse grained igneous and siltstone gravel, fine grained sand, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 23 7,10,13								>600 >600 >600	APPEARS WELL COMPACTED
						58	1							
					N = 27 14,14,13					as above, but brown and grey, with medium to coarse grained igneous, sandstone and siltstone gravel.			>600 >600 >600	
						57	2							
					N = 21 6,9,12					as above, but brown and grey mottled red brown.	w~PL		>600 >600 >600	
						56	3							
							4							
					N = 14 6,6,8	55				FILL: Silty clay, medium to high plasticity, grey, red brown and orange brown, with medium to coarse grained siltstone gravel.			300 310 350	
						54	5							
					N = 10 5,4,6		6			FILL: Silty clay, low plasticity, brown, with fine to medium grained siltstone gravel.	w<PL		>600 >600	APPEARS MODERATELY COMPACTED
						53					w>PL		120 110	

JK 9.02.4 LIB:GLB Log JK AUGERHOLE - MASTER 33177PN GLENMOREPARK.GPJ <<DrawingFile>> 02/06/2020 12:26 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

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BOREHOLE LOG

Borehole No. 10 **2 / 2**

SDUP10: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~59.3 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
▶	■					52				FILL: Silty clay, medium plasticity, yellow brown, trace of fine grained sand, and fine to medium grained ironstone gravel.	w>PL			APPEARS MODERATELY COMPACTED
						51	8							
	■													
				■	N = 6 2,2,4	50	9						100 80 150	
						49	10							
	■													
				■	N = 22 5,15,7	48	11			FILL: Silty clay, low plasticity, grey and dark grey, with medium to coarse grained siltstone gravel.				APPEARS WELL COMPACTED
						47	12						110 120 150	
						46	13			END OF BOREHOLE AT 12.45 m				

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BOREHOLE LOG

Borehole No. 12

1 / 1

SDUP12: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown grey, trace of fine to medium grained igneous and ironstone gravel, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 22 4,9,13	60	1			FILL: Silty clay, medium plasticity, grey and brown, with medium to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.			>600 >600 >600	APPEARS WELL COMPACTED
					N = 12 5,5,7	59	2			FILL: Silty clay, medium plasticity, brown and grey, with medium to coarse grained igneous, ironstone and siltstone gravel.	w~PL		380 390 360	
					N = 7 4,3,4	58	3						280 250 220	APPEARS MODERATELY COMPACTED
					N = 21 12,10,11	57	4			FILL: Silty clay, medium plasticity, grey, with medium to coarse grained siltstone gravel.	w<PL		>450 >600 >600	APPEARS WELL COMPACTED
						56	5							
					N=SPT 10/ 20mm REFUSAL	55	6			END OF BOREHOLE AT 6.02 m				SPT REFUSAL ON OBSTRUCTION IN FILL
						54								

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BOREHOLE LOG

Borehole No. 14

1 / 1

SDUP14: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~60.1 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						60				FILL: Silty clay, medium plasticity, brown and grey, with fine to coarse grained igneous, ironstone and siltstone gravel.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 16 5,6,10								>600 >600 >600	APPEARS WELL COMPACTED
						59	1							
					N = 17 8,7,10								>600 >600 >600	
						58	2							
					N = 22 8,12,10	57	3						>600 >600 >600	
						56	4							
					N = 12 7,6,6								>600 >600 450	
						55	5							
					N = 8 3,3,5	54	6				w>PL		200 290 240	APPEARS MODERATELY COMPACTED
										END OF BOREHOLE AT 6.45 m				

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BOREHOLE LOG

Borehole No. 16 **1 / 2**

SDUP16: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~63.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of igneous, ironstone, sandstone and siltstone gravel, and fine grained sand.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
											w~PL		410 250 260	APPEARS POORLY TO MODERATELY COMPACTED
					N = 5 4,3,2	63	1							
					N = 18 5,8,10	62	2			FILL: Silty clay, medium plasticity, grey and brown, with medium to coarse grained igneous and ironstone gravel.	w<PL		>600 >600 >600	APPEARS WELL COMPACTED
					N = 7 3,3,4	61	3			FILL: Silty clay, medium to high plasticity, brown and grey, with fine to coarse grained igneous, ironstone and siltstone gravel.	w~PL		270 310 360	APPEARS MODERATELY COMPACTED
▶						60	4			FILL: Gravelly silty clay, medium plasticity, grey mottled brown, with medium to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.	w>PL			APPEARS MODERATELY TO WELL COMPACTED
					N = 12 2,6,6	59	5						210 150 160	
						58	6			FILL: Silty clay, medium plasticity, grey and brown, with fine to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.				
					N = 11 5,5,6	57							220 270 210	

JK 9.02.4 LIB:GLB Log JK AUGERHOLE - MASTER 33177PN GLENMOREPARK.GPJ <<DrawingFile>> 02/06/2020 12:26 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

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BOREHOLE LOG

Borehole No. 16 **2 / 2**

SDUP16: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~63.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						56	8			FILL: Silty clay, medium plasticity, grey and brown, with fine to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel. *(continued)*	w>PL			APPEARS MODERATELY TO WELL COMPACTED
	■									FILL: Gravelly silty clay, medium plasticity, grey, fine to coarse grained sandstone and siltstone gravel.				APPEARS WELL COMPACTED
				■	N = 18 5,5,13	55	9							TOO GRAVELLY FOR HP TESTING
						54	10							
	■					53	11			FILL: Silty clay, medium to high plasticity, grey mottled brown, with medium to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.				
				■	N = 23 5,11,12	52	12						380 430 400	
						51	13			END OF BOREHOLE AT 12.45 m				
						50								

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BOREHOLE LOG

Borehole No. 18

1 / 1

SDUP18: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~62.7 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of fine to medium grained igneous, ironstone and siltstone gravel, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 14 7,5,9	62	1			FILL: Silty clay, medium plasticity, brown and grey, with fine to medium grained igneous, ironstone and siltstone gravel.			>600 >600 >600	APPEARS WELL COMPACTED
					N = 16 4,6,10	61	2						>600 >600 >600	
					N = 14 8,6,8	60	3						360 420 390	
					N = 28 6,11,17	59	4						>600 >600 >600	
					N = 27 7,11,16	58	5						>600 >600 >600	
						57	6							
						56				END OF BOREHOLE AT 6.45 m				

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BOREHOLE LOG

Borehole No. 20 **1 / 2**

SDUP20: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~61.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of fine to medium grained igneous and ironstone gravel, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 6 3,3,3	61	1			FILL: Silty clay, medium plasticity, brown, trace of medium to coarse grained igneous, ironstone and siltstone gravel.	w~PL		400 >600 480	APPEARS MODERATELY COMPACTED
					N = 6 2,3,3	60	2						150 210 200	
					N = 13 6,6,7	59	3			FILL: Silty clay, medium plasticity, brown and grey, trace of fine to coarse grained ironstone and siltstone gravel.	w<PL		>600 330 350	APPEARS MODERATELY TO WELL COMPACTED
					N = 9 5,4,5	58	4						400 400 410	
					N = 24 6,10,14	57	5						410 510 500	
						56	6			FILL: Silty clay, medium plasticity, grey mottled brown, with fine to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.				APPEARS WELL COMPACTED
						55								

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BOREHOLE LOG

Borehole No. 20 **2 / 2**

SDUP20: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~61.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	■					54	8			FILL: Silty clay, medium plasticity, grey mottled brown, with fine to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel. *(continued)*	w<PL			
				■	N = 8 2,3,5	53	9			FILL: Silty clay, medium plasticity, grey mottled brown, trace of fine to medium grained ironstone and siltstone gravel.	w~PL		550 190 220	APPEARS MODERATELY TO WELL COMPACTED
	■					52	10							
						51	11			FILL: Silty clay, medium to high plasticity, brown mottled light grey and red brown, trace of fine to medium grained ironstone and siltstone gravel.				
				■	N = 10 2,4,6	50	12						240 350 250	
						49	13			END OF BOREHOLE AT 12.45 m				
						48								

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BOREHOLE LOG

Borehole No. 21

1 / 1

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~58.3 m

Date: 11/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						58				FILL: Silty clay, medium plasticity, brown, trace of fine to medium grained igneous, ironstone, sandstone and siltstone gravel, fine grained sand, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
					N = 23 6,11,12		1						>600 >600 >600	APPEARS WELL COMPACTED
						57				as above, but brown and light grey, with medium to coarse grained igneous and siltstone gravel.				
					N = 25 7,10,15		2						>600 >600 >600	
						56								
					N = 8 4,3,5		3			as above, but mottled yellow brown, with medium to coarse grained ironstone gravel, and trace of fine grained sand.	w~PL		390 390 500	APPEARS MODERATELY COMPACTED
						55								
							4							
						54				FILL: Silty clay, low to medium plasticity, dark brown and grey, with medium to coarse grained ironstone and siltstone gravel.				
					N = 9 2,4,5		5						300 130 210	
						53								
					N = 6 2,3,3		6			FILL: Silty clay, medium plasticity, light brown, with medium to coarse grained ironstone and siltstone gravel.	w>PL		150 150 180	
						52								
										END OF BOREHOLE AT 6.45 m				

JKGeotechnics

BOREHOLE LOG

Borehole No. 22
1 / 1

SDUP22: 0.0m-0.2m

Client: NSW DEPARTMENT OF EDUCATION

Project: PROPOSED PUBLIC SCHOOL

Location: 1-23 FORESTWOOD DRIVE, GLENMORE PARK, NSW

Job No.: 33177PN **Method:** SPIRAL AUGER **R.L. Surface:** ~61.8 m

Date: 12/5/20 **Datum:** ASSUMED

Plant Type: JK500 **Logged/Checked By:** J.L./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m ASSUMED)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									FILL: Silty clay, medium plasticity, brown mottled orange brown, trace of fine to medium grained igneous, ironstone, sandstone and siltstone gravel, fine to medium grained sand, roots and root fibres.	w<PL			GRASS COVER TOP 100mm ROOT AFFECTED
				■	N = 18 8,8,10	61	1			FILL: Silty clay, medium plasticity, grey and brown, with medium to coarse grained siltstone gravel, trace of fine to medium grained ironstone gravel.			>600 >600 >600	APPEARS WELL COMPACTED
				■	N = 22 7,10,12	60	2						>600 >600 >600	
				■	N = 14 7,8,6	59	3						>600 510 450	
				■	N = 12 6,6,6	58	4						450 450 >600	
				■	N = 18 7,8,10	57	5						>600 >600 >600	
						56	6			END OF BOREHOLE AT 6.45 m				
						55								

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

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:

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

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:

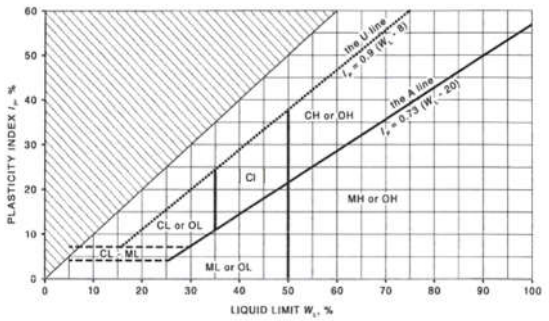
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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.

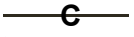
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

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.
		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.
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 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.
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.

Log Column	Symbol	Definition
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)	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 E: Laboratory Reports & COC Documents

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CERTIFICATE OF ANALYSIS 242855

Client Details

Client	Environmental Investigation Services
Attention	A Barkway
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33177PA, Glenmore Park**
Number of Samples	134 soil
Date samples received	14/05/2020
Date completed instructions received	14/05/2020

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	21/05/2020
Date of Issue	20/05/2020

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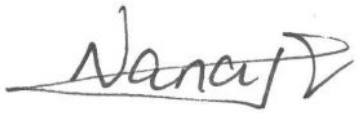
Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242855-1	242855-4	242855-10	242855-13	242855-18
Your Reference	UNITS	TP1	BH2	TP3	BH4	TP5
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	11/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	94	92	92	91	92

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242855-22	242855-33	242855-35	242855-36	242855-42
Your Reference	UNITS	BH6	TP7	TP7	BH8	TP9
Depth		0.0-0.1	0.0-0.1	1.3-1.4	0.0-0.2	0.0-0.1
Date Sampled		11/05/2020	12/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	75	93	90	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242855-46	242855-56	242855-59	242855-65	242855-69
Your Reference	UNITS	BH10	TP11	BH12	TP13	BH14
Depth		0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		11/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	18/05/2020	15/05/2020	15/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	91	91	88	93

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242855-75	242855-78	242855-86	242855-89	242855-95
Your Reference	UNITS	TP15	BH16	TP17	BH18	TP19
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	91	94	95	95

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		242855-98	242855-113	242855-133	242855-134
Your Reference	UNITS	BH20	SDUP1	TS-S1	TB-S1
Depth		0.0-0.2	-	-	-
Date Sampled		12/05/2020	12/05/2020	11/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	99%	<0.2
Toluene	mg/kg	<0.5	<0.5	98%	<0.5
Ethylbenzene	mg/kg	<1	<1	99%	<1
m+p-xylene	mg/kg	<2	<2	100%	<2
o-Xylene	mg/kg	<1	<1	100%	<1
naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	94	91	84	94

svTRH (C10-C40) in Soil						
Our Reference		242855-1	242855-4	242855-10	242855-13	242855-18
Your Reference	UNITS	TP1	BH2	TP3	BH4	TP5
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	11/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	110	110	110	113	109

svTRH (C10-C40) in Soil						
Our Reference		242855-22	242855-33	242855-35	242855-36	242855-42
Your Reference	UNITS	BH6	TP7	TP7	BH8	TP9
Depth		0.0-0.1	0.0-0.1	1.3-1.4	0.0-0.2	0.0-0.1
Date Sampled		11/05/2020	12/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	113	107	111	109	108

svTRH (C10-C40) in Soil						
Our Reference		242855-46	242855-56	242855-59	242855-65	242855-69
Your Reference	UNITS	BH10	TP11	BH12	TP13	BH14
Depth		0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		11/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	110	106	113	111	108

svTRH (C10-C40) in Soil						
Our Reference		242855-75	242855-78	242855-86	242855-89	242855-95
Your Reference	UNITS	TP15	BH16	TP17	BH18	TP19
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	107	113	106	108	101

svTRH (C10-C40) in Soil			
Our Reference		242855-98	242855-113
Your Reference	UNITS	BH20	SDUP1
Depth		0.0-0.2	-
Date Sampled		12/05/2020	12/05/2020
Type of sample		soil	soil
Date extracted	-	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	109	110

PAHs in Soil						
Our Reference		242855-1	242855-4	242855-10	242855-13	242855-18
Your Reference	UNITS	TP1	BH2	TP3	BH4	TP5
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	11/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	114	116	96	99	110

PAHs in Soil						
Our Reference		242855-22	242855-33	242855-36	242855-42	242855-46
Your Reference	UNITS	BH6	TP7	BH8	TP9	BH10
Depth		0.0-0.1	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		11/05/2020	12/05/2020	11/05/2020	12/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	108	120	124	125	125

PAHs in Soil						
Our Reference		242855-56	242855-59	242855-65	242855-69	242855-75
Your Reference	UNITS	TP11	BH12	TP13	BH14	TP15
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	124	113	115	121	130

PAHs in Soil						
Our Reference		242855-78	242855-86	242855-89	242855-95	242855-98
Your Reference	UNITS	BH16	TP17	BH18	TP19	BH20
Depth		0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	127	128	103	125	107

PAHs in Soil		
Our Reference		242855-113
Your Reference	UNITS	SDUP1
Depth		-
Date Sampled		12/05/2020
Type of sample		soil
Date extracted	-	15/05/2020
Date analysed	-	15/05/2020
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	124

Organochlorine Pesticides in soil						
Our Reference		242855-1	242855-10	242855-18	242855-33	242855-46
Your Reference	UNITS	TP1	TP3	TP5	TP7	BH10
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	108	88	121	127

Organochlorine Pesticides in soil						
Our Reference		242855-56	242855-65	242855-75	242855-86	242855-98
Your Reference	UNITS	TP11	TP13	TP15	TP17	BH20
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	98	104	112	115

Organophosphorus Pesticides in Soil						
Our Reference		242855-1	242855-10	242855-18	242855-33	242855-46
Your Reference	UNITS	TP1	TP3	TP5	TP7	BH10
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	108	88	121	127

Organophosphorus Pesticides in Soil						
Our Reference		242855-56	242855-65	242855-75	242855-86	242855-98
Your Reference	UNITS	TP11	TP13	TP15	TP17	BH20
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	98	104	112	115

PCBs in Soil						
Our Reference		242855-1	242855-10	242855-18	242855-33	242855-46
Your Reference	UNITS	TP1	TP3	TP5	TP7	BH10
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	108	88	121	127

PCBs in Soil						
Our Reference		242855-56	242855-65	242855-75	242855-86	242855-98
Your Reference	UNITS	TP11	TP13	TP15	TP17	BH20
Depth		0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	98	104	112	115

Acid Extractable metals in soil						
Our Reference		242855-1	242855-4	242855-10	242855-13	242855-18
Your Reference	UNITS	TP1	BH2	TP3	BH4	TP5
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	11/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Arsenic	mg/kg	6	5	7	8	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	9	9	11	9
Copper	mg/kg	24	36	32	30	33
Lead	mg/kg	16	16	18	16	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	19	14	14	15
Zinc	mg/kg	50	75	55	55	61

Acid Extractable metals in soil						
Our Reference		242855-22	242855-33	242855-36	242855-42	242855-46
Your Reference	UNITS	BH6	TP7	BH8	TP9	BH10
Depth		0.0-0.1	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		11/05/2020	12/05/2020	11/05/2020	12/05/2020	11/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Arsenic	mg/kg	7	<4	5	7	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	4	8	11	10
Copper	mg/kg	24	10	18	23	29
Lead	mg/kg	13	6	12	15	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	16	2	7	9	12
Zinc	mg/kg	57	10	30	36	47

Acid Extractable metals in soil						
Our Reference		242855-56	242855-59	242855-65	242855-69	242855-75
Your Reference	UNITS	TP11	BH12	TP13	BH14	TP15
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Arsenic	mg/kg	6	6	8	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	12	10	10	7
Copper	mg/kg	26	25	29	24	27
Lead	mg/kg	17	17	17	15	13
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	10	12	10	11
Zinc	mg/kg	45	38	47	39	42

Acid Extractable metals in soil						
Our Reference		242855-78	242855-86	242855-89	242855-95	242855-98
Your Reference	UNITS	BH16	TP17	BH18	TP19	BH20
Depth		0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Arsenic	mg/kg	6	7	8	7	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	9	9	7	10
Copper	mg/kg	41	33	32	27	32
Lead	mg/kg	26	17	21	19	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	14	13	14	12	14
Zinc	mg/kg	62	71	54	51	61

Acid Extractable metals in soil			
Our Reference		242855-113	242855-135
Your Reference	UNITS	SDUP1	TP17 - [TRIPLICATE]
Depth		-	0.0-0.1
Date Sampled		12/05/2020	12/05/2020
Type of sample		soil	soil
Date prepared	-	15/05/2020	15/05/2020
Date analysed	-	15/05/2020	15/05/2020
Arsenic	mg/kg	8	6
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	12	9
Copper	mg/kg	27	28
Lead	mg/kg	22	12
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	11	14
Zinc	mg/kg	48	48

Moisture						
Our Reference		242855-1	242855-4	242855-10	242855-13	242855-18
Your Reference	UNITS	TP1	BH2	TP3	BH4	TP5
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	11/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Moisture	%	7.6	8.0	7.3	7.8	5.3

Moisture						
Our Reference		242855-22	242855-33	242855-35	242855-36	242855-42
Your Reference	UNITS	BH6	TP7	TP7	BH8	TP9
Depth		0.0-0.1	0.0-0.1	1.3-1.4	0.0-0.2	0.0-0.1
Date Sampled		11/05/2020	12/05/2020	12/05/2020	11/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Moisture	%	8.4	6.0	6.5	7.4	9.1

Moisture						
Our Reference		242855-46	242855-56	242855-59	242855-65	242855-69
Your Reference	UNITS	BH10	TP11	BH12	TP13	BH14
Depth		0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2
Date Sampled		11/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Moisture	%	8.4	8.0	10	12	8.1

Moisture						
Our Reference		242855-75	242855-78	242855-86	242855-89	242855-95
Your Reference	UNITS	TP15	BH16	TP17	BH18	TP19
Depth		0.0-0.1	0.0-0.2	0.0-0.1	0.0-0.2	0.0-0.1
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/05/2020	15/05/2020	15/05/2020	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020	18/05/2020	18/05/2020	18/05/2020
Moisture	%	8.0	8.6	9.2	8.1	7.5

Moisture			
Our Reference		242855-98	242855-113
Your Reference	UNITS	BH20	SDUP1
Depth		0.0-0.2	-
Date Sampled		12/05/2020	12/05/2020
Type of sample		soil	soil
Date prepared	-	15/05/2020	15/05/2020
Date analysed	-	18/05/2020	18/05/2020
Moisture	%	5.3	8.2

Asbestos ID - soils NEPM - ASB-001						
Our Reference		242855-18	242855-33	242855-57	242855-75	242855-96
Your Reference	UNITS	TP5	TP7	TP11	TP15	TP19
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	0.3-0.5
Date Sampled		12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	19/05/2020	19/05/2020	19/05/2020	19/05/2020	19/05/2020
Sample mass tested	g	612.47	522.51	737.46	802.62	685.77
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			18/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	96	95
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	96	95
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	98	98
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	93	93
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	95	92
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	98	96
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	92	89
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	91	1	94	92	2	91	92

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	46	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	46	15/05/2020	15/05/2020		18/05/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	46	<25	<25	0	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	46	<25	<25	0	94	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	46	<0.2	<0.2	0	97	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	46	<0.5	<0.5	0	91	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	46	<1	<1	0	91	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	46	<2	<2	0	95	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	46	<1	<1	0	89	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	46	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	46	92	85	8	90	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		[NT]	[NT]
Date analysed	-			[NT]	86	18/05/2020	18/05/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	86	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	86	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	86	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	86	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	86	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	86	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	86	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	86	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	86	94	95	1	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	82
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	87
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	77	107
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	82
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	87
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	77	107
Surrogate o-Terphenyl	%		Org-020	105	1	110	111	1	130	110

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	86	<50	<50	0	74	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	86	<100	<100	0	124	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	86	<100	<100	0	92	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	86	<50	<50	0	74	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	86	<100	<100	0	124	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	86	<100	<100	0	92	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	86	106	103	3	124	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	96
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	86
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	98
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	90
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	92
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	72
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	96	86
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	139	1	114	104	9	79	78

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	104	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	96	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	124	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	120	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	78	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	76	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	86	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	86	<0.05	<0.05	0	98	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	86	128	119	7	113	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	98
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	107
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	86
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	112
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	130	94
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	100
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	118
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	75
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	71
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	70
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	90	1	101	103	2	104	98

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	96	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	104	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	122	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	130	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	126	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	124	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	94	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	102	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	83	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	72	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	86	112	132	16	90	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	92
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	104
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	100
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	120
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	110
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	122
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	134	120
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	90	1	101	103	2	104	98

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	78	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	121	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	98	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	98	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	100	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	126	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	128	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	86	112	132	16	90	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date extracted	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	120	97
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	90	1	101	103	2	104	98

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	114	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	86	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	86	112	132	16	90	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	242855-10
Date prepared	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Date analysed	-			15/05/2020	1	15/05/2020	15/05/2020		15/05/2020	15/05/2020
Arsenic	mg/kg	4	Metals-020	<4	1	6	6	0	107	89
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	105	82
Chromium	mg/kg	1	Metals-020	<1	1	8	9	12	104	83
Copper	mg/kg	1	Metals-020	<1	1	24	27	12	106	108
Lead	mg/kg	1	Metals-020	<1	1	16	16	0	107	87
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	83	82
Nickel	mg/kg	1	Metals-020	<1	1	10	10	0	104	87
Zinc	mg/kg	1	Metals-020	<1	1	50	47	6	111	101

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date prepared	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Date analysed	-			[NT]	86	15/05/2020	15/05/2020		15/05/2020	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	86	7	6	15	105	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	86	<0.4	<0.4	0	102	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	86	9	8	12	101	[NT]
Copper	mg/kg	1	Metals-020	[NT]	86	33	30	10	102	[NT]
Lead	mg/kg	1	Metals-020	[NT]	86	17	16	6	104	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	86	<0.1	<0.1	0	85	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	86	13	26	67	100	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	86	71	77	8	107	[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

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 242855-86 for Ni. Therefore a triplicate result has been issued as laboratory sample number 242855-135.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	A Barkway

Sample Login Details

Your reference	E33177PA, Glenmore Park
Envirolab Reference	242855
Date Sample Received	14/05/2020
Date Instructions Received	14/05/2020
Date Results Expected to be Reported	21/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	134 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	20.1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
TP1-0.0-0.1	✓	✓	✓	✓	✓	✓	✓		
TP1-0.2-0.3									✓
TP1-0.8-1.0									✓
BH2-0.0-0.2	✓	✓	✓				✓		
BH2-0.4-0.6									✓
BH2-0.8-1.0									✓
BH2-1.8-2.0									✓
BH2-2.8-3.0									✓
BH2-3.8-4.0									✓
TP3-0.0-0.1	✓	✓	✓	✓	✓	✓	✓		
TP3-0.5-0.6									✓
TP3-1.0-1.2									✓
BH4-0.0-0.2	✓	✓	✓				✓		
BH4-0.6-0.8									✓
BH4-1.8-2.0									✓
BH4-2.8-3.0									✓
BH4-5.6-5.8									✓
TP5-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
TP5-0.2-0.4									✓
TP5-0.8-1.0									✓
TP5-1.3-1.5									✓
BH6-0.0-0.1	✓	✓	✓				✓		
BH6-0.3-0.5									✓
BH6-0.9-1.1									✓
BH6-1.8-2.0									✓
BH6-2.8-3.0									✓
BH6-3.8-4.0									✓
BH6-4.8-5.0									✓
BH6-6.7-7.0									✓
BH6-8.4-8.7									✓
BH6-10.2-10.5									✓
BH6-11.8-12.0									✓

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
TP7-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
TP7-0.4-0.5									✓
TP7-1.3-1.4	✓	✓							
BH8-0.0-0.2	✓	✓	✓				✓		
BH8-0.8-1.0									✓
BH8-1.8-2.0									✓
BH8-2.8-3.0									✓
BH8-3.8-4.0									✓
BH8-4.8-5.0									✓
TP9-0.0-0.1	✓	✓	✓				✓		
TP9-0.3-0.5									✓
TP9-1.2-1.3									✓
TP9-1.8-2.0									✓
BH10-0.0-0.2	✓	✓	✓	✓	✓	✓	✓		
BH10-0.7-1.0									✓
BH10-1.8-2.0									✓
BH10-2.8-3.0									✓
BH10-4.0-4.3									✓
BH10-5.0-5.3									✓
BH10-6.0-6.3									✓
BH10-7.0-7.3									✓
BH10-8.7-9.0									✓
BH10-11.7-12.0									✓
TP11-0.0-0.1	✓	✓	✓	✓	✓	✓	✓		
TP11-0.3-0.4								✓	
TP11-1.2-1.4									✓
BH12-0.0-0.2	✓	✓	✓				✓		
BH12-0.8-1.0									✓
BH12-1.8-2.0									✓
BH12-2.8-3.0									✓
BH12-4.3-4.5									✓
BH12-5.7-6.0									✓

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	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
TP13-0.0-0.1	✓	✓	✓	✓	✓	✓	✓		
TP13-0.3-0.5									✓
TP13-0.9-1.0									✓
TP13-1.6-1.7									✓
BH14-0.0-0.2	✓	✓	✓				✓		
BH14-0.8-1.0									✓
BH14-1.8-2.0									✓
BH14-2.8-3.0									✓
BH14-4.3-4.5									✓
BH14-5.7-6.0									✓
TP15-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
TP15-0.6-0.7									✓
TP15-1.3-1.4									✓
BH16-0.0-0.2	✓	✓	✓				✓		
BH16-0.8-1.0									✓
BH16-1.8-2.0									✓
BH16-2.8-3.0									✓
BH16-4.3-4.5									✓
BH16-5.7-6.0									✓
BH16-8.0-8.3									✓
BH16-10.7-11.0									✓
TP17-0.0-0.1	✓	✓	✓	✓	✓	✓	✓		
TP17-0.2-0.3									✓
TP17-1.2-1.3									✓
BH18-0.0-0.2	✓	✓	✓				✓		
BH18-0.8-1.0									✓
BH18-1.8-2.0									✓
BH18-2.8-3.0									✓
BH18-3.7-4.0									✓
BH18-5.7-6.0									✓
TP19-0.0-0.1	✓	✓	✓				✓		
TP19-0.3-0.5								✓	

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
TP19-1.2-1.3									✓
BH20-0.0-0.2	✓	✓	✓	✓	✓	✓	✓		
BH20-0.8-1.0									✓
BH20-1.8-2.0									✓
BH20-2.8-3.0									✓
BH20-3.8-4.0									✓
BH20-5.8-6.0									✓
BH20-7.8-8.0									✓
BH20-9.0-9.2									✓
BH20-11.0-11.2									✓
BH22-0.0-0.2									✓
BH22-0.8-1.0									✓
BH22-1.8-2.0									✓
BH22-2.8-3.0									✓
BH22-4.3-4.5									✓
BH22-5.8-6.0									✓
SDUP1	✓	✓	✓				✓		
SDUP2									✓
SDUP3									✓
SDUP4									✓
SDUP6									✓
SDUP7									✓
SDUP8									✓
SDUP9									✓
SDUP10									✓
SDUP11									✓
SDUP12									✓
SDUP13									✓
SDUP14									✓
SDUP15									✓
SDUP16									✓
SDUP17									✓

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
SDUP18									✓
SDUP19									✓
SDUP20									✓
SDUP22									✓
TS-S1	✓								
TB-S1	✓								

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.

20.1'c

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: E33177PA
Date Results Required: STANDARD
Page: 1 of 6

FROM:
JKEnvironments
REAR OF 115 WICKS ROAD
MACQUARIE PARK, NSW 2113
P: 02-9888 5000 F: 02-9888 5001
Attention: Anthony Barkway

Location: Glenmore Park
Sampler: CR / JL

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			
12/05/2020	1	TP1	0.0-0.1	G, A	0	Fill: Silty Clay			X									
12/05/2020	2	TP1	0.2-0.3	G, A	0	Fill: Silty Clay												
12/05/2020	3	TP1	0.8-1.0	G, A	0	Fill: Silty Clay												
11/05/2020	4	BH2	0.0-0.2	G, A	0	Fill: Silty Clay		X										
11/05/2020	5	BH2	0.4-0.6	G, A	0	Fill: Silty Clay												
11/05/2020	6	BH2	0.8-1.0	G, A	0.1	Fill: Silty Clay												
11/05/2020	7	BH2	1.8-2.0	G, A	0.2	Fill: Silty Clay												
11/05/2020	8	BH2	2.8-3.0	G, A	0	Fill: Silty Clay												
11/05/2020	9	BH2	3.8-4.0	G, A	0	Fill: Silty Clay												
12/05/2020	10	TP3	0.0-0.1	G, A	0	Fill: Silty Clay			X									
12/05/2020	11	TP3	0.5-0.6	G, A	0	Fill: Silty Clay												
12/05/2020	12	TP3	1.0-1.2	G, A	0	Fill: Silty Clay												
11/05/2020	13	BH4	0.0-0.2	G, A	0	Fill: Silty Clay		X										
11/05/2020	14	BH4	0.6-0.8	G, A	0	Fill: Silty Clay												
11/05/2020	15	BH4	1.8-2.0	G, A	0.1	Fill: Silty Clay												
11/05/2020	16	BH4	2.8-3.0	G, A	0.1	Fill: Silty Clay												
11/05/2020	17	BH4	5.6-5.8	G, A	0.1	Fill: Silty Clay												
12/05/2020	18	TP5	0.0-0.1	G, A	0	Fill: Silty Clay			X						X			
12/05/2020	19	TP5	0.2-0.4	G, A	0	Fill: Silty Clay												
12/05/2020	20	TP5	0.8-1.0	G, A	0	Fill: Silty Clay												
12/05/2020	21	TP5	1.3-1.5	G, A	0	Fill: Silty Clay												
11/05/2020	22	BH6	0.0-0.1	G, A	0	Fill: Silty Clay		X										
11/05/2020	23	BH6	0.3-0.5	G, A	0.4	Fill: Silty Clay.												
11/05/2020	24	BH6	0.9-1.1	G, A	0	Fill: Silty Clay												
11/05/2020	25	BH6	1.8-2.0	G, A	0	Fill: Silty Clay												

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 212855
Date Received: 13/5/20
Time Received: 1620
Received By: M
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar G2 - 150mg Glass Jar
A - Ziplock Asbestos Bag V - Vial
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
[illegible]	13/5/2020 15:40	1620	C. McKenzie	13/5/20

242855

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: E33177PA Date Results Required: STANDARD Page: 2 of 6	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location:	Glenmore Park						Sample Preserved in Esky on Ice											
Sampler:	CR / JL						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			
11/05/2020	26	BH6	2.8-3.0	G, A	0	Fill: Silty Clay												
11/05/2020	27	BH6	3.8-4.0	G, A	0	Fill: Silty Clay												
11/05/2020	28	BH6	4.8-5.0	G, A	0.2	Fill: Silty Clay												
11/05/2020	29	BH6	6.7-7.0	G, A	0.1	Fill: Silty Clay												
11/05/2020	30	BH6	8.4-8.7	G, A	0.1	Fill: Silty Clay												
11/05/2020	31	BH6	10.2-10.5	G, A	0.1	Fill: Silty Clay												
11/05/2020	32	BH6	11.8-12.0	G, A	0.2	Fill: Silty Clay												
12/05/2020	33	TP7	0.0-0.1	G, A	0	Fill: Silty Clay			X						X			
12/05/2020	34	TP7	0.4-0.5	G, A	0.1	Fill: Silty Clay												
12/05/2020	35	TP7	1.3-1.4	G, A	3.1	Fill: Silty Clay							X					
11/05/2020	36	BH8	0.0-0.2	G, A	0	Fill: Silty Clay		X										
11/05/2020	37	BH8	0.8-1.0	G, A	0	Fill: Silty Clay												
11/05/2020	38	BH8	1.8-2.0	G, A	0	Fill: Silty Clay												
11/05/2020	39	BH8	2.8-3.0	G, A	0.4	Fill: Gravelly Silty Clay												
11/05/2020	40	BH8	3.8-4.0	G, A	0.2	Fill: Gravelly Silty Clay												
11/05/2020	41	BH8	4.8-5.0	G, A	0.1	Fill: Silty Clay												
12/05/2020	42	TP9	0.0-0.1	G, A	0	Fill: Silty Clay		X										
12/05/2020	43	TP9	0.3-0.5	G, A	0	Fill: Silty Clay												
12/05/2020	44	TP9	1.2-1.3	G, A	0	Fill: Silty Clay												
12/05/2020	45	TP9	1.8-2.0	G, A	0	Fill: Silty Clay												
11/05/2020	46	BH10	0.0-0.2	G, A	0	Fill: Silty Clay			X									
11/05/2020	47	BH10	0.7-1.0	G, A	0.3	Fill: Silty Clay												
11/05/2020	48	BH10	1.8-2.0	G, A	0.1	Fill: Silty Clay												
11/05/2020	49	BH10	2.8-3.0	G, A	0.3	Fill: Silty Clay												
11/05/2020	50	BH10	4.0-4.3	G, A	0.1	Fill: Silty Clay												

Remarks (comments/detection limits required):	**Sample Containers:** G - 250mg Glass Jar G2 - 150mg Glass Jar A - Ziplock Asbestos Bag V - Vial P - Plastic Bag

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

242855

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: E33177PA Date Results Required: STANDARD Page: 3 of 6	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location:	Glenmore Park						Sample Preserved in Esky on Ice												
Sampler:	CR / JL						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				
11/05/2020	51	BH10	5.0-5.3	G, A	0.2	Fill: Silty Clay													
11/05/2020	52	BH10	6.0-6.3	G, A	0.3	Fill: Silty Clay													
11/05/2020	53	BH10	7.0-7.3	G, A	0	Fill: Silty Clay													
11/05/2020	54	BH10	8.7-9.0	G, A	0	Fill: Silty Clay													
11/05/2020	55	BH10	11.7-12.0	G, A	0.1	Fill: Silty Clay													
12/05/2020	56	TP11	0.0-0.1	G, A	0	Fill: Silty Clay			X										
12/05/2020	57	TP11	0.3-0.4	G, A	0	Fill: Silty Gravelly Clay									X				
12/05/2020	58	TP11	1.2-1.4	G, A	0	Fill: Silty Gravelly Clay													
12/05/2020	59	BH12	0.0-0.2	G, A	0	Fill: Silty Clay		X											
12/05/2020	60	BH12	0.8-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	61	BH12	1.8-2.0	G, A	0.1	Fill: Silty Clay													
12/05/2020	62	BH12	2.8-3.0	G, A	0.2	Fill: Silty Clay													
12/05/2020	63	BH12	4.3-4.5	G, A	0	Fill: Silty Clay													
12/05/2020	64	BH12	5.7-6.0	G, A	0	Fill: Silty Clay													
12/05/2020	65	TP13	0.0-0.1	G, A	0	Fill: Silty Clay			X										
12/05/2020	66	TP13	0.3-0.5	G, A	0	Fill: Silty Gravelly Clay			✓										
12/05/2020	67	TP13	0.9-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	68	TP13	1.6-1.7	G, A	0	Fill: Silty Clay													
12/05/2020	69	BH14	0.0-0.2	G, A	0	Fill: Silty Clay		X											
12/05/2020	70	BH14	0.8-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	71	BH14	1.8-2.0	G, A	0	Fill: Silty Clay													
12/05/2020	72	BH14	2.8-3.0	G, A	0	Fill: Silty Clay													
12/05/2020	73	BH14	4.3-4.5	G, A	1.0	Fill: Silty Clay													
12/05/2020	74	BH14	5.7-6.0	G, A	0	Fill: Silty Clay													
12/05/2020	75	TP15	0.0-0.1	G, A	0	Fill: Silty Gravelly Clay			X						X				

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar G2 - 150mg Glass Jar A - Ziplock Asbestos Bag V - Vial P - Plastic Bag

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

242855

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: E33177PA Date Results Required: STANDARD Page: 4 of 6	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location:	Glenmore Park						Sample Preserved in Esky on Ice												
Sampler:	CR / JL						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				
12/05/2020	76	TP15	0.6-0.7	G, A	0.5	Fill: Silty Clay													
12/05/2020	77	TP15	1.3-1.4	G, A	0	Fill: Silty Clay													
12/05/2020	78	BH16	0.0-0.2	G, A	0	Fill: Silty Clay		X											
12/05/2020	79	BH16	0.8-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	80	BH16	1.8-2.0	G, A	0	Fill: Silty Clay													
12/05/2020	81	BH16	2.8-3.0	G, A	0.1	Fill: Silty Clay													
12/05/2020	82	BH16	4.3-4.5	G, A	0.7	Fill: Gravelly Silty Clay													
12/05/2020	83	BH16	5.7-6.0	G, A	0.8	Fill: Silty Clay													
12/05/2020	84	BH16	8.0-8.3	G, A	0.7	Fill: Gravelly Clay													
12/05/2020	85	BH16	10.7-11.0	G, A	0.8	Fill: Silty Clay													
12/05/2020	86	TP17	0.0-0.1	G, A	0	Fill: Silty Clay			X										
12/05/2020	87	TP17	0.2-0.3	G, A	0	Fill: Silty Clay													
12/05/2020	88	TP17	1.2-1.3	G, A	0	Fill: Silty Clay													
12/05/2020	89	BH18	0.0-0.2	G, A	0	Fill: Silty Clay		X											
12/05/2020	90	BH18	0.8-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	91	BH18	1.8-2.0	G, A	0	Fill: Silty Clay													
12/05/2020	92	BH18	2.8-3.0	G, A	0	Fill: Silty Clay													
12/05/2020	93	BH18	3.7-4.0	G, A	0.3	Fill: Silty Clay													
12/05/2020	94	BH18	5.7-6.0	G, A	0.3	Fill: Silty Clay													
12/05/2020	95	TP19	0.0-0.1	G, A	0	Fill: Silty Clay		X											
12/05/2020	96	TP19	0.3-0.5	G, A	0	Fill: Silty Clay									X				
12/05/2020	97	TP19	1.2-1.3	G, A	0	Fill: Silty Clay													
12/05/2020	98	BH20	0.0-0.2	G, A	0	Fill: Silty Clay			X										
12/05/2020	99	BH20	0.8-1.0	G, A	0	Fill: Silty Clay													
12/05/2020	100	BH20	1.8-2.0	G, A	0.3	Fill: Silty Clay													

Remarks (comments/detection limits required):	**Sample Containers:** G - 250mg Glass Jar G2 - 150mg Glass Jar A - Ziplock Asbestos Bag V - Vial P - Plastic Bag

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

242855

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: E33177PA Date Results Required: STANDARD Page: 5 of 6	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location:	Glenmore Park						Sample Preserved in Esky on Ice											
Sampler:	CR / JL						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			
12/05/2020	101	BH20	2.8-3.0	G, A	1.9	Fill: Silty Clay												
12/05/2020	102	BH20	3.8-4.0	G, A	2.8	Fill: Silty Clay												
12/05/2020	103	BH20	5.8-6.0	G, A	0	Fill: Silty Clay												
12/05/2020	104	BH20	7.8-8.0	G, A	0	Fill: Silty Clay												
12/05/2020	105	BH20	9.0-9.2	G, A	0	Fill: Silty Clay												
12/05/2020	106	BH20	11.0-11.2	G, A	0	Fill: Silty Clay												
12/05/2020	107	BH22	0.0-0.2	G, A	0	Fill: Silty Clay												
12/05/2020	108	BH22	0.8-1.0	G, A	0	Fill: Silty Clay												
12/05/2020	109	BH22	1.8-2.0	G, A	0	Fill: Silty Clay												
12/05/2020	110	BH22	2.8-3.0	G, A	0	Fill: Silty Clay												
12/05/2020	111	BH22	4.3-4.5	G, A	0	Fill: Silty Clay												
12/05/2020	112	BH22	5.8-6.0	G, A	0	Fill: Silty Clay												
12/05/2020	113	SDUP1	-	G		Duplicate		X										
11/05/2020	114	SDUP2	-	G		Duplicate												
12/05/2020	115	SDUP3	-	G		Duplicate												
11/05/2020	116	SDUP4	-	G		Duplicate												
12/05/2020	—	SDUP5	-	G		Duplicate		X		SEND TOXIC.								
11/05/2020	117	SDUP6	-	G		Duplicate												
12/05/2020	118	SDUP7	-	G		Duplicate												
11/05/2020	119	SDUP8	-	G		Duplicate												
12/05/2020	120	SDUP9	-	G		Duplicate												
11/05/2020	121	SDUP10	-	G		Duplicate												
12/05/2020	122	SDUP11	-	G		Duplicate												
12/05/2020	123	SDUP12	-	G		Duplicate												
12/05/2020	124	SDUP13	-	G		Duplicate												

Remarks (comments/detection limits required):	**Sample Containers:** G - 250mg Glass Jar G2 - 150mg Glass Jar A - Ziplock Asbestos Bag V - Vial P - Plastic Bag

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

242855

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: E33177PA Date Results Required: STANDARD Page: 6 of 6	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location:	Glenmore Park						Sample Preserved in Esky on Ice										
Sampler:	CR / JL						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		
12/05/2020	125	SDUP14	-	G	-	Duplicate											
12/05/2020	126	SDUP15	-	G	-	Duplicate											
12/05/2020	127	SDUP16	-	G	-	Duplicate											
12/05/2020	128	SDUP17	-	G	-	Duplicate											
12/05/2020	129	SDUP18	-	G	-	Duplicate											
12/05/2020	130	SDUP19	-	G	-	Duplicate		/					V	C			
12/05/2020	131	SDUP20	-	G	-	Duplicate											
12/05/2020	132	SDUP22	-	G	-	Duplicate											
11/05/2020	133	TS-S1		V	-	Spike								X			
11/05/2020	134	TB-S1		G2	-	Blank								X			

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar G2 - 150mg Glass Jar A - Ziplock Asbestos Bag V - Vial P - Plastic Bag

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

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
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melbourne@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 21106

Client Details

Client	JK Environments
Attention	A Barkway
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33177PA**
Number of Samples	1 SOIL
Date samples received	19/05/2020
Date completed instructions received	19/05/2020

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	25/05/2020
Date of Issue	25/05/2020

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
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		21106-1
Your Reference	UNITS	SDUP5
Date Sampled		12/05/2020
Type of sample		SOIL
Date extracted	-	20/05/2020
Date analysed	-	20/05/2020
vTRH C_6 - C_9	mg/kg	<25
vTRH C_6 - C_{10}	mg/kg	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total BTEX	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	106

TRH Soil C10-C40 NEPM		
Our Reference		21106-1
Your Reference	UNITS	SDUP5
Date Sampled		12/05/2020
Type of sample		SOIL
Date extracted	-	20/05/2020
Date analysed	-	21/05/2020
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	%	94

PAHs in Soil		
Our Reference		21106-1
Your Reference	UNITS	SDUP5
Date Sampled		12/05/2020
Type of sample		SOIL
Date extracted	-	20/05/2020
Date analysed	-	25/05/2020
Naphthalene	mg/kg	0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j&k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	0.3
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d_{14}	%	128

Acid Extractable metals in soil		
Our Reference		21106-1
Your Reference	UNITS	SDUP5
Date Sampled		12/05/2020
Type of sample		SOIL
Date digested	-	20/05/2020
Date analysed	-	21/05/2020
Arsenic	mg/kg	9
Cadmium	mg/kg	<0.4
Chromium	mg/kg	12
Copper	mg/kg	28
Lead	mg/kg	22
Mercury	mg/kg	<0.1
Nickel	mg/kg	14
Zinc	mg/kg	58

Moisture		
Our Reference		21106-1
Your Reference	UNITS	SDUP5
Date Sampled		12/05/2020
Type of sample		SOIL
Date prepared	-	20/05/2020
Date analysed	-	21/05/2020
Moisture	%	6.6

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	84	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	84	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	82	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	86	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	85	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	110	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			21/05/2020	[NT]	[NT]	[NT]	[NT]	21/05/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	79	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	79	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate o-Terphenyl	%		Org-020	93	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			25/05/2020	[NT]	[NT]	[NT]	[NT]	25/05/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]	[NT]	[NT]	[NT]	78	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	130	[NT]	[NT]	[NT]	[NT]	124	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			21/05/2020	[NT]	[NT]	[NT]	[NT]	21/05/2020	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	103	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	104	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[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.

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ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	A Barkway

Sample Login Details

Your reference	E33177PA
Envirolab Reference	21106
Date Sample Received	19/05/2020
Date Instructions Received	19/05/2020
Date Results Expected to be Reported	25/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	**Phone: 03 9763 2500**
Fax: 03 9763 2633	**Fax: 03 9763 2633**
Email: padams@envirolab.com.au	**Email: cdeluca@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Acid Extractable metalsin soil
SDUP5	✓	✓	✓	✓

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.

Relinquished by Envirolab
C. McKenzie
18/5/20 1030
cm

20.1°C

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: E33177PA
Date Results Required: STANDARD
Page: 1 of 6

FROM:
JKEnvironments
REAR OF 115 WICKS ROAD
MACQUARIE PARK, NSW 2113
P: 02-9888 5000 F: 02-9888 5001
Attention: Anthony Barkway

Location: Glenmore Park
Sampler: CR / JL

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
12/05/2020	1	TP1	0.0-0.1	G, A	0	Fill: Silty Clay			X						
12/05/2020	2	TP1	0.2-0.3	G, A	0	Fill: Silty Clay									
12/05/2020	3	TP1	0.8-1.0	G, A	0	Fill: Silty Clay									
11/05/2020	4	BH2	0.0-0.2	G, A	0	Fill: Silty Clay		X							
11/05/2020	5	BH2	0.4-0.6	G, A	0	Fill: Silty Clay									
11/05/2020	6	BH2	0.8-1.0	G, A	0.1	Fill: Silty Clay									
11/05/2020	7	BH2	1.8-2.0	G, A	0.2	Fill: Silty Clay									
11/05/2020	8	BH2	2.8-3.0	G, A	0	Fill: Silty Clay									
11/05/2020	9	BH2	3.8-4.0	G, A	0	Fill: Silty Clay									
12/05/2020	10	TP3	0.0-0.1	G, A	0	Fill: Silty Clay			X						
12/05/2020	11	TP3	0.5-0.6	G, A	0	Fill: Silty Clay									
12/05/2020	12	TP3	1.0-1.2	G, A	0	Fill: Silty Clay									
11/05/2020	13	BH4	0.0-0.2	G, A	0	Fill: Silty Clay		X							
11/05/2020	14	BH4	0.6-0.8	G, A	0	Fill: Silty Clay									
11/05/2020	15	BH4	1.8-2.0	G, A	0.1	Fill: Silty Clay									
11/05/2020	16	BH4	2.8-3.0	G, A	0.1	Fill: Silty Clay									
11/05/2020	17	BH4	5.6-5.8	G, A	0.1	Fill: Silty Clay									
12/05/2020	18	TP5	0.0-0.1	G, A	0	Fill: Silty Clay			X						X
12/05/2020	19	TP5	0.2-0.4	G, A	0	Fill: Silty Clay									
12/05/2020	20	TP5	0.8-1.0	G, A	0	Fill: Silty Clay									
12/05/2020	21	TP5	1.3-1.5	G, A	0	Fill: Silty Clay									
11/05/2020	22	BH6	0.0-0.1	G, A	0	Fill: Silty Clay		X							
11/05/2020	23	BH6	0.3-0.5	G, A	0.4	Fill: Silty Clay									
11/05/2020	24	BH6	0.9-1.1	G, A	0	Fill: Silty Clay									
11/05/2020	25	BH6	1.8-2.0	G, A	0	Fill: Silty Clay									

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 242855
Date Received: 14/5/20
Time Received: 1620
Received By: W
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ENVIROLAB
Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500
Job No: 21106
Date Received: 14/5/20
Time Received: 2:20 pm
Received By: VS
Temp: Cool/Ambient 15.1
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
G2 - 150mg Glass Jar
A - Ziplock Asbestos Bag
V - Vial
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
	13/5/2020 15:40	1620	C. McKenzie	13/5/20

242855

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: E33177PA Date Results Required: STANDARD Page: 5 of 6	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Anthony Barkway

Location: Glenmore Park

Sampler: CR / JL

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			
12/05/2020	101	BH20	2.8-3.0	G, A	1.9	Fill: Silty Clay												
12/05/2020	102	BH20	3.8-4.0	G, A	2.8	Fill: Silty Clay												
12/05/2020	103	BH20	5.8-6.0	G, A	0	Fill: Silty Clay												
12/05/2020	104	BH20	7.8-8.0	G, A	0	Fill: Silty Clay												
12/05/2020	105	BH20	9.0-9.2	G, A	0	Fill: Silty Clay												
12/05/2020	106	BH20	11.0-11.2	G, A	0	Fill: Silty Clay												
12/05/2020	107	BH22	0.0-0.2	G, A	0	Fill: Silty Clay												
12/05/2020	108	BH22	0.8-1.0	G, A	0	Fill: Silty Clay												
12/05/2020	109	BH22	1.8-2.0	G, A	0	Fill: Silty Clay												
12/05/2020	110	BH22	2.8-3.0	G, A	0	Fill: Silty Clay												
12/05/2020	111	BH22	4.3-4.5	G, A	0	Fill: Silty Clay												
12/05/2020	117	BH22	5.8-6.0	G, A	0	Fill: Silty Clay												
12/05/2020	113	SDUP1	-	G		Duplicate		X										
11/05/2020	114	SDUP2	-	G		Duplicate												
12/05/2020	115	SDUP3	-	G		Duplicate												
11/05/2020	116	SDUP4	-	G		Duplicate												
12/05/2020	~	SDUP5	-	G		Duplicate		X	SEND TO VIC.									
11/05/2020	117	SDUP6	-	G		Duplicate												
12/05/2020	118	SDUP7	-	G		Duplicate												
11/05/2020	119	SDUP8	-	G		Duplicate												
12/05/2020	120	SDUP9	-	G		Duplicate												
11/05/2020	120	SDUP10	-	G		Duplicate												
12/05/2020	122	SDUP11	-	G		Duplicate												
12/05/2020	123	SDUP12	-	G		Duplicate												
12/05/2020	124	SDUP13	-	G		Duplicate												

ENVIROLAB

Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

Job No: 21106

Date Received: 19/5/20

Time Received: 2:20pm

Received By: KS

Temp: (Cool/Ambient

Cooling: Ice/Icepack

Security: (Intact)/Broken/None

15-1

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
G2 - 150mg Glass Jar
A - Ziplock Asbestos Bag
V - Vial
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
ELS Sydney C. Mullenne	18/5/20 1030	2:20pm (Received)	ELS - KS	19/5/20

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CERTIFICATE OF ANALYSIS 243106

Client Details

Client	Environmental Investigation Services
Attention	A Barkway
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33177PA, Glenmore Park**
Number of Samples	5 Water
Date samples received	18/05/2020
Date completed instructions received	18/05/2020

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	25/05/2020
Date of Issue	25/05/2020

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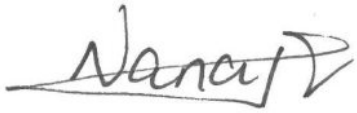
Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		243106-1
Your Reference	UNITS	MW8
Date Sampled		18/05/2020
Type of sample		Water
Date extracted	-	20/05/2020
Date analysed	-	21/05/2020
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		243106-1
Your Reference	UNITS	MW8
Date Sampled		18/05/2020
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	114
Surrogate toluene-d8	%	98
Surrogate 4-BFB	%	102

vTRH(C6-C10)/BTEXN in Water					
Our Reference		243106-1	243106-2	243106-4	243106-5
Your Reference	UNITS	MW8	WDUP1	TB-W1	TS-W1
Date Sampled		18/05/2020	18/05/2020	18/05/2020	18/05/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	20/05/2020	20/05/2020	20/05/2020	20/05/2020
Date analysed	-	21/05/2020	21/05/2020	21/05/2020	21/05/2020
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	<1	127%
Toluene	µg/L	<1	<1	<1	117%
Ethylbenzene	µg/L	<1	<1	<1	105%
m+p-xylene	µg/L	<2	<2	<2	106%
o-xylene	µg/L	<1	<1	<1	110%
Naphthalene	µg/L	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	114	114	112	112
Surrogate toluene-d8	%	98	99	97	101
Surrogate 4-BFB	%	102	103	103	106

svTRH (C10-C40) in Water			
Our Reference		243106-1	243106-2
Your Reference	UNITS	MW8	WDUP1
Date Sampled		18/05/2020	18/05/2020
Type of sample		Water	Water
Date extracted	-	19/05/2020	19/05/2020
Date analysed	-	19/05/2020	19/05/2020
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
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
Surrogate o-Terphenyl	%	83	104

PAHs in Water - Low Level			
Our Reference		243106-1	243106-2
Your Reference	UNITS	MW8	WDUP1
Date Sampled		18/05/2020	18/05/2020
Type of sample		Water	Water
Date extracted	-	19/05/2020	19/05/2020
Date analysed	-	19/05/2020	19/05/2020
Naphthalene	µg/L	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<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	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	70	94

HM in water - dissolved			
Our Reference		243106-1	243106-2
Your Reference	UNITS	MW8	WDUP1
Date Sampled		18/05/2020	18/05/2020
Type of sample		Water	Water
Date prepared	-	19/05/2020	19/05/2020
Date analysed	-	19/05/2020	19/05/2020
Arsenic-Dissolved	µg/L	48	47
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	<1	<1
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	25	25
Zinc-Dissolved	µg/L	9	11

Miscellaneous Inorganics		
Our Reference	UNITS	243106-1
Your Reference		MW8
Date Sampled		18/05/2020
Type of sample		Water
Date prepared	-	18/05/2020
Date analysed	-	18/05/2020
pH	pH Units	7.1
Electrical Conductivity	µS/cm	6,100

Cations in water Dissolved		
Our Reference		243106-1
Your Reference	UNITS	MW8
Date Sampled		18/05/2020
Type of sample		Water
Date digested	-	20/05/2020
Date analysed	-	20/05/2020
Calcium - Dissolved	mg/L	53
Magnesium - Dissolved	mg/L	150
Hardness	mgCaCO 3 /L	740

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

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			21/05/2020	[NT]	[NT]	[NT]	[NT]	21/05/2020	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[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	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	102	[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	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			21/05/2020	[NT]	[NT]	[NT]	[NT]	21/05/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	101	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	92	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	110	[NT]
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]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
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]	112	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
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]	100	[NT]
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]	110	[NT]
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	101	[NT]	[NT]	[NT]	[NT]	115	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Date analysed	-			19/05/2020	[NT]	[NT]	[NT]	[NT]	19/05/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
Date analysed	-			18/05/2020	[NT]	[NT]	[NT]	[NT]	18/05/2020	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Cations in water Dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Date analysed	-			20/05/2020	[NT]	[NT]	[NT]	[NT]	20/05/2020	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	87	[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	Environmental Investigation Services
Attention	A Barkway

Sample Login Details

Your reference	E33177PA, Glenmore Park
Envirolab Reference	243106
Date Sample Received	18/05/2020
Date Instructions Received	18/05/2020
Date Results Expected to be Reported	25/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9.6
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	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity	Cations in water Dissolved	On Hold
MW8	✓	✓	✓	✓	✓	✓	✓	✓	
WDUP1		✓	✓	✓	✓				
WDUP2									✓
TB-W1		✓							
TS-W1		✓							

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: E33177PA 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: Anthony Barkway

Location:	Glenmore Park	Sample Preserved in Esky on Ice														
Sampler:	CR	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		
18/05/2020	1	MW8	G1, V, H, PVC	0.2	Water		X	X	X					X		
18/05/2020	2	WDUP1	G1, V, H, PVC	-	Duplicate		X									
18/05/2020	3	WDUP2	G1, V, H, PVC	-	Duplicate											
18/05/2020	4	TB-W1	V	-	Blank								X			
18/05/2020	5	TS-W1	V		Spike								X			

ENVIROLAB GROUP

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

Job No: 243106
Date Received: 18/5/20
Time Received: 1455
Received By: BD
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers:
All analysis PQLs to ANZECC (2000) Detection Limits Please	G1 - 500mL Amber Glass Bottle G2 - 1L Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By:	Date:	Time:	Received By:	Date:
	18/5/2020 13:40		Jason Day	1455 18/5/20

Appendix F: Report Explanatory Notes

Standard Sampling Procedure

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

A. Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the JKE job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-2017[19].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork where it is safe to do so. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

B. Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

[19] Standards Australia, (2017), *Geotechnical Site Investigations.* (AS1726-2017)

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

C. Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Measure the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Stericup single-use filters (for heavy metals samples);
  - Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/Temperature meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow peristaltic pump and associated tubing; and
  - Groundwater sampling forms.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow sampling equipment to reduce the disturbance of the water column and loss of volatiles.

- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements is less than 0.2 units, the difference in conductivity is less than 10% and whilst the well is no longer in draw-down.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements specified by the laboratory and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice.
- At the end of each water sampling complete a chain of custody form for samples being sent to the laboratory.

D. <u>Decontamination Procedures for Groundwater Sampling Equipment</u>

- All equipment associated with the groundwater sampling procedure (other than single-use items) are decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[20] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[21]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

[20] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[21] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this assessment is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample TP1 0.0-0.1m)	Approximately 5% of primary samples	Heavy metals, TRH/BTEX and PAHs
Inter-laboratory duplicate (soil)	SDUP5 (primary sample TP5 0.0-0.1m)	Approximately 5% of primary samples	Heavy metals, TRH/BTEX and PAHs
Intra-laboratory duplicate (groundwater)	WDUP1 (primary sample MW8)	Approximately 33% of primary samples	Heavy metals, TRH/BTEX, PAHs and VOCs
Trip spike	TS-S1 (15/05/20) – Soil TS-W1 (20/05/20) - Groundwater	One for the assessment of soil and one for the assessment of groundwater to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank	TB-S1 (15/05/20) – Soil TB-W1 (20/05/20) - Groundwater	One for the assessment of soil and one for the assessment of groundwater to demonstrate adequacy of preservation, storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table S8 and Table G4) attached to the assessment report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field/Trip Blanks

Acceptable targets for field blank samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%. This is in line with spike recovery limits adopted by the laboratory for organic analysis.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance with the JKE SSP. The SSP was developed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 20.1°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE are of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch. This is further supported by the trip spike recovery results (discussed further below) which reported adequate recovery in the range of 98% to 100% for soil, demonstrating that recovery of volatiles was acceptable and storage/transport/preservation methods were robust.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC. With the exception of the vinyl chloride PQL for groundwater analysis which was 10 times greater than the ecological SAC. In light of the VOC concentrations reported for groundwater, JKE are of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the assessment.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for several PAH compounds in soil SDUP5/TP5 (0.0-0.1m); and
- Elevated RPDs were also reported for heavy metals lead and chromium in soil SDUP1/ TP1 (0.0-0.1m).

Values outside the acceptable limits have been attributed to the heterogeneous nature of fill material strata from which these samples were collected and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. In addition, detectable concentrations of these analytes were relatively low and close to the laboratory PQLs which would yield higher RPD values for detected variations. Both the primary and duplicate results were screened against the SAC, therefore the RPD exceedances are not significant.

Field/Trip Blanks

During the investigation, one soil and one water trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Trip Spikes

The results for soil ranged from 98% to 100%. The results for water ranged from 105% to 127%. These results indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this assessment.

One laboratory RPD exceeded for nickel. This exceedance was minor and a triplicate was analysed (See lab report 242855). The result is attributed to minor heterogeneity in the fill and is not significant as the nickel concentrations were well below the SAC.

C. DATA QUALITY SUMMARY

JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the PSI. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the PSI.

Appendix H: Field Work Documents

JKEnvironments

Client:	NSW Department of Education	**Job No.:**	E33177PA
Project:	Proposed Public School	**Well No.:**	MW8
Location:	1-23 Forestwood Drive, GLENMORE PARK, NSW	**Depth (m):**	6.0m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Typhoon	**SWL – Before (m):**	2.07
Date:	11/5/2020	**Time – Before:**	15:20
Undertaken By:	CR	**SWL – After (m):**	2.55
Total Vol. Removed:	95L	**Time – After:**	15:40
PID Reading (ppm):	1.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	21.3	2.1	3092	7.17	242.6
5	21.9	3.9	6456	7.26	217.7
8	22.0	2.7	7326	7.32	202.9
10	21.9	3.3	7281	7.32	194.6
15	22.0	3.9	7238	7.27	183.1
20	22.0	4.2	6986	7.33	171.5
25	21.9	3.6	7643	7.41	159.2
30	21.9	4.6	7067	7.35	141.2
35	21.9	4.6	7002	7.35	130.3
40	21.9	4.0	6977	7.35	123.4
45	21.5	5.2	6904	7.37	115.7
50	21.9	2.5	6953	7.33	106.2
55	21.8	2.8	6853	7.34	97.9
60	21.8	2.4	6957	7.31	93.3
63	21.7	2.5	6791	7.55	99.3
70	21.9	2.3	6946	7.42	91.0
75	21.9	2.4	6886	7.41	85.0
80	21.9	2.2	6934	7.36	79.0
85	21.7	2.6	6890	7.51	82.4
90	21.8	2.6	6991	7.38	74.0
95	21.9	2.7	7010	7.39	68.5

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved ((YES) / NO)

YSI Used: 4

Tested By:	C. RIDGEWAY
Date Tested:	11/5/20
Checked By:	VB
Date:	22/5/20

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

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	NSW Department of Education		
Project:	Proposed Public School		
Location:	1-23 Forestwood Drive, GLENMORE PARK, NSW		
Job Number:	E33177PA		
DISSOLVED OXYGEN			
Make: YSI	Model: 4		
Date of calibration: 11/5/2020	Name of Calibrator: C RIDLEY		
Span value: 70% to 130%			
Measured value: 96%			
Measured reading Acceptable (Yes/No): YES			
pH			
Make: YSI	Model: 4		
Date of calibration: 11/5/2020	Name of Calibrator: C RIDLEY		
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 02/21	Lot No: 342068	
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 11/20	Lot No: 336994	
Measured reading of Buffer 1: 7.84			
Measured reading of Buffer 2: 4.90			
Slope:	Measured reading Acceptable (Yes/(No)): NO		
EC			
Make: YSI	Model: 4		
Date: 11/5/2020	Name of Calibrator: C. RIDLEY	Temperature: 15.6 °C	
Calibration solution: 1413 NS/Cm	Expiry date: 12/20	Lot No: 338223	
Theoretical conductivity at temperature (see solution container): 1170 µS/cm			
Measured conductivity: 1194 µS/cm	Measured reading Acceptable (Yes/No): YES		
REDOX			
Make: YSI	Model: 4		
Date of calibration: 11/5/2020	Name of Calibrator: C. RIDLEY		
Calibration solution: 240mV	Expiry date: 01/21	Lot No: 3822	
Theoretical redox value: 240mV			
Measured redox reading: 209 mV	Measured reading Acceptable (Yes/No): YES		

JKEnvironments

Client:	NSW Department of Education	**Job No.:**	E33177PA
Project:	Proposed Public School	**Well No.:**	MW8
Location:	1-23 Forestwood Drive, GLENMORE PARK, NSW	**Depth (m):**	6.00

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	PERISTALTIC PUMP	**SWL – Before:**	2.05m
Date:	18/5/2020	**Time – Before:**	09:55
Undertaken By:	C. RIDLEY	**Total Vol Removed:**	6.5L
Pump Program No:	4.27	**PID (ppm):**	0.2

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
3.5	2.08	–	turbid	19.5	2.6	5185	6.79	175.1
6	2.06	1	" "	20.5	0.9	5347	6.74	25.5
10.5	2.08	2	SLIGHTLY TURBID	20.6	0.8	5358	6.80	8.2
16	2.07	2.5	VERY SLIGHTLY TURB	20.7	0.6	5376	6.79	7.3
21.5	2.08	3.5	CLEAR	20.4	2.4	5336	6.92	6.7
26.5	2.09	4	" "	20.9	0.9	5341	6.81	5.7
30	2.05	4.8	" "	20.6	1.7	5374	6.88	6.7
36.5	2.06	6	" "	20.0	0.9	5402	6.82	7.9
40	2.06	6.5	" "	20.9	1.0	5414	6.81	7.2
			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, 0 x H2SO4 plastic, 1 x unpreserved plastic PER SAMPLE

YSI used: 3 · W DUP 1

Tested By: Craig Ridley	**Remarks:**
Date Tested: 18/5/2020	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Checked By: VB	
Date: 22/5/20	

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	NSW Department of Education		
Project:	Proposed Public School		
Location:	1-23 Forestwood Drive, GLENMORE PARK, NSW		
Job Number:	E33177PA		
DISSOLVED OXYGEN			
Make: YSI (3)	Model:		
Date of calibration: 18/5/20	Name of Calibrator: CRIDLEY		
Span value: 70% to 130%			
Measured value: 96			
Measured reading Acceptable (Yes/No): YES			
pH			
Make: YSI (3)	Model:		
Date of calibration: 18/5/2020	Name of Calibrator: CRIDLEY		
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 02/21	Lot No: 342069	
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 11/20	Lot No: 336994	
Measured reading of Buffer 1: 6.97			
Measured reading of Buffer 2: 4.01			
Slope:	Measured reading Acceptable (Yes/No):		
EC			
Make: YSI (3)	Model:		
Date: 18/5/20	Name of Calibrator: C. RIDLEY	Temperature: °C	
Calibration solution: 1413	Expiry date: 12/20	Lot No: 338233	
Theoretical conductivity at temperature (see solution container): 1170 µS/cm			
Measured conductivity: 1170 µS/cm	Measured reading Acceptable (Yes/No):		
REDOX			
Make: YSI (3)	Model:		
Date of calibration: 18/5/20	Name of Calibrator: C. RIDLEY		
Calibration solution:	Expiry date: 01/24	Lot No: 3822	
Theoretical redox value: 240mV			
Measured redox reading: 238.6 mV	Measured reading Acceptable (Yes/No):		

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	NSW Department of Education
Project:	Proposed Public School
Location:	1-23 Forestwood Drive, GLENMORE PARK, NSW
Job Number:	E33177PA

PID

Make: MINIRAE	Model: LITE	Unit: GREEN	Date of last factory calibration: 20/1/20
Date of calibration: 11/5/2020		Name of Calibrator: C. RIDLEY	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100 ppm		Error in measured reading: ± 0 ppm	
Measured reading Acceptable (Yes/No): (Yes circled)			

PID

Make: MINIRAE	Model: LITE	Unit: GREEN	Date of last factory calibration: 20/1/2020
Date of calibration: 18/5/2020		Name of Calibrator: C. RIDLEY	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100 ppm		Error in measured reading: ± 0 ppm	
Measured reading Acceptable (Yes/No): YES.			

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):			

Appendix I: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

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

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

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

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

NSW Office of Environment and Heritage (OEH), (2011). Guidelines for Consultants Reporting on Contaminated Sites

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

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

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