REPORT TO

HEALTH INFRASTRUCTURE

ON

PRELIMINARY AND DETAILED SITE INVESTIGATION (DSI)

FOR

PROPOSED NEPEAN TAMS DEVELOPMENT

AT

NEPEAN HOSPITAL, DEBRY STREET, KINGSWOOD, NSW

Date: 1 July 2022
Ref: E35033PLrpt

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Executive Summary

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary and Detailed Site Investigation (DSI) for the proposed Nepean TAMS development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the investigation is to make an assessment of site contamination. For the purpose of this report, 'the site' refers to the proposed TAMS development area. The surrounds within the hospital are referred to as the 'wider hospital campus'. 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 Review of Environmental Factors (REF) for the proposed Nepean TAMS development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[1] (formerly known as SEPP55).

JKE (as EIS, prior to our rebranding) completed a Preliminary Environmental Site Assessment (Contamination) (Ref: E29845KPrpt)[2] of the wider hospital campus. The 2017 ESA report also references and reviewed two previous contamination reports prepared by Golder Associates (Ref: 107622058-004-R-RevA)[3] and (Ref:107622059-003-R-Rev0)[4] which covered other portions of the wider hospital campus, with some minor overlap into the current site area.

JKE completed a PSI/DSI of the CAMHS site, immediately to the north of the site. The site information and site history provided in the Lotsearch report (refer to Appendix B) obtained for the investigation of the CAMHS site was utilised in preparation of this DSI.

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 an 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 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 soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- 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.

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[1] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

[2] EIS (2017). *Report to Health Infrastructure on Preliminary Environmental Site Assessment (Contamination) for Proposed Hospital Upgrade at Nepean Hospital, Derby Street, Kingswood, NSW*. (referred to as 2017 ESA report)

[3] *Golder (2010a). Penrith Health Campus Redevelopment Stage 3 (East Block), Nepean Hospital – Phase I & II Environmental Site Assessment dated 20 May 2010* (referred to as Golder 2010a)

[4] *Golder (2010a). Penrith Health Campus Redevelopment Stage 3A, Nepean Hospital – Phase I & II Environmental Site Assessment dated 1 July 2010* (referred to as Golder 2010b)

Based on the scope of work undertaken for this investigation, JKE identified the following potential contamination sources/AEC:

- Fill material;
- On-site car park (oil/fuel leaks from parked vehicles);
- Off-site contamination sources (within the wider hospital campus);
- Historical agricultural use; and
- Use of pesticides.

The DSI included a review of historical information for the site and sampling of the soil from seven borehole locations and groundwater from three monitoring wells. The site has historically been vacant or used for grazing/agricultural purposes, prior to its development as an open-air car park as part of the wider hospital campus from sometime between 1986 and 1991 to the present day.

The CoPC for the soil samples analysed were reported at concentrations below the SAC, or at levels below the laboratory detection limits. Risks from contamination (i.e. exposure via a complete SPR linkage) were not identified.

Elevations of heavy metals in groundwater were identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions. Overall, risks associated with groundwater contamination were assessed to be low.

Based on the findings of the DSI, JKE is of the opinion that the site is suitable for the proposed development described in Section 1.1. There is considered to be a relatively low potential for contamination-related unexpected finds to occur at the site during the proposed development works, however it is recommended that an unexpected finds protocol be developed and implemented during the construction phase of the development.

Reference is to be made to Section 9 for the waste classification information.

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

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Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
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Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
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Australian Height Datum	**AHD**
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Above-Ground Storage Tank	**AST**
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Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
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Contaminant(s) of Potential Concern	**CoPC**
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Dial Before You Dig	**DBYD**
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JK Environments	**JKE**
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National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
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Sampling, Analysis and Quality Plan	**SAQP**
Site Audit Statement	**SAS**
Site Audit Report	**SAR**
State Environmental Planning Policy	**SEPP**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
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	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary and Detailed Site Investigation (DSI) for the proposed Nepean TAMS development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the investigation is to make an assessment of site contamination.

For the purpose of this report, 'the site' refers to the proposed TAMS development area. The surrounds within the hospital are referred to as the 'wider hospital campus'. 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 Review of Environmental Factors (REF) for the proposed Nepean TAMS development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[5] (formerly known as SEPP55).

A geotechnical investigation was undertaken in conjunction with this DSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 35033LTrpt)[6]. This report should be read in conjunction with the JKG report.

JKE (as EIS, prior to our rebranding) completed a Preliminary Environmental Site Assessment (Contamination) (Ref: E29845KPrpt)[7] of the wider hospital campus. The 2017 ESA report also references and reviewed two previous contamination reports prepared by Golder Associates (Ref: 107622058-004-R-RevA)[8] and (Ref:107622059-003-R-Rev0)[9] which covered other portions of the wider hospital campus, with some minor overlap into the current site area. A detailed review of these reports is provided in Section 2.

JKE completed a PSI/DSI of the CAMHS site, immediately to the north of the site. The site information and site history provided in the Lotsearch report (refer to Appendix B) obtained for the investigation of the CAMHS site was utilised in preparation of this DSI.

1.1 Proposed Development Details

From the architectural plans provided by the client, JKE understands the proposed development includes construction of a two-level building in the southern portion of the site with a footprint of approximately 600m^2. The approximate extent of the proposed building is shown on the attached Figure 2. It is assumed that the remainder of the site is likely to remain for use as an on-grade carpark.

The building is proposed to contain a maintenance workshop on the ground level with staff amenities on the upper level. Only minor excavation is presumed to be required for footings or piles, with the building being constructed at or above existing ground levels.

[5] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

[6] JKG, (2022). *Report to Health Infrastructure on Geotechnical Investigation for Proposed TAMS Building at Nepean Hospital, Derby Street, Kingswood, NSW.* (referred to as JKG report)

[7] EIS (2017). *Report to Health Infrastructure on Preliminary Environmental Site Assessment (Contamination) for Proposed Hospital Upgrade at Nepean Hospital, Derby Street, Kingswood, NSW*. (referred to as 2017 ESA report)

[8] *Golder (2010a). Penrith Health Campus Redevelopment Stage 3 (East Block), Nepean Hospital – Phase I & II Environmental Site Assessment dated 20 May 2010* (referred to as Golder 2010a)

[9] *Golder (2010a). Penrith Health Campus Redevelopment Stage 3A, Nepean Hospital – Phase I & II Environmental Site Assessment dated 1 July 2010* (referred to as Golder 2010b)

Although no specific landscaped areas are proposed as part of the development, the design in in the preliminary phase and there is uncertainty around any landscaped areas within the site boundary. A copy of the supplied development plans is attached in the appendices.

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 an 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 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 soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP55875PL) of 4 February 2022 and written acceptance from the client of 22 June 2022. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- 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)[10], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[11] and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

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

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

2 SITE INFORMATION

2.1 2017 ESA

The 2017 ESA included a site inspection and soil sampling and analysis from 16 borehole locations. The 2017 ESA report identified the following:

- A search of SafeWork NSW records did not identify any records pertaining to the wider hospital campus. However, the report notes that it is possible that the search did not identify any records due to the various street addresses that have historically been used for the hospital. The 2017 ESA scope also included a review of the Golder 2010a and 2010b reports which did identify the storage of dangerous goods;
- Potential sources of contamination/AEC outlined in the CSM included fill material, above-ground bulk fuel and chemical storage, former/abandoned Underground Storage Tanks (USTs), historical agricultural use and hazardous building materials;
- All soil results were below the human-health based site assessment criteria (SAC) for a commercial/industrial land use setting;
- Asbestos was identified in fibre cement material in one sample collected from the ground surface in the north-eastern section of the wider hospital campus; and
- Minor elevations of nickel and benzo(a)pyrene above the ecological SAC for commercial/industrial land use were identified in road base fill material beneath the asphaltic pavement.

The 2017 ESA report concluded that: "….*the potential for widespread, significant contamination at the site was considered to be low to moderate. Based on the scope of work undertaken, EIS are of the opinion that the site can be made suitable for the proposed development via the completion of additional investigation, and if required, remediation.*"

2.2 Golder 2010a

The investigation was limited to the general area currently occupied by East Block to the north-west of the site (see Figure 4). The Golder 2010a report included a summary of a preliminary investigation undertaken by Golder in 2009. The preliminary investigation indicated the following:

- The investigation identified no specific potential sources of contamination (past or present) associated with land use operations. Potentially contaminating past activities could have included the generation, storage and in-ground disposal of waste produced at the hospital;
- CoPC included heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), total petroleum hydrocarbons (TPHs – referred to herein as total recoverable hydrocarbons, TRHs), benzene, toluene, ethylbenzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), asbestos fibres and asbestos containing materials (ACM); and
- The risk to construction workers and future site users from the CoPC was considered likely to be low, and the risk to surface and groundwater was considered likely to be negligible.

In summary, the preliminary investigation recommended:

- An intrusive investigation to confirm the above findings;

- Review of the CoPC following the investigation and visual inspection of the soils to ensure testing includes all appropriate contaminants;
- Review of the potential risks to workers, site users, surface water and groundwater, with remedial actions prescribed accordingly if required; and
- A hazardous materials survey prior to demolition of the existing structures.

The Golder 2010a investigation was designed as a detailed contamination assessment including review of historical information (Phase 1 desktop) and detailed investigation of the assessment area (see Figure 4). The investigation included sampling from 16 boreholes which met the minimum guideline density required by the NSW EPA. In summary:

- The investigation area formed part of the wider hospital campus. Historical land titles indicated that the site has been owned by the Nepean District Hospital since the early 1940s. Prior to this, part of the land was owned by Frederick Nepean Jones (a Master Tanner by trade);
- A search of WorkCover NSW records (now SafeWork NSW) did not identify any records pertaining to dangerous goods storage in the investigation area. However, the search did identify a number of areas within the wider hospital site where dangerous goods have been stored, including USTs for diesel. As the records were not attached to the draft report, the location of the USTs could not be established;
- A fragment of fibre cement (possible ACM) was observed within exposed soils "to the south of East Block". Exposed soils did not indicate the presence of widespread fill materials;
- The investigation identified fill up to a maximum depth of approximately 1.6m, overlying natural soil and weathered siltstone and shale;
- Groundwater was identified at a depth of approximately 5.3m;
- Field photo-ionisation detector (PID) screening indicated a low probability of volatile organic compound (VOC) contamination, with results ranging from 0ppm to 1.7ppm; and
- A total of 15 primary samples were analysed for the CoPC listed previously. All results were below the adopted SAC for commercial/industrial land use.

Golder 2010a concluded that *"……the area of investigation is considered to have a low likelihood of extensive soil contamination and low risk to human health. However, based on the findings of the Phase I there is a potential for the presence of fragments of fibro cement which may contain asbestos. It is recommended that if these materials are encountered they are to be collected and disposed of by an appropriately licensed contractor,…."*.

JKE note that substantial earthworks appear to have occurred in the Golder 2010a investigation area following the Golder 2010a investigation. This may have included cut/fill earthworks, and/or importation of additional fill.

2.3 Golder 2010b

The investigation was limited to three separate proposed development areas (see Figure 4). These areas included a Mental Health Patient Unit in the central south of the site, an Oral Health Unit in the south-east of the site, and a new maintenance depot in the north/north-west of the wider hospital campus.

The Golder 2010b investigation was designed as a detailed contamination assessment including review of historical information (Phase 1 desktop) and detailed investigation of the three nominated areas. The investigation included sampling from a total of 25 boreholes which Golder stated met the minimum guideline density required by the NSW EPA. In summary:

- The development areas formed part of the wider hospital campus. Historical aerial photographs indicated that some cultivation activities may have occurred on site in the early to mid-1900s;
- Section 149 (2&5) planning certificates (now Section 10.7 (2&5)) indicated that the land does not: include and is not affected by the following:
  - Critical habitat;
  - Conservation areas;
  - Mine subsidence;
  - Policy adopted by council to restrict development on the land due to land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk;
  - The land has not been declared an investigation or remediation area under Part 3 of the *Contaminated Land Management Act 1997* and is not subject of a voluntary investigation proposal or site audit statement.
- A search of WorkCover NSW records (now SafeWork NSW) was included. The records identified a number of dangerous goods stores/depots within the hospital (most of which are not considered by JKE to be significant as they relate to above ground stores for medical-related items such as nitrous oxide and oxygen). Based on a review of the records by JKE, the following was noted (reference can also be made to Figure 4):
  - A former UST (9,000L for petrol or diesel storage) was abandoned in the central-south-western section of the wider hospital. A letter dated September 1995 indicated that the tank was *"evacuated, filled with sand and all pipework's removed"*;
  - A former UST (25,000L) was abandoned via concrete grout filling and sealing of vents and fill points. The location of this UST is unknown. Although the details vary somewhat, based on the date of the documentation, JKE consider this may be the same UST as noted above;
  - Up to 40L of xylene was stored in a 'roofed store' in the north-western section of the wider hospital campus;
  - Up to 40L of diesel was contained within a 'storage area' in the central-southern area of the wider hospital campus;
- The investigation identified fill up to a maximum depth of approximately 2m, overlying natural soil and weathered siltstone and shale;
- Groundwater was identified at depths ranging from approximately 2.8m to 5.3mBGL;
- Field PID screening indicated a low probability of VOC contamination, with results ranging from 0ppm to 8.5ppm;
- A total of 40 primary soil samples were analysed for the CoPC listed previously. With the exception of the presence of asbestos in one soil sample obtained from BHA (see Figure 4), all results were below the adopted SAC for commercial/industrial land use; and
- A total of four primary groundwater samples were analysed for heavy metals, TRH, BTEX and PAHs. Marginally elevated concentrations of some heavy metals were detected. Golder considered that the metals were the result of the underlying geology (i.e. a regional condition, rather than a site-specific contamination issue). TRHs, xylene and ethylbenzene were encountered in BHI and BH102 (see Figure

4). The concentrations were below the SAC adopted by Golder and were considered to indicate the possibility of on-site contamination resulting from past or current uses.

Golder 2010b concluded that *"……the area of investigation is considered to have a low likelihood of extensive soil contamination and low risk to human health."*.

2.4 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Health Infrastructure NSW
Site Address:	Derby Street, Kingswood, NSW
Lot & Deposited Plan:	Part of Lot 4 DP1238301
Current Land Use:	Commercial/Industrial – Carpark
Proposed Land Use:	Commercial/Industrial – Maintenance Office Building
Local Government Authority:	Penrith City Council
Current Zoning:	SP2: Infrastructure
Site Area (m^2) (approx.):	Approx. 1,790m^2
RL (AHD in m) (approx.):	50-52
Geographical Location (decimal degrees) (approx.):	Latitude: -33.761087534 Longitude: 150.714707345
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
SAC Exceedance Plan:	Figure 3
Plan of Notable Features from Previous Investigations:	Figure 4

2.5 Site Location and Regional Setting

The site is located within the grounds of the wider hospital campus and is bound by and internal service road to the north and a staff car park and Derby Street to the south. The site is located approximately 400m to the north-west of a small tributary to Werrington Creek.

2.6 Topography

The regional topography is gently undulating characterised by a local ridgeline that runs on a north-south orientation, roughly along Parker Street and the Northern Road. The site itself consisted of a gentle slope down towards the south with a gradient of approximately 2°.

2.7 Site Inspection

A walkover inspection of the site was undertaken by JKE on 4 June 2022. The inspection was limited to accessible areas of the site and immediate surrounds. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

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

At the time of the inspection, the site was in use as an asphalt/gravel-covered carpark for fleet vehicles for Nepean Hospital. Several light poles were within the area of the site in addition to boom gates at the exit/entrance driveways on the south-western end of the site.

2.7.2 Buildings, Structures and Roads

No structures were present at the site during the time of the inspection. The site is covered with asphaltic concrete, which was in poor condition and exposed the underlying soil or gravels in large portions of the site.

2.7.3 Boundary Conditions, Soil Stability and Erosion

At the time of the inspection the site was not fenced and no signs of erosion or soil wash was encountered.

2.7.4 Presence of Drums/Chemical Storage and Waste

At the time of the inspection, there was no evidence of any chemical storage or waste on the site.

2.7.5 Evidence of Cut and Fill

Portions of the site may have historically been cut and/or filled to achieve the relatively level site surface for the existing car park.

2.7.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Minor surficial staining (suspected to be from minor fuel or oil leaks from parked vehicles) was observed on the asphalt in south-eastern corner of the site, in areas designated as car parking spots. No other staining or olfactory indicators of contamination were observed around the site.

2.7.7 Drainage and Services

Surface water flow was expected to follow the topography of the site towards the south. Run-off from site is expected to flow onto Derby Street and into the stormwater drainage system. Additionally, sewer pits were observed in the north-eastern and south-eastern corners of the site.

2.7.8 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.

2.7.9 Landscaped Areas and Visible Signs of Plant Stress

Sparse vegetation was present on site, in the form of native trees and shrubs, specifically in landscaped areas along the northern, western and southern edges of the site. These plants appeared healthy, with no obvious signs of vegetative stress or dieback.

2.8 Surrounding Land Use

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

- North – Nepean 2 building and wider Nepean Hospital campus;
- South – Derby Street with residential apartment buildings and Nepean Dermatology beyond;
- East – Nepean Hospital P5 multi-storey car park; and
- West – Nepean Sexual Health and Court buildings.

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

2.9 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the investigation 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. Major services were not identified that would be expected to act as preferential pathways for contamination migration.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

Regional geological information was reviewed for the investigation. The information was sourced from the Lotsearch report attached in the appendices. The report indicates 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 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.

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 was a total of 10 registered bores within the report buffer of 2,000m. In summary:

- The nearest registered bore was located approximately 880m from 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 available typically identified fill and/or clay soil to depths of 0.5, underlain by shale bedrock. Standing water levels (SWLs) in the one bore with data available was measured at 69mBGL.

The information reviewed for the DSI indicates that the subsurface conditions at the site are likely to consist of fill overlying relatively low permeability (residual) soils and shallow 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 anticipate groundwater to flow towards the south-east. This was not confirmed within the scope of this investigation.

3.4 Receiving Water Bodies

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is the tributary to Werrington Creek located approximately 400m to the south-east of the site. This is cross-gradient from site and is considered unlikely to be a potential receptor.

4 SITE HISTORY INFORMATION

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the investigation. The information was sourced from 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
1943	**On-site:** The site appeared to be vacant and grassed (possibly used for grazing purposes). Trees and visible tracks were located across the site and in the immediate surrounds. **Off-site:** The surrounds appeared similar to the site and were potentially used for grazing purposes.
1949	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** The surrounds appeared generally similar to the previous photograph with the exception of evidence of residential development south of the site. These appeared to consist of small buildings with large cleared paddocks possibly used for grazing or agricultural use.
1956	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** Areas to the north and west of the site appeared to contain the original buildings built within the wider hospital. Additional residential properties visible to the south and south-east.
1961-1970	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** The wider hospital buildings to the north and west appeared to have expanded with service roads and main entrance area to the north.
1978	**On-site:** The site appeared generally similar to the previous photograph **Off-site:** The wider hospital campus appeared to have further expanded to the north and west, with the construction of the Nepean 1 building visible to the north-west of the site.
1982-1986	**On-site:** The site appeared generally similar to the previous photograph. **Off-site:** Construction of additional car parking and other buildings associated with the hospital campus were visible to the north of the site.
1991	**On-site:** The site now appeared to be mostly paved and in use as a car park. Cut and or fill works may have taken place at this time to achieve a level surface for the car park. **Off-site:** Further expansion of the wider hospital campus continued to the north, south, east and west of the site.
1994-2000	The site and immediate surrounds appeared generally similar to the previous photograph.
2009-2015	The P5 multi-storey car park to the west of the site was constructed during this time. The site itself appeared unchanged.
2020	The general site layout and immediate surrounds appeared generally similar to the present day.

4.2 NSW EPA and Department of Defence Records

A review of the NSW EPA and Department of Defence databases was undertaken for the DSI. Information from the following databases were sourced from the Lotsearch report:

- 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)[12];
- Licensed activities under the Protection of the Environment Operations Act (1997)[13];
- Sites being investigated under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program;
- Sites being investigated by the Department of Defence for PFAS contamination; and
- Sites being managed by the Department of Defence for PFAS contamination.

The search included the site and surrounding areas in the report buffer. A summary of the information is provided below:

Table 4-2: NSW EPA and Department of Defence Records

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	None
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	None
Licences under the POEO Act 1997	None	Current and historical licenses were identified for several properties within the report buffer, including the application of herbicides along waterways, railway activities and road construction. However, these activities are considered unlikely to pose a contamination risk to the site or represent and off-site source of contamination.
Records relating to the NSW EPA PFAS Investigation Program	None	None
Records relating to the Department of Defence PFAS management and investigation programs	None	None

[12] 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)

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

4.3 Historical Business Directory and Additional Lotsearch Information

Historical business records and other relevant information were reviewed for the investigation. The information was sourced from the Lotsearch report and summarised in the following table:

Table 4-3: Historical Business Directory and other Records

Records	On-site	Off-site
Historical dry cleaners, motor garages and service stations	None	There were several motor garages listed in the report buffer between 1970-1993. The nearest property was a service station located approximately 320m to the north of the site. Due to the distance and likely cross-gradient location, the property is not considered to represent an off-site source of contamination. The remaining properties were located further than 400m from the site and were either cross or down-gradient, and therefore not of concern.
Other historical businesses that could represent potential sources of contamination	None	None
National waste management site database	None	None
National liquid fuel facilities	None	There was one listed liquid fuel facility within the report buffer. This is a Caltex petrol station and is located approximately 600m to the north of the site and is not of concern.
Mapped heritage items	None	Various heritage items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.
Mapped ecological constraints	None	Various ecological items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.
Mapped naturally occurring asbestos	None	None

4.4 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the following table. 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 4-4: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
Pre 1943-1949	Vacant / Agricultural (grazing)	Vacant / Agricultural (grazing)
1949-1986	Part of the Nepean Hospital campus. Development on-site had not yet occurred.	Nepean Hospital campus. Various construction and development activities relating to the expansion of the hospital have continuously taken place for upgrading of facilities.
1986- 1991	The site had been paved and was in use as a car park during this time. Potential cut/fill works may have taken place associated with the construction works.	
1991-2009	The site and surrounds appeared unchanged.	
2009-2015	The site appeared unchanged during this time.	Construction of the P5 mutli-0storey car park to the west of the site occurred at this time.
2015-2020	The site and surrounds appeared generally similar to the present day.	

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 has 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 – Previous investigations identified fill to variable depths across the wider hospital campus. The fill may have been imported from various sources and could be contaminated.	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.
On-site car park – The site has been in use as an open-air car park since sometime between 1986 and 1991. Surficial impacts from fuel/oil leaking from parked vehicles may have occurred since this time.	Lead, TRH, PAHs and BTEX
Off-site sources of contamination (within the wider hospital campus) – Historical records and findings from the previous investigations identified: bulk diesel storage and flammable liquids (notably xylene) in the north-western section and of the wider hospital campus; at least one UST was identified within the wider hospital campus; and detectable concentrations of xylene in ground water as identified in BH102 in the Golder 2010b investigation. Refer to Figure 4 for the locations of these off-site sources.	Lead, TRH, PAHs and BTEX
Historical agricultural use – The site may have been historically used for grazing purposes prior to 1949. This could have resulted in contamination across the site via use of machinery, application of pesticides, installation of pipework containing asbestos etc.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site for typical pest control applications.	Heavy metals and OCPs

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); • On-site car park – 'top-down' and spills (e.g. leaks from parked vehicles at the ground surface level); • Off-site (wider hospital campus) sources (fuel storage/xylene impacts) – 'top-down', spills (e.g. during filling of the tanks and/or dispensing activities), or sub-surface release (e.g. from leaking tank or pipework); • Historical agricultural use – 'top-down' and spills (e.g. application of pesticides, refuelling or repairing machinery, and other activities at the ground surface level); and • Use of pesticides – 'top-down' and spills (e.g. during normal use, application and/or improper storage).
Affected media	Soil and groundwater have been identified as potentially affected media. It is noted that some of the CoPC are volatile and may affect soil vapour. Soil vapour would need to be considered depending on the contamination status of soil/groundwater.
Receptor identification	Human receptors include site occupants/users (including primarily adults), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users within the same/similar land use setting. Use of the site by children may occur, however is expected to be infrequent. This has been discussed further later in this report. Ecological receptors include terrestrial organisms and plants within unpaved areas. This has been included to incorporate any associated landscaping which may occur as part of the proposed development.
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 inhalation of vapours within enclosed spaces such as buildings and basements. This pathway would only be a consideration if elevated concentrations of volatile contaminants be identified in soil or groundwater.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination:

	• Vapour intrusion into the proposed basement and/or building (either from soil contamination or volatilisation of contaminants from groundwater); and • Contact (dermal, ingestion or inhalation) during construction and/or with exposed soils in unpaved areas. Whilst there are no surface water bodies in the immediate vicinity and no associated receptors, we have assessed the groundwater data against relevant ecological criteria for screening purposes.

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). 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 consent authority in exercising its planning functions in relation to the development proposal.

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

The DQOs were developed by the author of this report and checked by the reviewer. Both the author and reviewer were joint decision-makers in relation to Step 2 of the DQO process.

6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation 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 suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

6.1.3 Step 3 - Identify Information Inputs

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

- Existing relevant environmental data from previous reports;
- 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 and groundwater for the CoPC identified in the CSM. It is noted that a broader suite of VOCs were screened in groundwater; 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 (spatial boundary). The sampling was completed between 4 June 2022 and 9 June 2022 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

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 investigation, the following decision rules will apply:
- If all CoPC (with the exception of asbestos) concentrations are below the SAC, then the data will be compared directly to the SAC without statistical analysis;
- For soil data, if any individual CoPC (with the exception of asbestos) concentration is above the SAC, then statistical analysis will be undertaken. This will include calculation of the 95% upper confidence limit (UCL) value for the data set, with regards to the NEPM (2013) framework and other relevant guidelines made under the CLM Act 1997. The UCL will be considered acceptable where the UCL is below the SAC, the standard deviation of the data is less than 50% of the SAC and none of the individual concentrations are more than 250% of the SAC;
- If asbestos concentrations are encountered above the SAC or in the top 100mm of soil, then asbestos will be deemed a contaminant of concern for remediation purposes; and
- Groundwater data will be compared directly to the SAC and evaluated with regards to valid/complete SPR-linkages.

6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike, trip blank and rinsate 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 investigation, the null hypothesis (H_0) is that the 95% UCL for the CoPC is greater than the SAC. The alternative hypothesis (H_A) is that the 95% UCL for the CoPC is less than the SAC. Alternative considerations are made regarding asbestos based on an assessment of multiple lines of evidence.

Potential outcomes include Type I and Type II errors as follows:

- Type I error of determining that the soil is acceptable for the proposed land use when it is not (wrongly rejects true H_0), includes an alpha (α) risk of 0.05; and
- Type II error of determining that the soil is unacceptable for the proposed land use when it is (wrongly accepts false H_0), includes beta (β) risk of 0.2.

Statistical analysis will not apply to asbestos or groundwater data, therefore these data will be assessed based on a multiple lines of evidence and risk-based approach.

Data Quality Indicators (DQI) for field and laboratory QA/QC samples are defined in the QA/QC Data Evaluation in the appendices. An assessment of the DQI's was made in relation to precision, accuracy, representativeness, completeness and comparability.

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 investigation objectives. Adjustment of the investigation 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 investigation is outlined in the table below:

Table 6-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were obtained from seven locations as shown on the attached Figure 2. This number of locations met the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[14].
Sampling Plan	The sampling locations were placed on a systematic plan with a grid spacing of approximately 17m between sampling location. A systematic plan was considered suitable to identify hotspots to a 95% confidence level and calculate UCLs for specific data populations (UCLs were only applied were appropriate and in accordance with the DQOs). Based on the 17m square grid spacing, the following hotspot diameters have been calculated: • Circular hotspot diameter with a 95% confidence level (K value of 0.59) – 19.9m; and • Elliptical hotspot diameter with a 95% confidence level (K value of 0.9) – 30.2m along the long dimension and 15.1m along the short dimension. JKE note that due to the presence of underground services, BH104 and BH102 were relocated and are not accurately on the grid-based sampling plan. Therefore, the confidence level of the above hotspot diameters may vary in the vicinity of these locations.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected 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.
Sample Collection and Field QA/QC	Soil samples were obtained on 4 June 2022 in accordance with our standard field procedures. 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. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.
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

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

Aspect	Input
	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 included the following: • A representative bulk sample was collected from fill at 1m intervals, or from each distinct fill profile. The quantity of material for each sample varied based on whatever return could be achieved using the auger. The bulk sample intervals are shown on the attached borehole logs; • Each 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; • 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 bulk 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. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.
Decontamination and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. 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 wells were installed in BH101 (MW101), BH104 (MW104) and BH107 (MW107). The wells were positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW104 and MW107 were considered to be in the up-gradient area of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the north-west. MW101 was considered to be in the down-gradient area of the site and would be expected to provide an indication of groundwater flowing across (beneath) the site and beyond the down-gradient site boundary.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. The monitoring wells were installed to depths of approximately 6m below ground level. The wells were generally constructed as follows:

Aspect	Input
	• 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 monitoring well installation, including the screen lengths, were considered suitable for assessment of general groundwater quality with regards to Table 5 in Schedule B2 of NEPM 2013.
Monitoring Well Development	The monitoring wells were developed on 4 June 2022 using a submersible electrical pump. Due to the hydrogeological conditions, groundwater inflow into the wells was relatively low and there was no water in MW104 or MW107. A small volume of water was encountered in MW101 and the well was pumped until it was effectively dry. Steady state conditions were not achieved. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring wells were allowed to recharge for approximately five days after development. Groundwater samples were obtained on 9 June 2022. Prior to sampling, the monitoring wells were 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: • Standing water level (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. 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. Steady state conditions were not achieved during sampling due to the low groundwater inflows. 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	During development, the pump was flushed between monitoring wells with potable water (single-use tubing was used for each well). The pump tubing was discarded after each sampling event and replaced 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 or ice bricks. 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.

6.3.1 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 6-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	297274 & 297775
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	31869 & 31972

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.

The guidelines on specific land use scenarios outlined in the NEPM 2013, Schedule B7, Section 3.2.5.3, state that:

"Adults of working age are the population usually most sensitive to health risks associated with soil contamination within the generic commercial/industrial land use scenario. Although many commercial premises welcome children on an intermittent basis, it is unlikely that children visit the majority of workplaces frequently. Similarly, in commercial premises where children are regular visitors, such as shopping centres, both the duration and frequency of child exposures are generally lower than that of a full-time adult employee."

"In accordance with the recommendations outlined in enHealth (2004), the adult employees addressed in the HIL D values have been considered to work within the same commercial/industrial premises for their full working life (30 years). The HILs developed for the commercial/industrial land use scenario are not applicable to a site used frequently by more sensitive groups such as children (within childcare centres, hospitals and hotels) and the elderly (within hospitals, aged care facilities and hospices)."

For this proposed development and associated land use at the site, we have adopted the commercial/industrial human-health and ecological SAC. This SAC is based on the proposed land use as an asset management facility where it is unlikely that children will be visiting the site frequently or for extended time periods.

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 'commercial/industrial' exposure scenario (HIL-D);
- Health Screening Levels (HSLs) for a 'commercial/industrial' exposure scenario (HSL-D). HSLs were calculated based on conservative assumptions including a 'sand' 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)[15]; and
- Asbestos was assessed against the HSL-D criteria. A summary of the asbestos criteria is provided in the table below:

[15] 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*

Table 7-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-D 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 the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[16]. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.05% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): $$\textbf{\% w/w asbestos in soil} = \frac{\textbf{\% asbestos content x bonded ACM (kg)}}{\text{Soil volume (L) x soil density (kg/L)}}$$ 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): $$\textbf{\% w/w asbestos in soil} = \frac{\textbf{\% asbestos content x bonded ACM (g)}}{\text{Soil weight (g)}}$$

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for a 'commercial/industrial' 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[17];
- ESLs were adopted based on the soil type;
- 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)[18]. This method is considered to be adequate for the Tier 1 screening. It is noted that physiochemical data were obtained for soil pH and cation exchange capacity, however, it was not needed to calculate the EILs as the heavy metals results were sufficiently low.

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

[16] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

[17] 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)

[18] 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

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)[19] 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.

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)[20]. Environmental values for this investigation include human-health risks in non-use scenarios. Aquatic ecosystems are also being considered for completeness.

7.2.1 Human Health

- The NEPM (2013) HSLs were not applicable for this project as the groundwater was recorded at depths shallower than 2m. 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 2021)[21] for BTEX compounds and selected VOCs;

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

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

[21] National Health and Medical Research Council (NHMRC), (2021). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

- World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[22] 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.

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)[23]. 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.

[22] 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)

[23] 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 is 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 logs attached in the appendices for further details.

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Asphaltic Concrete (AC) pavement was present at the site however was not encountered at measurable thickness in the sample locations.
Fill	Fill was encountered at the surface in all boreholes and extended to depths of approximately 0.5mBGL to 1.0mBGL. The fill depths are shown on Figure 2. The fill typically comprised silty clay, sandy gravelly clay, gravelly sand and silty sandy clay with inclusions of ash, sandstone gravels, igneous gravels, ironstone gravels and root fibres. A slight hydrocarbon odour was detected in the shallow fill in BH101. This was attributed to a previous oil/fuel leak from a parked vehicle.
Natural Soil	Natural silty clay soil was encountered beneath the fill in all boreholes and extended to depths of between approximately 1.0mBGL and 2.2mBGL. BH102, BH103, BH105 and BH106 were terminated in the natural soil at the intended target depth.
Bedrock	Weathered siltstone bedrock was encountered in BH101, BH104 and BH107 at depths of between 2.1mBGL and 2.2mBGL. The siltstone extended to the termination depth of the boreholes where it was encountered.
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. All boreholes remained dry on completion of drilling and a short time after.

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 0.1ppm to 0.7ppm equivalent isobutylene which indicate that relatively low to negligible levels of PID detectable VOCs were present.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. All screening results were below the SAC. Visible asbestos/FCF/ACM was not identified in the bulk samples.

Aspect	Details
Groundwater Depth & Flow	Groundwater seepage was not encountered in the boreholes during drilling and remained dry during and a short time after completion of drilling. SWLs measured in the monitoring wells installed at the site ranged from 1.66mBGL to 2.61mBGL. The groundwater wells were not surveyed, therefore groundwater RLs were not calculated on these measurements. However, based on the contour plot created as part of a previous investigation at the hospital by JKE, groundwater flow is considered to be generally towards the south-east.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 5.7 to 6.3; - EC ranged from 20,365µS/cm to 25,156µS/cm; - Eh ranged from 131.2mV to 151.5mV; and - DO ranged from 3.9ppm to 4.8ppm. VOC concentrations in the monitoring well headspace were between 0.5ppm and 6.6ppm at the time of sampling.
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 were assessed against the SAC presented in Section 7.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results 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	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	11	6	0	0	-
Cadmium	11	<PQL	0	NSL	-
Chromium (total)	11	34	0	0	-
Copper	11	38	0	0	-
Lead	11	15	0	0	-
Mercury	11	<PQL	0	NSL	-
Nickel	11	40	0	0	-
Zinc	11	36	0	0	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Total PAHs	11	2.4	0	NSL	-
Benzo(a)pyrene	11	0.2	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	11	<PQL	0	NSL	-
Naphthalene	11	<PQL	0	NSL	-
DDT+DDE+DDD	7	<PQL	0	NSL	-
DDT	7	<PQL	NSL	0	-
Aldrin and dieldrin	7	<PQL	0	NSL	-
Chlordane	7	<PQL	0	NSL	-
Heptachlor	7	<PQL	0	NSL	-
Chlorpyrifos (OPP)	7	<PQL	0	NSL	-
PCBs	7	<PQL	0	NSL	-
TRH F1	11	<PQL	0	0	-
TRH F2	11	<PQL	0	0	-
TRH F3	11	<PQL	0	0	-
TRH F4	11	<PQL	0	0	-
Benzene	11	<PQL	0	0	-
Toluene	11	<PQL	0	0	-
Ethylbenzene	11	<PQL	0	0	-
Xylenes	11	<PQL	0	0	-
Asbestos (in soil) ACM >7mm AF/FA	7	<0.01 % w/w 0.001% w/w	0 0	-	-

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

8.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 7.1.4. 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	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	11	0	0	-
Cadmium	11	0	0	-
Chromium	11	0	0	-
Copper	11	NSL	NSL	-
Lead	11	0	0	-
Mercury	11	0	0	-
Nickel	11	0	0	-
Zinc	11	NSL	NSL	-
TRH (C_6-C_9)	11	0	0	-
TRH (C_{10}-C_{36})	11	0	0	-
BTEX	11	0	0	-
Total PAHs	11	0	0	-
Benzo(a)pyrene	11	0	0	-
OCPs & OPPs	7	0	0	-
PCBs	7	0	0	-
Asbestos	7	-	-	Asbestos was not detected in the samples analysed.

N: Total number (primary samples)
NSL: No set limit

8.5 Groundwater Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.2. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

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

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	3	2	0	0	-
Cadmium	3	2.5	0	3	Cadmium exceeded the ecological SAC in MW101, MW104 and MW107 with a maximum concentration of 2.5µg/L identified in sample MW101.
Chromium (total)	3	2	0	0	-
Copper	3	4	0	1	One elevated concentration of copper above the ecological criterion was encountered in MW104.
Lead	3	<PQL	0	0	-
Mercury	3	<PQL	0	0	-
Nickel	3	220	0	2	Two elevated concentrations of nickel above the ecological criterion were encountered in MW101 and MW107, with a maximum concentration of 220µg/L identified in the sample MW101.
Zinc	3	330	0	3	Zinc exceeded the ecological SAC in MW101, MW104 and MW107 with a maximum concentration of 330µg/L identified in sample MW107.
Total PAHs	3	0.6	0	0	-
Benzo(a)pyrene	3	<PQL	0	0	-
Naphthalene	3	0.6	0	0	-
TRH F1	3	<PQL	0	NSL	-
TRH F2	3	82	0	NSL	Traces of TRH F2 were detected in MW101.
TRH F3	3	<PQL	NSL	NSL	-
TRH F4	3	<PQL	NSL	NSL	-
Benzene	3	<PQL	0	0	-

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Toluene	3	<PQL	0	0	-
Ethylbenzene	3	<PQL	0	0	-
m+p-Xylene	3	<PQL	0	0	-
o-Xylene	3	<PQL	0	0	-
Total Xylenes	3	<PQL	0	0	-
VOCs	3	<PQL	0	0	-
pH	3	5.7	0	2	The pH was marginally outside the criteria for freshwaters with the lowest pH of 5.7 recorded in MW101.
EC	3	29,000	NSL	NSL	-

Notes:

^: Primary samples

N: Total number

NSL: No set limit

NL: Not limiting

9 WASTE CLASSIFICATION ASSESSMENT

9.1 Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is assigned a preliminary classification of **General Solid Waste (non-putrescible)**.

An inspection should be undertaken following the removal of the overlying asphaltic concrete pavement to check there are no unexpected finds. An addendum letter/final waste classification report must be prepared documenting the inspection and confirming the waste quantity and classification prior to off-site disposal.

9.2 Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this assessment, and at the time of reporting, JKE is of the opinion that the natural soil at the site is likely to meet the definition of **VENM** for off-site disposal or re-use purposes.

Further assessment via sampling and/or inspection is required following the removal of the overlying fill to confirm this classification prior to off-site disposal of the waste. The anticipated waste quantities should also be confirmed at that time and documented in the addendum letter/final waste classification report.

10 DISCUSSION

10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this investigation, JKE identified the following potential contamination sources/AEC:

- Fill material;
- On-site car park (oil/fuel leaks from parked vehicles);
- Off-site contamination sources (within the wider hospital campus);
- Historical agricultural use; and
- Use of pesticides.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE is of the opinion that there is a potential for site contamination. The soil and groundwater data collected for the investigation is discussed further in the following subsection, as part of the Tier 1 risk assessment.

10.2 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.

10.2.1 Soil/Fill

All CoPC concentrations were below the SAC, indicating that there was no confirmed source of contamination associated with these CoPC and no complete SPR linkages.

10.2.2 Groundwater

Elevated concentrations of heavy metals including cadmium, copper, nickel and zinc above the ecological SAC were encountered in the groundwater sampled from groundwater wells MW101, MW104 and MW107. These elevations were consistent with the heavy metal concentrations encountered during groundwater sampling events undertaken for the previous investigations at the wider hospital campus. Therefore, JKE consider the elevated results are likely to be indicative of regional groundwater background concentrations rather than on on-site contamination source. On this basis, and considering there is no nearby surface water receptor, these heavy metals in groundwater are considered to represent a low risk to ecological receptors.

All remaining CoPC concentrations for BTEX, VOCs and PAHs were below the SAC, indicating that there was no source of contamination associated with these CoPC and no complete SPR linkages. Traces of TRH F2 were detected in groundwater in MW101, however the concentration was below the SAC (and we note that the SSA SAC are very conservative in the context of assessing vapour risks from volatile TRH in groundwater).

10.3 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?*

Yes, as noted in Section 10.1.

> *Are any results above the SAC?*

Yes, as noted in Section 10.2.

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

Risks were assessed to be low based on the DSI data.

> *Is remediation required?*

Based on the results of this DSI and in the context of the proposed development, there are no triggers for remediation.

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

Based on the data collected and assessed for the DSI, JKE is of the opinion that the site is suitable for the proposed development from a contamination standpoint, without the need for remediation.

10.4 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	Based on the site history and the results reported, the potential for groundwater contamination to pose a risk to the receptors is considered to be low. Additional work to address this data gap is not recommended.

11 CONCLUSIONS AND RECOMMENDATIONS

The DSI included a review of historical information for the site and sampling of the soil from seven borehole locations and groundwater from three monitoring wells. The site has historically been vacant or used for grazing/agricultural purposes, prior to its development as an open-air car park as part of the wider hospital campus from sometime between 1986 and 1991 to the present day.

The CoPC for the soil samples analysed were reported at concentrations below the SAC, or at levels below the laboratory detection limits. Risks from contamination (i.e. exposure via a complete SPR linkage) were not identified.

Elevations of heavy metals in groundwater were identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions. Overall, risks associated with groundwater contamination were assessed to be low.

Based on the findings of the DSI, JKE is of the opinion that the site is suitable for the proposed development described in Section 1.1. There is considered to be a relatively low potential for contamination-related unexpected finds to occur at the site during the proposed development works, however it is recommended that an unexpected finds protocol be developed and implemented during the construction phase of the development.

JKE is of the opinion that there is currently no requirement to report the contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[24]. JKE consider that the report objectives outlined in Section 1.2 have been addressed.

[24] 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 investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation 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 investigation 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 investigations 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 investigation 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.

Investigation Limitations
Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation 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 Investigations by Design Professionals
Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation 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 Investigation 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 investigation. 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 investigation. 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 investigation 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 investigation 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 investigation, 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

Title: **SITE LOCATION PLAN**

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Project No: E35033PL

Figure No: 1

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

JKEnvironments

PLOT DATE: 24/06/2022 10:23:23 AM DWG FILE: K:\5C EIS JOBS\35000'S\E35033PL KINGSWOOD\CAD\E35033PL.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)

0 4 8 12 16 20
SCALE 1:400 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

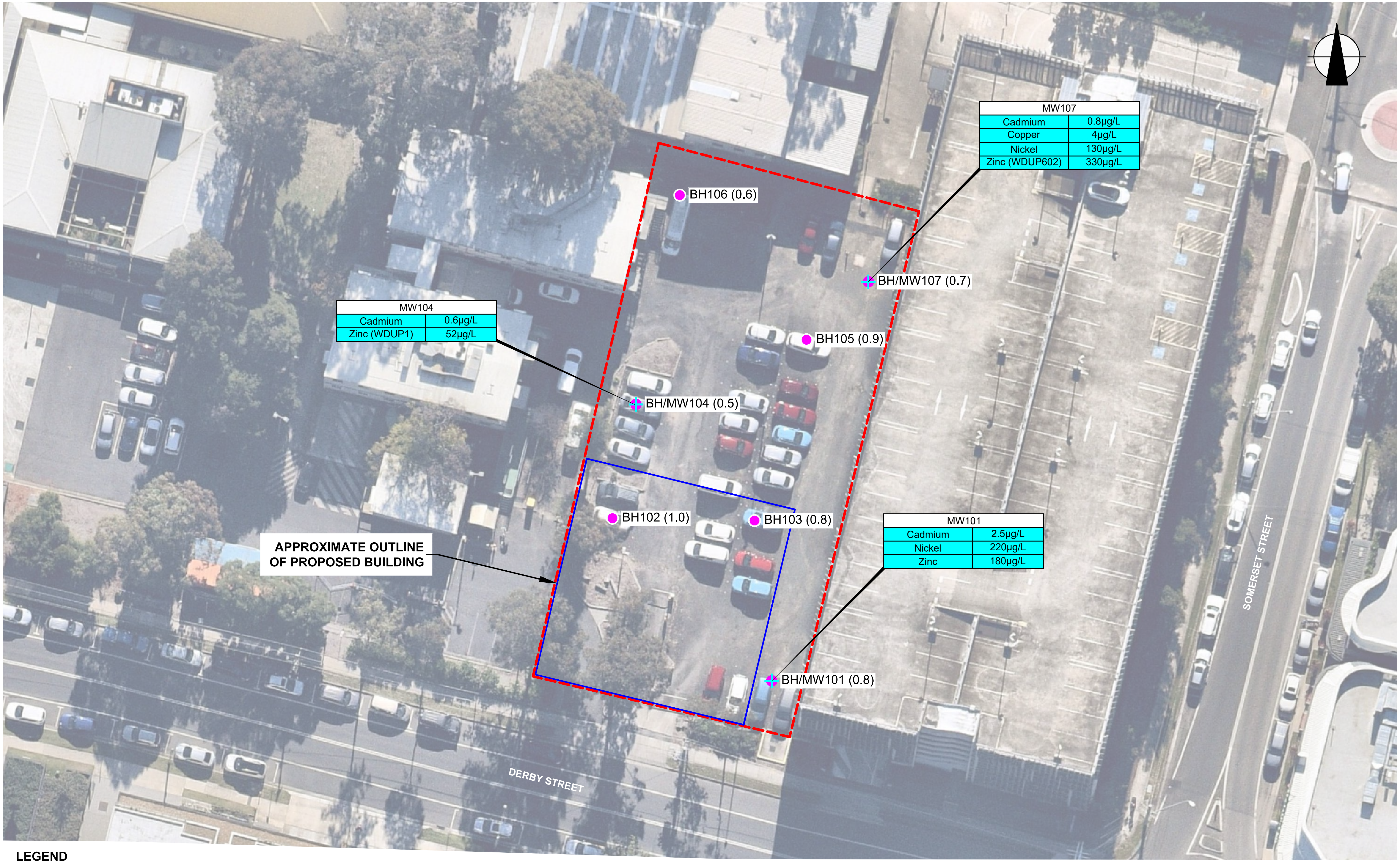
Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Project No: E35033PL

Figure No: 2

JKEnvironments

PLOT DATE: 1/07/2022 9:30:16 AM DWG FILE: K:\5C EIS JOBS\35000'S\E35033PL KINGSWOOD\CAD\E35033PL.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)

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

GROUNDWATER CONTAMINATION ABOVE SAC

0 4 8 12 16 20
SCALE 1:400 @A3 METRES

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

Title: **SAC EXCEEDANCE PLAN**

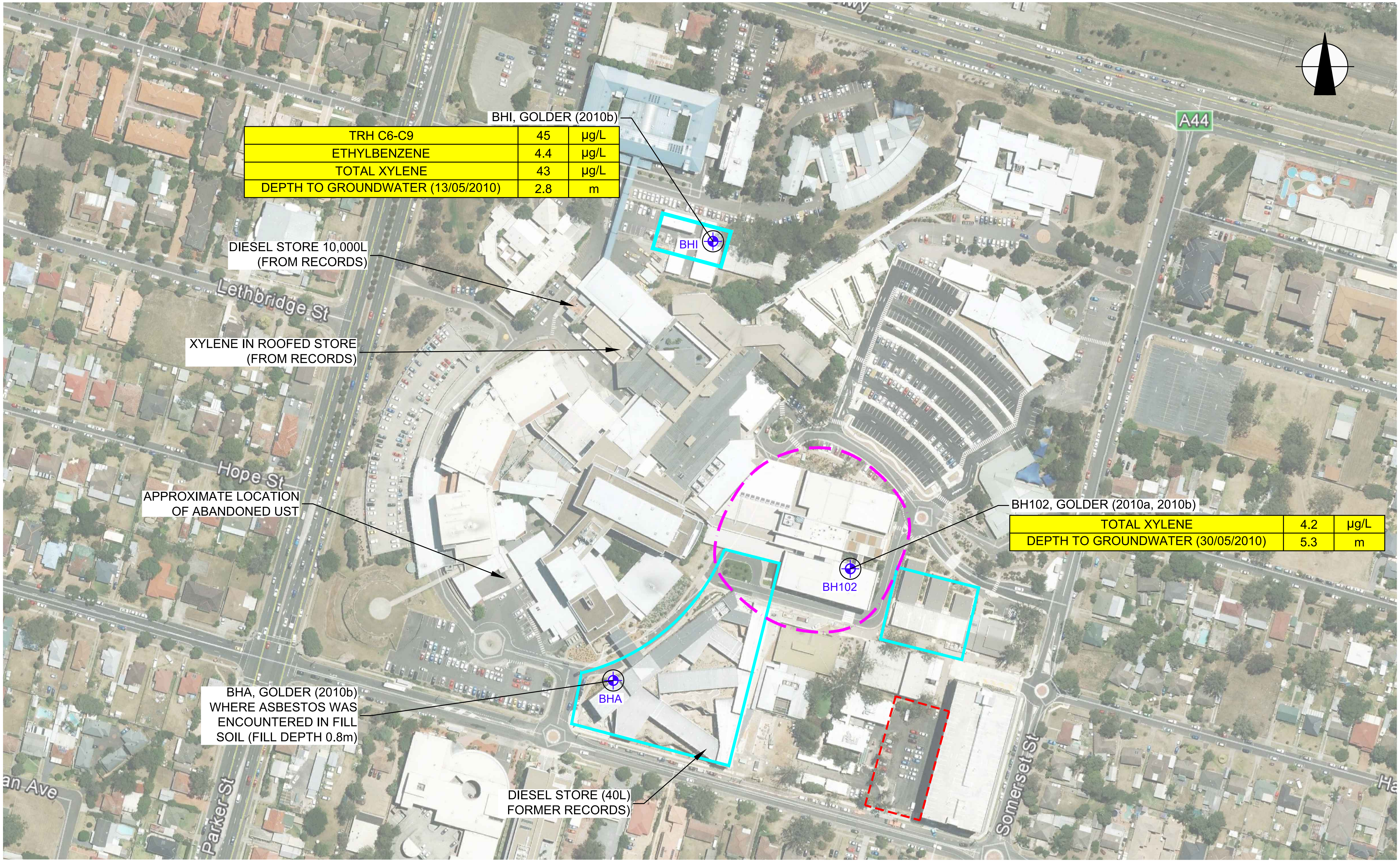
Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Project No: E35033PL

Figure No: 3

JKEnvironments

PLOT DATE: 1/07/2022 9:30:29 AM DWG FILE: K:\5C EIS JOBS\35000'S\E35033PL KINGSWOOD\CAD\E35033PL.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF GOLDER (2010a) INVESTIGATION
- APPROXIMATE EXTENT OF GOLDER (2010b) INVESTIGATION
- APPROXIMATE MONITORING WELL LOCATION (GOLDER 2010a AND 2010b)

0 20 40 60 80 100
SCALE 1:2000 @A3 METRES

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

Title: **NOTABLE FEATURES FROM PREVIOUS INVESTIGATIONS**

Location: NEPEAN HOSPITAL, DERBY STREET KINGSWOOD, NSW

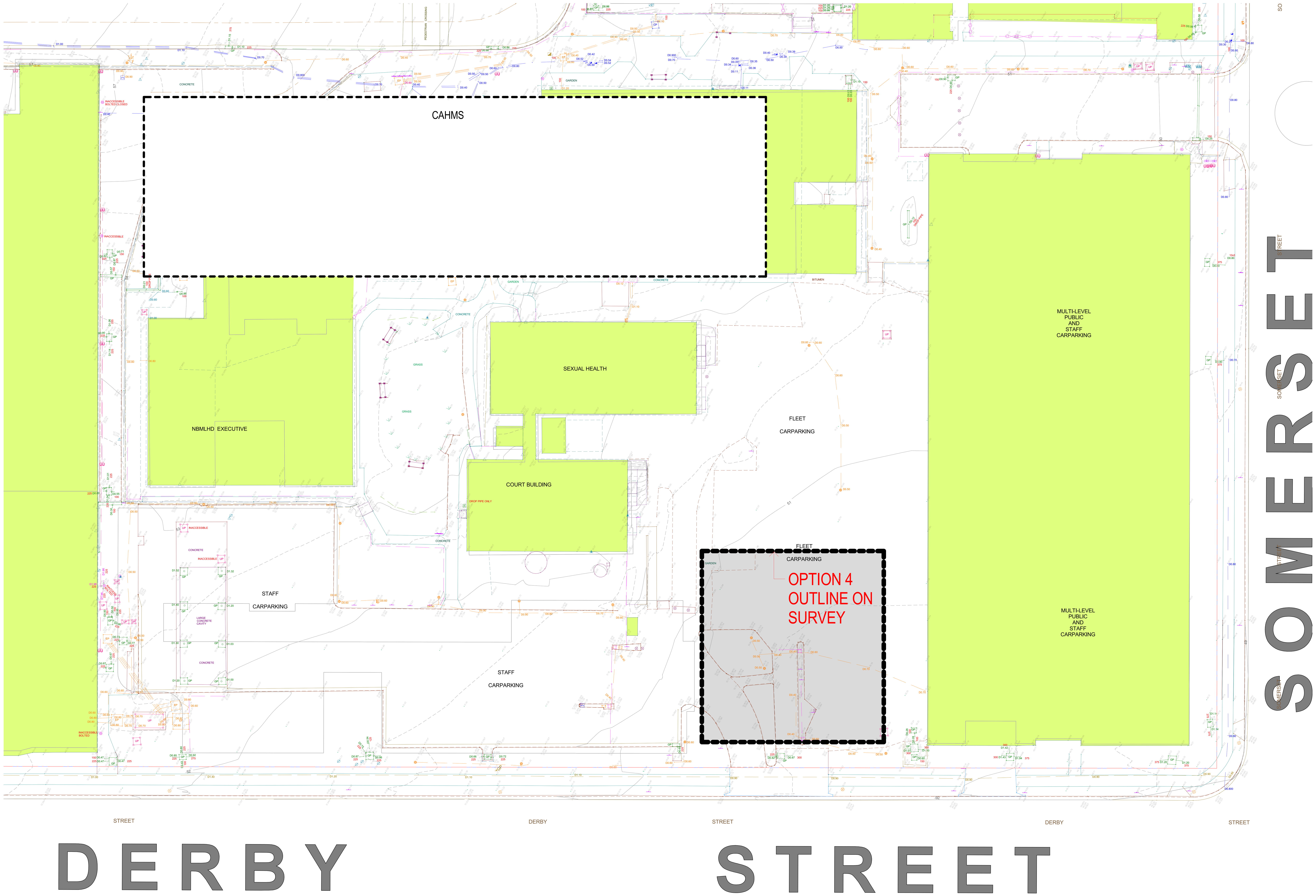
Project No: E35033PL

Figure No: 4

JKEnvironments

PLOT DATE: 1/07/2022 2:53:29 PM DWG FILE: K:\5C EIS JOBS\35000'S\E35033PL KINGSWOOD\CAD\FIG4\E35033PL.DWG

Proposed Development Plans



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ISSUE	DATE	FOR
A	26/02/21	70% SD DRAFT ISSUE

NOTE:
ALL DRAWINGS TO BE READ IN CONJUNCTION WITH THE TRADE PACKAGE COVER SHEET AND NOTES

PROJECT
NEPEAN HOSPITAL - STAGE 2

DERBY ST
KINGSWOOD NSW 2747
NEPEAN

BVN PROJECT NUMBER
1903020.000

TRUE NORTH
PROJECT NORTH

SCALE
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DRAWN BY: Author
CHECKED BY: Checker
DESIGNED BY: Designer
APPROVED BY: Approver

STATUS
SCHEMATIC DESIGN

DRAWING
TAM - SITE PLAN

DRAWING NUMBER
NHR-BVN-DRW-ARC-TAM-GEN-NL00001

ISSUE
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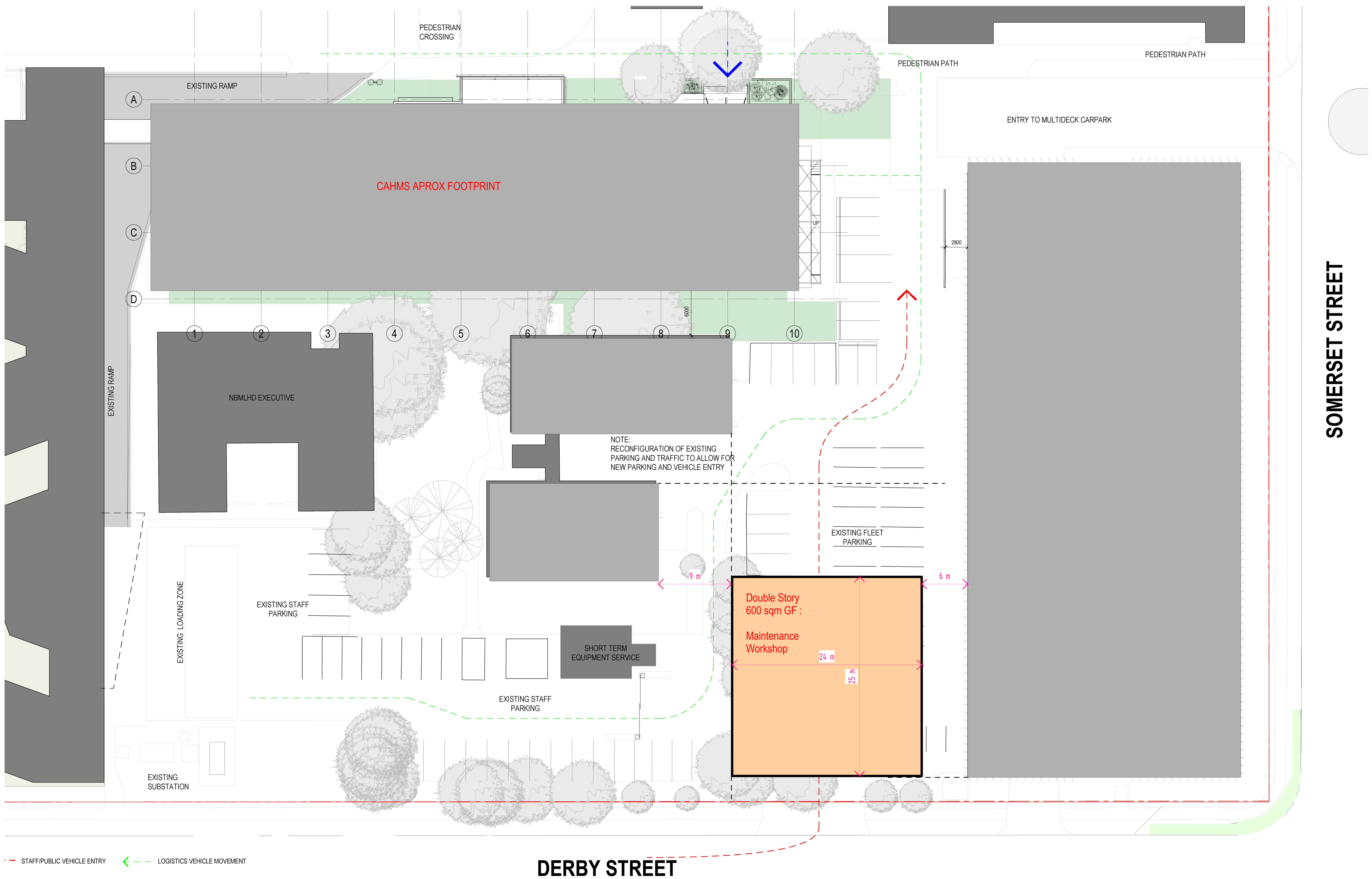

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PROJECT
NEPEAN HOSPITAL - STAGE 2

DERBY ST
KINGSWOOD NSW 2747
NEPEAN

BVN PROJECT NUMBER
1903020.000

TRUE NORTH
PROJECT NORTH

SCALE
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DRAWN BY: Author CHECKED BY: Checker
DESIGNED BY: Designer APPROVED BY: Approver

STATUS
SCHEMATIC DESIGN

DRAWING
TAM - LEVEL 01

DRAWING NUMBER
NHR-BVN-DRW-ARC-TAM-GEN-NL00002

ISSUE
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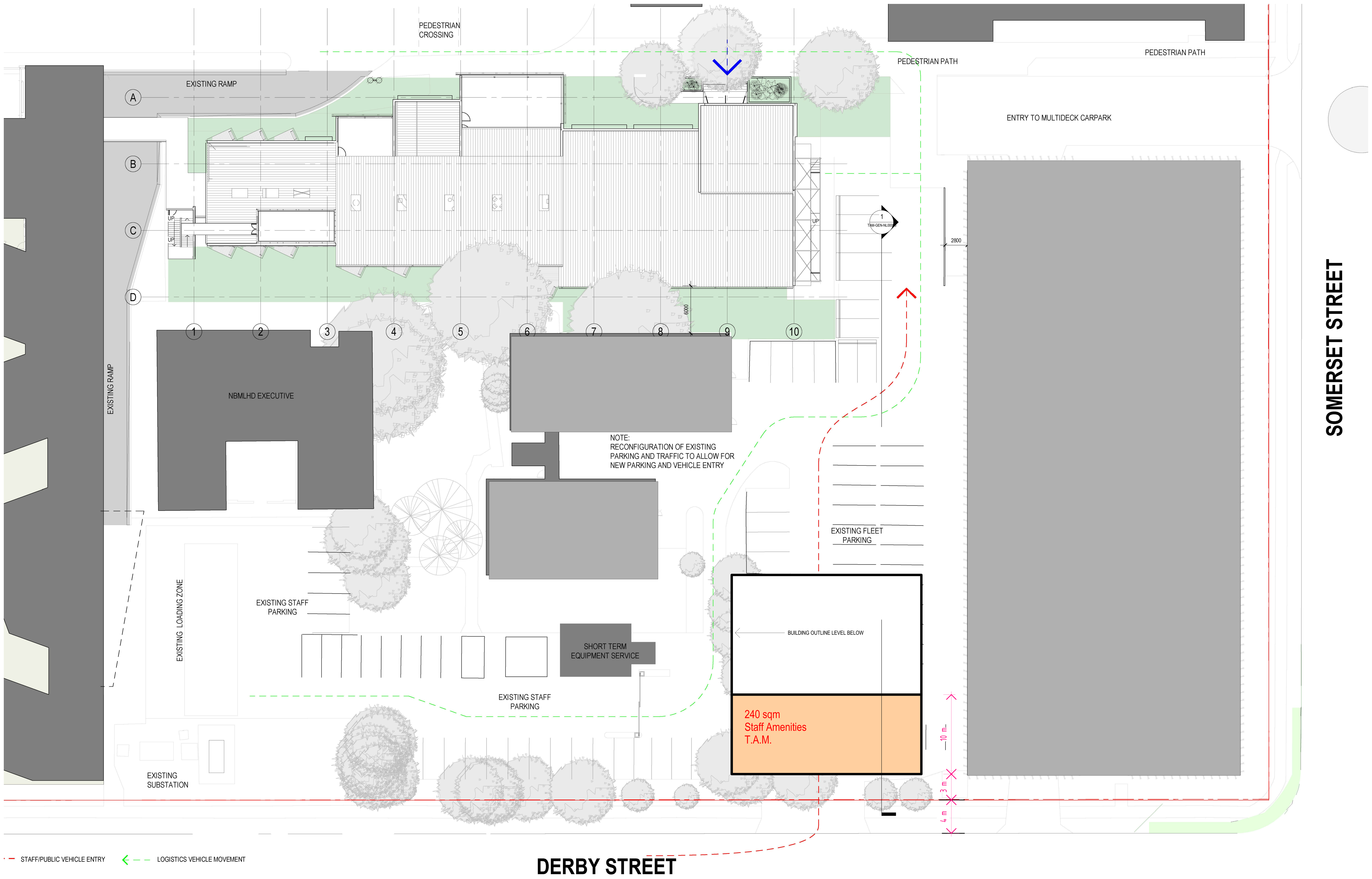

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PROJECT
NEPEAN HOSPITAL - STAGE 2

DERBY ST
KINGSWOOD NSW 2747
NEPEAN

BVN PROJECT NUMBER
1903020.000

TRUE NORTH
PROJECT NORTH

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DESIGNED BY: Designer APPROVED BY: Approver

STATUS
SCHEMATIC DESIGN

DRAWING
TAM - LEVEL 02

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NHR-BVN-DRW-ARC-TAM-GEN-NL00003

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NOTE:
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PROJECT
NEPEAN HOSPITAL - STAGE 2

DERBY ST
KINGSWOOD NSW 2747
NEPEAN

BVN PROJECT NUMBER
1903020.000

TRUE NORTH

PROJECT NORTH

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CHECKED BY: Checker
DESIGNED BY: Designer
APPROVED BY: Approver

STATUS
SCHEMATIC DESIGN

DRAWING
ELEVATIONS

DRAWING NUMBER
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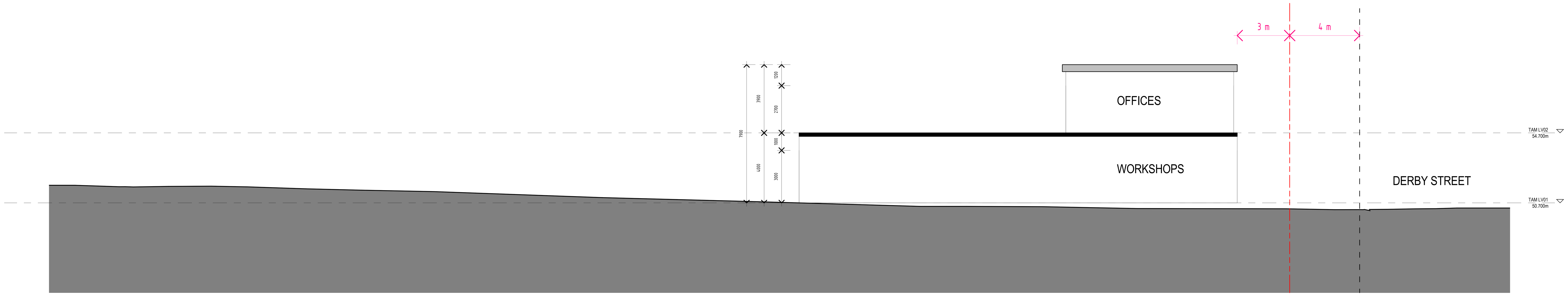

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TAM-GEN-NL00003 1 : 100

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ISSUE	DATE	FOR
A	26/02/21	70% SD DRAFT ISSUE

NOTE:
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PROJECT
NEPEAN HOSPITAL - STAGE 2

DERBY ST
KINGSWOOD NSW 2747
NEPEAN

BVN PROJECT NUMBER
1903020.000

TRUE NORTH
PROJECT NORTH

SCALE
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1:200mm

DRAWN BY: Author CHECKED BY: Checker
DESIGNED BY: Designer APPROVED BY: Approver

STATUS
SCHEMATIC DESIGN

DRAWING
SECTIONS

DRAWING NUMBER
NHR-BVN-DRW-ARC-
TAM-GEN-NL00005

ISSUE
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Appendix B: Site Information and Site History

Lotsearch Environmental Risk and Planning Report

This Lotsearch report was sought for the adjoining CAHMS site.
Due to the close proximity to the adjoining TAMS site,
it has been utilised for the purpose of the TAMS DSI

LOTSEARCH ENVIRO PROFESSIONAL

Date: 18 Feb 2021 12:56:05

Reference: LS018022 EP

Address: Derby Street, Kingswood, NSW 2747

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

Dataset Listing

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

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	13/11/2020	13/11/2020	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	14/01/2021	14/01/2021	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	09/02/2021	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	11/02/2021	07/03/2017	Quarterly	1000	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Quarterly	1000	0	0	1
EPA PFAS Investigation Program	Environment Protection Authority	15/02/2021	23/11/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	05/02/2021	05/02/2021	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	05/02/2021	05/02/2021	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	03/02/2021	03/02/2021	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	15/02/2021	15/02/2021	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	02/02/2021	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	0	0	2
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	1	1	2
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	08/02/2021	08/02/2021	Monthly	1000	0	0	3
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	2	2
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	38
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	57
Points of Interest	NSW Department of Finance, Services & Innovation	30/03/2020	30/03/2020	Quarterly	1000	0	1	48
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	16/02/2021	16/02/2021	Quarterly	1000	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	16/02/2021	16/02/2021	Quarterly	1000	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	17/02/2021	17/02/2021	Quarterly	1000	0	0	1
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	22/01/2021	11/12/2020	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	2
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	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	10
Geological Units 1:100,000	NSW Department of Planning, Industry and Environment	20/08/2014		None planned	1000	1	-	3
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	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	14/10/2020	27/07/2020	Annually	1000	1	-	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	27/01/2021	03/07/2020	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	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Department of Planning, Industry and Environment	12/05/2017	01/01/2002	None planned	1000	1	1	4
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	16/02/2021	16/02/2021	Quarterly	1000	0	0	0
Current Mining Titles	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Mining Title Applications	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	0	0	0
Historic Mining Titles	NSW Department of Industry	05/02/2021	05/02/2021	Monthly	1000	7	7	7
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	27/01/2021	07/12/2018	Monthly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	27/01/2021	22/01/2021	Monthly	1000	1	2	64
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	24/11/2020	20/11/2019	Quarterly	1000	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	24/11/2020	20/11/2019	Quarterly	1000	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	15/02/2021	30/11/2020	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning, Industry and Environment	27/01/2021	22/01/2021	Monthly	1000	0	0	11
Bush Fire Prone Land	NSW Rural Fire Service	15/02/2021	11/02/2021	Weekly	1000	0	0	2
Remnant Vegetation of the Cumberland Plain	NSW Office of Environment & Heritage	07/10/2014	04/08/2011	Unknown	1000	1	2	8
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	1
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	3
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	08/02/2021	08/02/2021	Weekly	10000	-	-	-

Site Diagram

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Internal Parcel Boundaries

Total Area: 3825m^2

Total Perimeter: 286m

Disclaimers:

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

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

Scale: 0 20 40 Meters

Data Sources: Aerial Imagery © Aerometrex Pty Ltd

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

Contaminated Land

Derby Street, Kingswood, NSW 2747

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

Derby Street, Kingswood, NSW 2747

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

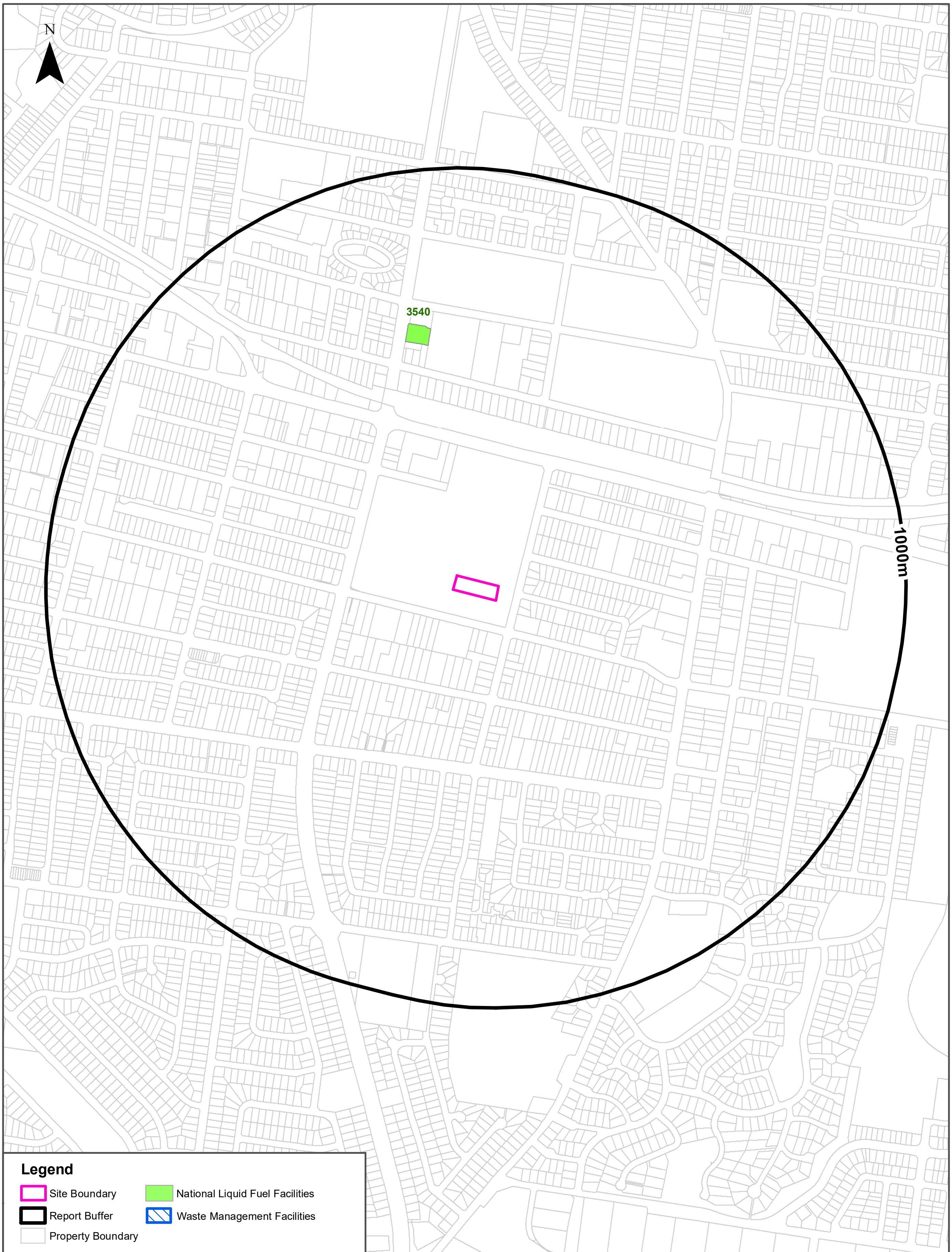
Former Gasworks within the dataset buffer:

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

Derby Street, Kingswood, NSW 2747



Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Waste Management & Liquid Fuel Facilities

Derby Street, Kingswood, NSW 2747

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											

Waste Management Facilities Data Source: Geoscience Australia

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Direction
3540	Caltex	Woolworths Caltex Kingswood	66 Parker Street	Kingswood	Petrol Station	Operational		25/07/2011	Premise Match	570m	North

National Liquid Fuel Facilities Data Source: Geoscience Australia

PFAS Investigation & Management Programs

Derby Street, Kingswood, NSW 2747

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 Sites

Derby Street, Kingswood, NSW 2747

Defence 3 Year Regional Contamination Investigation Program

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

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

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

EPA Other Sites with Contamination Issues

Derby Street, Kingswood, NSW 2747

EPA Other Sites with Contamination Issues

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

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

Sites within the dataset buffer:

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

EPA Other Sites with Contamination Issues: Environment Protection Authority

Current EPA Licensed Activities

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Report Buffer

Property Boundary

Current Licensed Activities under POEO Act

Current Licences related to Other Activities incl. Application of Herbicides to Waterways

Current Licences related to Irrigated Agriculture

Scale: 0 100 200 400 600 Meters

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

EPA Activities

Derby Street, Kingswood, NSW 2747

Licensed Activities under the POEO Act 1997

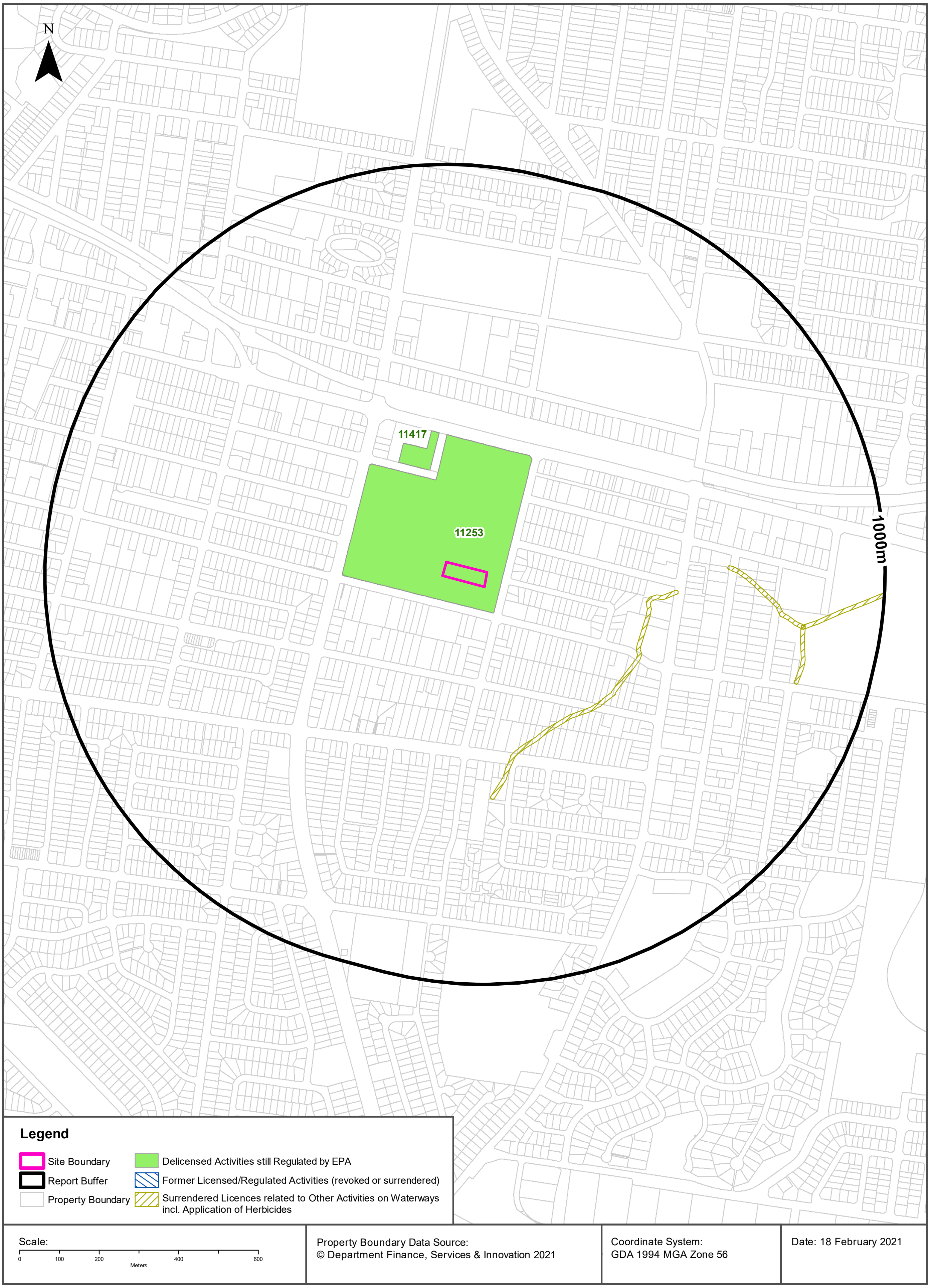
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
12208	SYDNEY TRAINS		SYDNEY TRAINS, HAYMARKET, NSW 1238		Railway systems activities	Network of Features	366m	North
20910	ACCIONA INFRASTRUCTURE PROJECTS AUSTRALIA PTY LTD		Glenmore Park to Jamison Road, PENRITH SOUTH, NSW 2750		Road construction	Road Match	537m	South West

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Derby Street, Kingswood, NSW 2747



Property Boundary Data Source:
© Department Finance, Services & Innovation 2021

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

EPA Activities

Derby Street, Kingswood, NSW 2747

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
11253	SYDNEY WEST AREA HEALTH SERVICE	NEPEAN HOSPITAL	CNR DERBY STREET AND PARKER STREET	KINGSWOOD	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	0m	Onsite
11417	HEALTHSCOPE OPERATIONS PTY LTD	NEPEAN PRIVATE HOSPITAL	9 Barber Avenue	KINGSWOOD	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	235m	North

Delicensed Activities Data Source: Environment Protection Authority

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

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

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	386m	-
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	386m	-
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	386m	-

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

Derby Street, Kingswood, NSW 2747

Legend

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

Scale: 0 30 60 90 120 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

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

Historical Business Directories

Derby Street, Kingswood, NSW 2747

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
1	PLASTERERS SOLID PLASTERING CONTRACTORS.	Penrith Fibrous Plaster Co., 58A Derby St., Kingswood. 2750	74083	1986	Premise Match	85m	South West
	PLASTERERS - SOLID - PLASTERING CONTRACTORS. (P5400)	Penrith Fibrous Plaster Co., 58A Derby St., Kingswood. 2750.	64431	1982	Premise Match	85m	South West

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					

Dry Cleaners, Motor Garages & Service Stations

Derby Street, Kingswood, NSW 2747

Legend

- Site Boundary
- Buffer 500m
- Property Boundary
- Business directory records mapped to a specific premise
- Business directory records mapped to a road intersection
- Business directory records mapped to a road corridor
- Business directory records mapped to a general area

Scale: 0 90 180 270 360 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

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

Historical Business Directories

Derby Street, Kingswood, NSW 2747

Dry Cleaners, Motor Garages & Service Stations 1948-1993
Premise or Road Intersection Matches

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

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

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES & SERVICE STATIONS.	Solo Kingswood Service Station, 236 Great Western Hwy., Kingswood. 2747	25454	1993	Premise Match	294m	North East
	Motor Garages & Service Stations	Solo Kingswood Service Station, 236 Great Western H'way, Kingswood 2747	53897	1991	Premise Match	294m	North East
2	Motor Garages & Service Stations	Nepean Automotive Services, 48 Cox Ave, Kingswood 2747	97836	1991	Premise Match	403m	North
	MOTOR GARAGES & SERVICE STATIONS.	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2747	11923	1990	Premise Match	403m	North
	MOTOR GARAGE & SERVICE STATIONS.	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2750	5332	1989	Premise Match	403m	North
	MOTOR GARAGES & SERVICE STATIONS.	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2750	59702	1988	Premise Match	403m	North
	MOTOR GARAGES & SERVICE STATIONS.	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2750	65178	1986	Premise Match	403m	North
	MOTOR GARAGES & SERVICE STATIONS.	Nepean Automotive Services., 48 Cox Ave., Kingswood. 2750	45280	1985	Premise Match	403m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2750	33855	1984	Premise Match	403m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Nepean Automotive Services., 48 Cox Ave., Kingswood 2750	15206	1983	Premise Match	403m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Nepean Automotive Services, 48 Cox Ave., Kingswood. 2750.	57284	1982	Premise Match	403m	North
3	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Roberts. M., 68 Cox Ave., Kingswood. 2750.	57477	1982	Premise Match	422m	North
4	MOTOR GARAGES & SERVICE STATIONS.	Kingswood Auto Port, 182 Great Western Hwy., Kingswood. 2747	19054	1993	Premise Match	456m	East
	Motor Garages & Service Stations	Kingswood Auto Port, 182 Great Western H'way., Kingswood 2747	96636	1991	Premise Match	456m	East
5	MOTOR GARAGE & SERVICE STATIONS.	Penrith Dyno Tune Centre, 16/83 Cox Ave., Kingswood. 2750	5400	1989	Premise Match	476m	North
	MOTOR GARAGES & SERVICE STATIONS.	Penrith Dyno Tune Centre, 16/83 Cox Ave., Kingswood. 2750	59779	1988	Premise Match	476m	North
	MOTOR GARAGES & SERVICE STATIONS.	Penrith Dyno Tune Centre, 16, 83 Cox Ave., Kingswood. 2750	65257	1986	Premise Match	476m	North
	MOTOR GARAGES & SERVICE STATIONS.	Trojan Performance, 81 Cox Ave., Kingswood. 2750	65646	1986	Premise Match	476m	North
	MOTOR GARAGES & SERVICE STATIONS.	Penrith Dyno Tune Centre, 16, 83 Cox Ave., Kingswood. 2750	45366	1985	Premise Match	476m	North
	MOTOR GARAGES & SERVICE STATIONS.	Trojan Performance., 81 Cox Ave., Kingsgrove. 2750	45769	1985	Premise Match	476m	North

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
5	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Mini Shop Pty Ltd The 81 Cox Ave., Kingswood. 2750	33768	1984	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Dyno Tune Centre, 16, 83 Cox Ave., Kingswood. 2750	33937	1984	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Trojan Performance., 81 Cox Ave., Kingswood. 2750	34331	1984	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Mini Shop Pty Ltd The., 81 Cox Ave., Kingswood 2750	15116	1983	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Dyno Tune Centre, 16, 83 Cox Ave., Kingswood. 2750	65784	1983	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Trojan Performance., 81 Cox Ave., Kingswood 2750	21772	1983	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Mini Shop Pty. Ltd.The, 81 Cox Ave., Kingswood. 2750.	57191	1982	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Penrith Dyno Tune Centre, 16, 83 Cox Ave., Kingswood. 2750.	57372	1982	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Trojan Performance, 81 Cox Ave., Kingswood. 2750.	57772	1982	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Mini Shop Pty Ltd The., 81 Cox Ave., Kingswood 2750	3756	1981	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Dyno Tune Centre., 16, 83 Cox Ave., Kingswood 2750	3920	1981	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Trojan Perlormence., 81 Cox Ave., Kingswood 2750	8352	1981	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Mini Shop Pty Ltd The., 81 Cox Ave., Kingswood. 2750	58488	1980	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Dyno Tune Centre., 16, 83 Cox Ave., Kingswood. 2750	58663	1980	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Trojan Performance., 81 Cox Ave., Kingswood. 2750	59039	1980	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Mini Shop Pty Ltd, The., 81 Cox Ave., Kingswood. 2750.	45982	1979	Premise Match	476m	North
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Dyno Tune Centre., Shop 16., 83 Cox Ave., Kingswood. 2750	46157	1979	Premise Match	476m	North
6	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Penrith Transmission Service., 14 Cox Ave., Penrith. 2750.	46158	1979	Premise Match	499m	North East

Dry Cleaners, Motor Garages & Service Stations 1948-1993
Road or Area Matches

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

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

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
7	MOTOR GARAGES & SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western Hghwy, Kingswood. 2747	11639	1990	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Kingswood Auto Port, Great Western Hghwy, Kingswood. 2747	11752	1990	Road Match	310m
	MOTOR GARAGE & SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western Hghwy, Kingswood. 2750	65114	1989	Road Match	310m
	MOTOR GARAGE & SERVICE STATIONS.	Kingswood Auto Port, Great Western Hghwy, Kingswood. 2750	5150	1989	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western Hghwy, Kingswood. 2750	59347	1988	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Kingswood Auto Port, Great Western Hghwy, Kingswood. 2750	59500	1988	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western H'way., Kingswood. 2750	64765	1986	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Kingswood Auto Port, Great Western H'way., Kingswood. 2750	64956	1986	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western Hghwy, Kingswood. 2750	39774	1985	Road Match	310m
	MOTOR GARAGES & SERVICE STATIONS.	Kingswood Auto Port, Great Western Hghwy, Kingswood. 2750	45058	1985	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station, Great Western Hghwy, Kingswood. 2750	28352	1984	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Auto Port, Great Western Hghwy, Kingswood. 2750	28557	1984	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station., Great Western H'way., Kingswood. 2750	14775	1983	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Auto Port., Great Western H'way., Kingswood. 2750	14988	1983	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Golden Fleece Kingswood Service Station, Great Western H'way., Kingswood. 2750.	56837	1982	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Golden Fleece Kingswood Service Station, Great Western H'way., Kingswood. 2750.	56836	1982	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS. (M6860)	Kingswood Auto Port, Great Western H'way., Kingswood. 2750.	57058	1982	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station., Great Western H'way., Kingswood 2750	3396	1981	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station., Great Western H'way., Kingswood 2750	3397	1981	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood. Service Station., Great Western H'way., Kingswood 2750	3395	1981	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Auto Port., Great Western H'way., Kingswood 2750	3609	1981	Road Match	310m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
7	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station., Great Western Highway., Kingswood. 2750	58129	1980	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Kingswood Service Station., Great Western Highway., Kingswood. 2750	58130	1980	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Auto Port., Great Western H'way., Kingswood. 2750	58344	1980	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Golden Fleece Service Station., Great Western Highway., Kingswood. 2750.	41599	1979	Road Match	310m
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Auto Port., Great Western Highway., Kingswood. 2750.	41806	1979	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	16811	1972	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	2275	1971	Road Match	310m
	MOTOR GARAGES & ENGINEERS	Beattie, R. & Co., Great Western Hghwy. Kingswood	535551	1970	Road Match	310m
	MOTOR GARAGES & ENGINEERS	Golden Fleece Service Station, Great Western Hghwy. Kingswood	535552	1970	Road Match	310m
	MOTOR SERVICE STATIONS, PETROL, OILS, Etc.	Kingswood Auto Port, Great Western Hghwy. Kingswood	535557	1970	Road Match	310m
	MOTOR SERVICE STATIONS, PETROL, OILS, Etc.	Kingswood Tyre Service, Great Western Hghwy. Kingswood	535558	1970	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL,OIL,Etc.	Kingswood Tyre Service., Great Western Hghwy., KINGSWOOD	341256	1970	Road Match	310m
	MOTOR SERVICE STATIONS, PETROL, OILS, Etc.	Towns, L. R., Great Western Hghwy. Kingswood	535559	1970	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy Kingswood	50361	1969	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	31377	1968	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	15851	1967	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	1425	1966	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	52094	1964	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Kingswood Tyre Service., Great western Hghwy., Kingswood	65431	1962	Road Match	310m
	MOTOR GARAGES & ENGINEERS	Beattie, R. & Co., Great Western Highway., Kingswood	211435	1961	Road Match	310m
	MOTOR SERVICE STATIONS—PETROL, OIL, Etc.	Kingswood Tyre Service, Great Western Hghwy. Kingswood	350757	1961	Road Match	310m
	MOTOR SERVICE STATIONS, PETROL, Etc.	Towns, L. R., Great Western Highway., Kingswood	211437	1961	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL,. OIL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	24272	1959	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Kingswood Tyre Service., Western Hghwy., Kingswood	9625	1958	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Kingswood Tyre Service., Great Western Hghwy., Kingswood	61982	1956	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, ETC.	Kingswood Tyre Service., Western Hghwy., Kingswood	54535	1954	Road Match	310m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
7	MOTOR SERVICE STATIONS–PETROL, ETC.	Kingswood Tyre Service., Western Hghwy., Kingswood	44114	1953	Road Match	310m
	MOTOR SERVICE STATIONS–PETROL, ETC.	Kingswood Tyre Service., Western Hghwy., Kingswood	35888	1952	Road Match	310m
	MOTOR SERVICE STATIONS-PETROL, Etc.	Kingswood Tyre Service, Western Highway., Kingswood	86110	1950	Road Match	310m
8	MOTOR GARAGES & ENGINEERS	Ward's Motors Pty. Ltd., Great Western Hghwy. Penrith	536052	1970	Road Match	434m
	MOTOR GARAGES & ENGINEERS	Ward's Motors Pty. Ltd., Great Western Highway., Penrith	222561	1961	Road Match	434m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Ward's Motors Pty. Ltd., Great Western Highway., Penrith	222581	1961	Road Match	434m
	MOTOR GARAGES & ENGINEERS	McCleary Motors, Western Rd. Penrith	151376	1950	Road Match	434m
9	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Kingswood Smash Repairs., Cox Ave., Kingswood. 2750.	45862	1979	Road Match	455m
	MOTOR GARAGES & ENGINEERS	Kingswood Smash & Body Repairs, Cox Ave. Kingswood	535554	1970	Road Match	455m
10	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Hucar Holdings Pty Ltd., Phillip St., Kingswood. 2750	58266	1980	Road Match	476m

Aerial Imagery 2020

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Aerial Imagery 2015

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Buffer 150m

Scale: 0 25 50 75 100 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Aerial Imagery 2009

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Aerial Imagery 2000

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Buffer 150m

Scale: 0 25 50 75 100 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Aerial Imagery 1994

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 17 February 2021

Aerial Imagery 1991

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Aerial Imagery 1986

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 17 February 2021

Aerial Imagery 1982

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Buffer 150m

Scale: 0 25 50 75 100 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Aerial Imagery 1978

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 17 February 2021

Aerial Imagery 1970

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters

Data Source Aerial Imagery:
© NSW Department of Customer Service

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Aerial Imagery 1965

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 17 February 2021

Aerial Imagery 1961

Derby Street, Kingswood, NSW 2747

Legend

Site Boundary

Buffer 150m

Scale: 0 25 50 75 100 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 17 February 2021

Aerial Imagery 1956

Derby Street, Kingswood, NSW 2747

Scale: 0 25 50 75 100 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 17 February 2021

Aerial Imagery 1949

Derby Street, Kingswood, NSW 2747

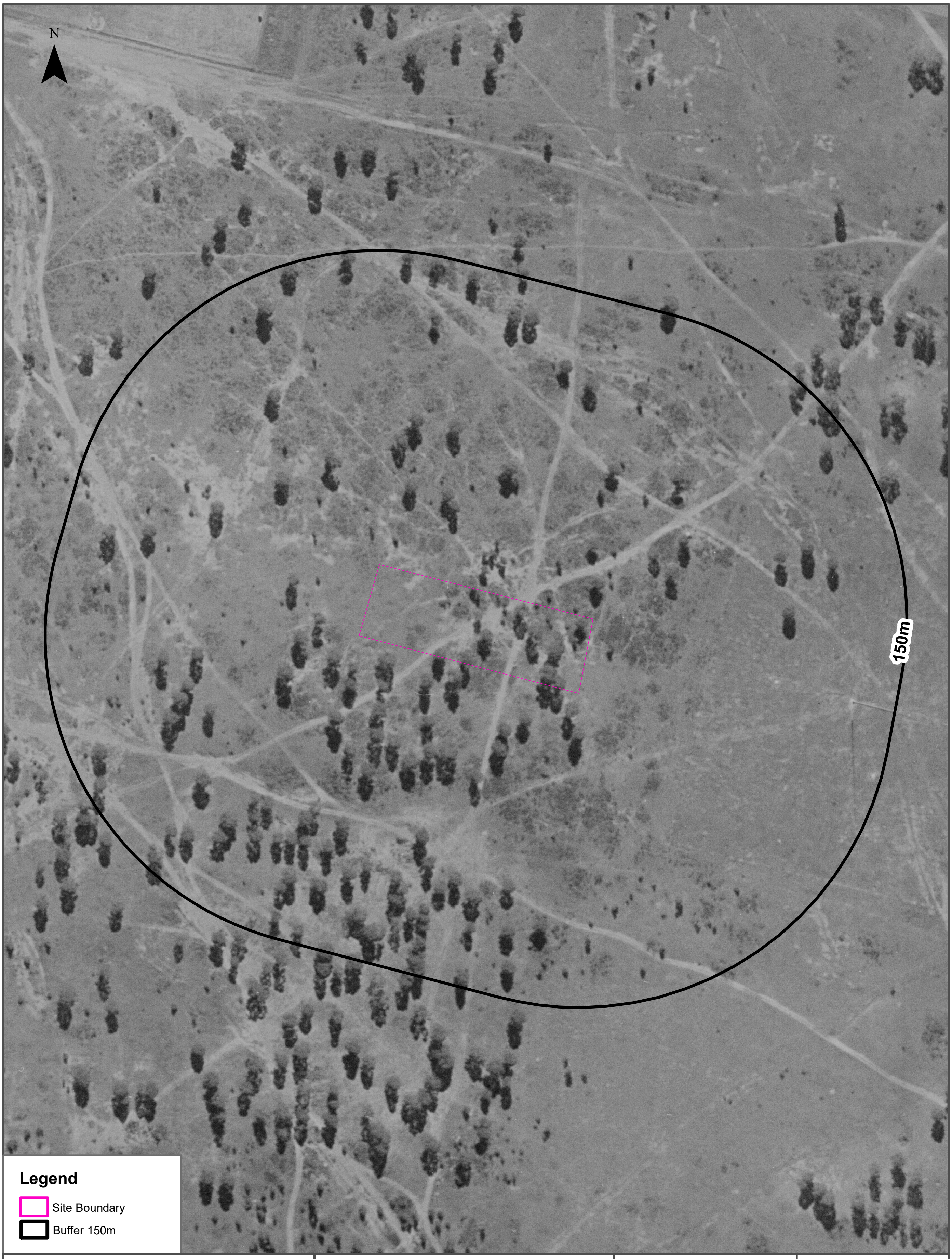
Data Source Aerial Imagery: ©2021 Geoscience Australia

Coordinate System: GDA 1994 MGA Zone 56

Date: 17 February 2021

Aerial Imagery 1943

Derby Street, Kingswood, NSW 2747



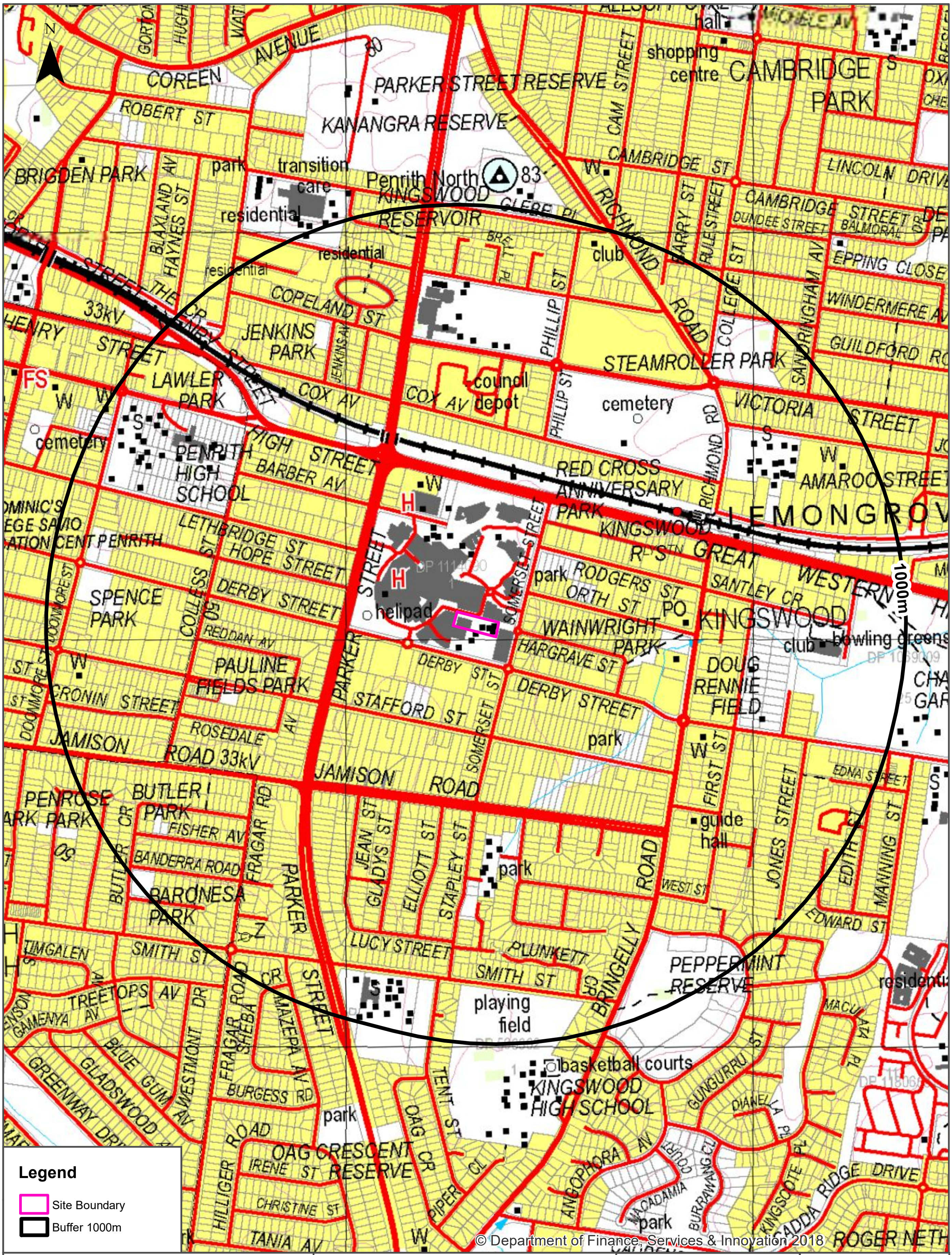
Legend

- Site Boundary
- Buffer 150m

Scale: 0 25 50 75 100 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Topographic Map 2015

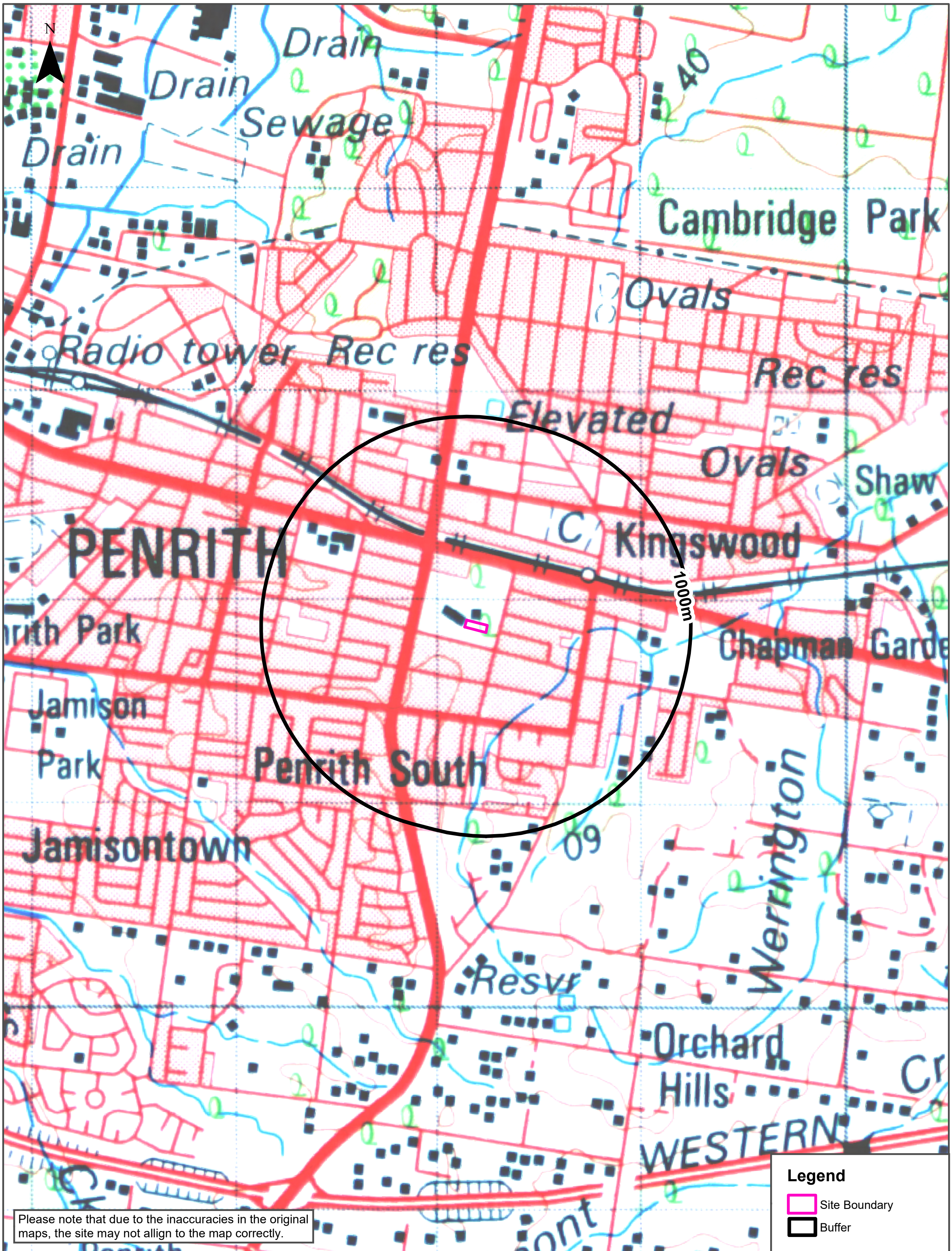
Derby Street, Kingswood, NSW 2747



Scale: 0 100 200 400 600 Meters	Data Sources: Topographic Map Data © NSW Land and Property Information	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Historical Map 1975

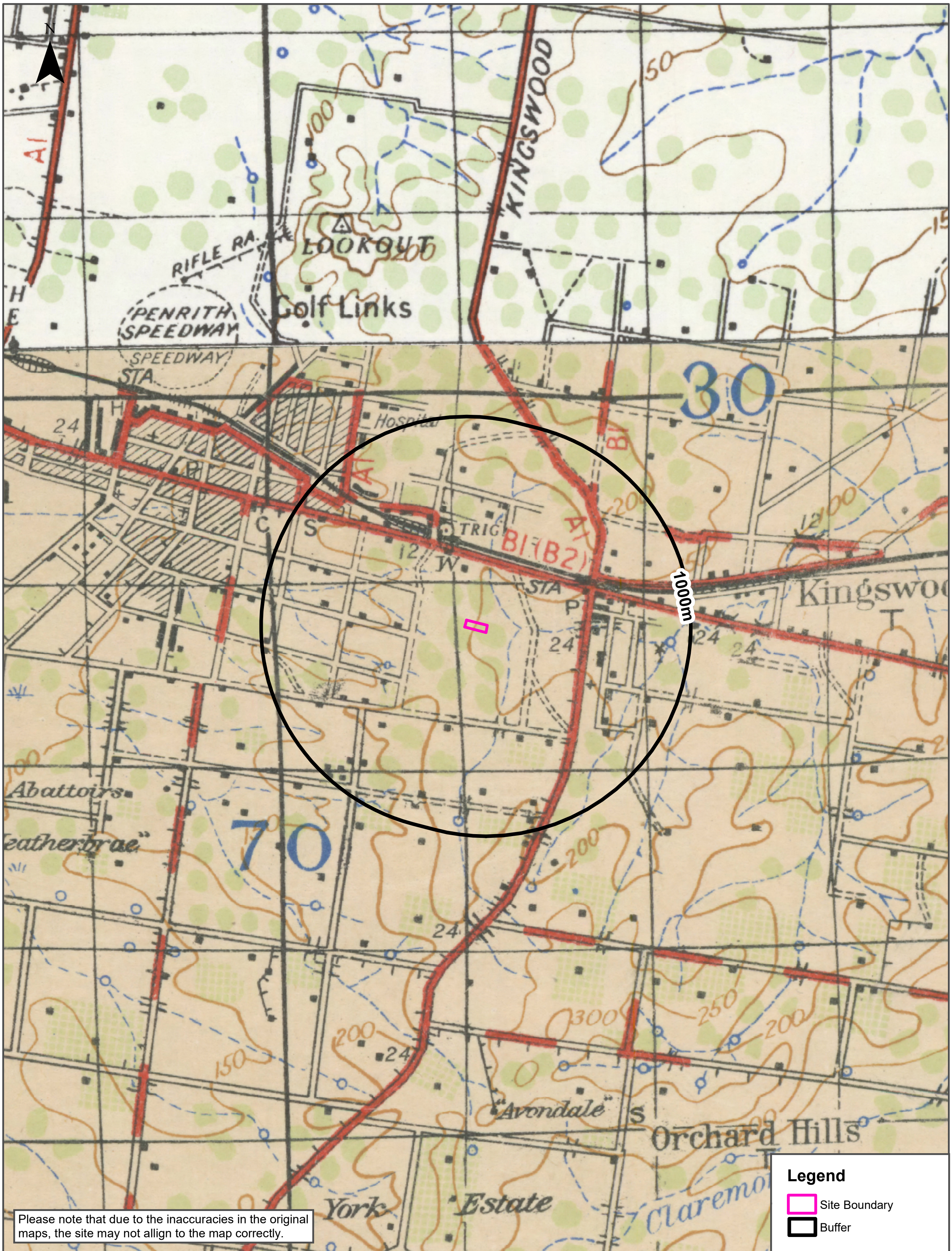
Derby Street, Kingswood, NSW 2747



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: 18 February 2021

Historical Map c.1942 - 1942

Derby Street, Kingswood, NSW 2747



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

Legend

- Site Boundary
- Buffer

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: 18 February 2021

Historical Map c.1929 - 1929

Derby Street, Kingswood, NSW 2747

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

Topographic Features

Derby Street, Kingswood, NSW 2747

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Topographic Features

Derby Street, Kingswood, NSW 2747

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1730835	Parking Area	Parking Area	17m	South East
1730834	Parking Area	Parking Area	148m	North
1730970	General Hospital	NEPEAN HOSPITAL	183m	West
1730746	Parking Area	Parking Area	195m	North East
1730630	Helipad	Helipad	212m	West
1730744	Park	Park	223m	North East
1730833	Parking Area	Parking Area	230m	North West
1730750	Parking Area	Parking Area	234m	North
1731415	Community Medical Centre	TRESILLIAN FAMILY CARE CENTRE KINGSWOOD	247m	North
1730956	General Hospital	NEPEAN PRIVATE HOSPITAL	267m	North West
1730918	Park	RED CROSS ANNIVERSARY PARK	302m	North East
1730892	Place Of Worship	BAPTIST CHURCH	326m	North
1730920	Park	WAINWRIGHT PARK	409m	East
1730938	Park	Park	421m	South East
1730612	Community Facility	KINGSWOOD NEIGHBOURHOOD CENTRE	444m	East
1730897	Post Office	KINGSWOOD POST OFFICE	460m	East
1730952	Suburb	KINGSWOOD	487m	East
1730987	Railway Station	KINGSWOOD RAILWAY STATION	518m	North East
1730890	Place Of Worship	ANGLICAN CHURCH	565m	South East
1730915	Park	Park	568m	South
1730911	Park	PAULINE FIELDS PARK	581m	West
1730901	Cemetery	PENRITH CEMETERY	607m	North East
1730647	Ambulance Station	PENRITH SUPERSTATION AMBULANCE STATION	659m	North West
1731003	Sports Field	DOUG RENNIE FIELD	668m	East
1731007	Combined Primary-Secondary School	ST DOMINIC'S COLLEGE	700m	North
1731360	Urban Place	LEMONGROVE	740m	North East
1730935	Park	JENKINS PARK	749m	North West
1730902	Park	LAWLER PARK	760m	North West
1730969	High School	PENRITH HIGH SCHOOL	785m	North West
1730964	Primary School	ST JOSEPH'S PRIMARY SCHOOL	794m	North East
1730885	Club	KINGSWOOD SPORTS CLUB	796m	East

Map Id	Feature Type	Label	Distance	Direction
1730947	Sports Field	BOWLING GREENS	806m	East
1730908	Park	BUTLER PARK	876m	South West
1730914	Park	SPENCE PARK	901m	West
1730929	Park	STEAMROLLER PARK	911m	North East
1730933	Park	PEPPERMINT RESERVE	919m	South East
1730984	Community Home	LEMONGROVE GARDENS HOSTEL	919m	North West
1730962	Primary School	KINGSWOOD SOUTH PUBLIC SCHOOL	924m	South
1730891	Place Of Worship	Place Of Worship	926m	North East
1730896	Place Of Worship	CHURCH OF CHRIST	928m	West
1730961	Primary School	PENRITH PUBLIC SCHOOL	939m	North West
1730636	Nursing Home	UNITING EDINGLASSIE LODGE PENRITH	939m	North West
1730989	Preschool	KINGSWOOD SOUTH PUBLIC SCHOOL PRESCHOOL	949m	South
1730983	Club	PENRITH GAELS CULTURAL AND SPORTING ASSOCIATION	959m	North
1730951	Sports Field	PLAYING FIELD	966m	South
1730990	Retirement Village	LEMONGROVE GARDENS	990m	North West
1730888	Place Of Worship	PRESBYTERIAN CHURCH	996m	North West
1730931	Park	BARONESA PARK	999m	South West

Topographic Features

Derby Street, Kingswood, NSW 2747

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
167895560	Primary	Right of way	3M	888m	South East

Topographic Features

Derby Street, Kingswood, NSW 2747

State Forest

What State Forest exist within the dataset buffer?

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

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

National Parks and Wildlife Service Reserves

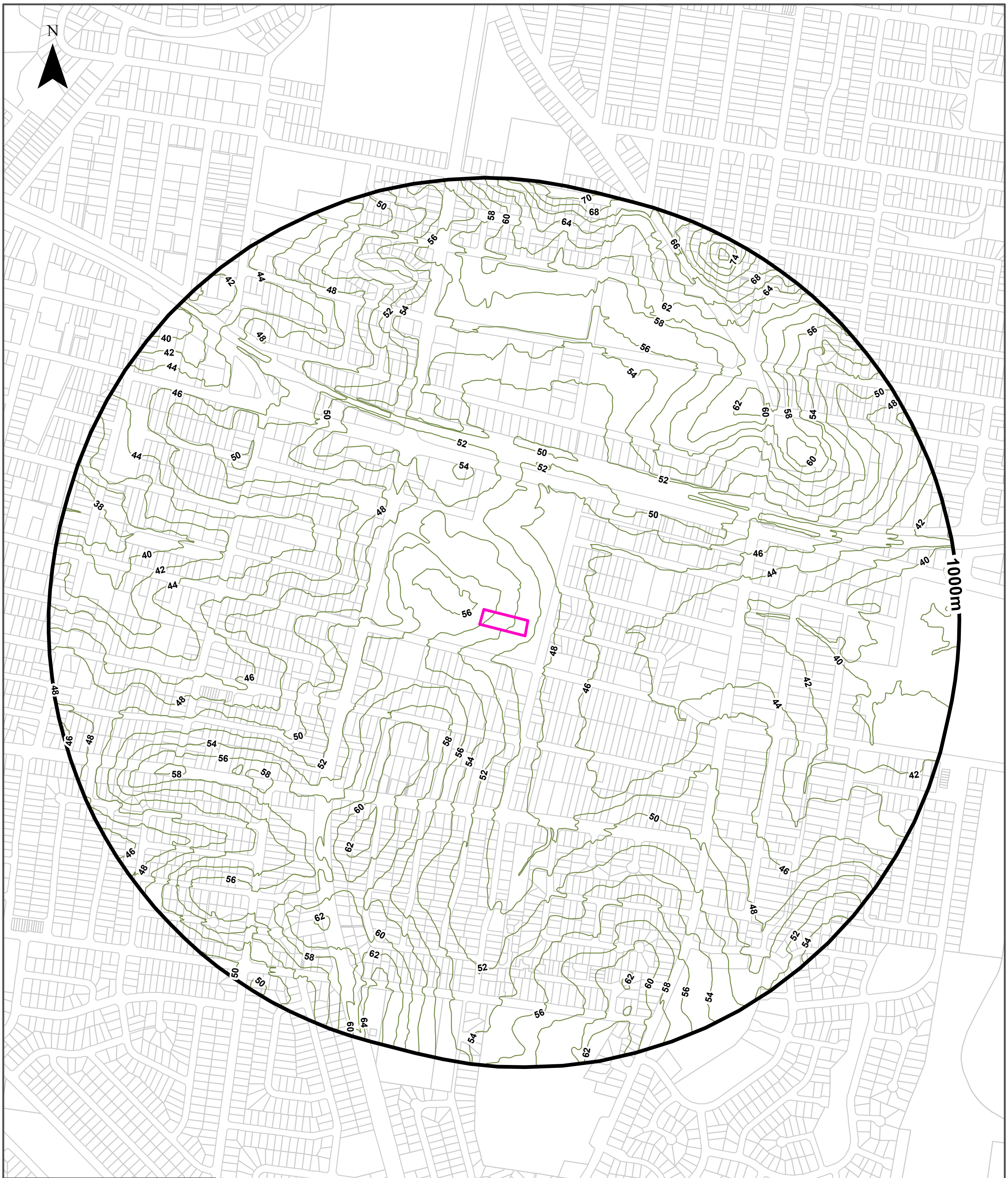
What NPWS Reserves exist within the dataset buffer?

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

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

Elevation Contours (m AHD)

Derby Street, Kingswood, NSW 2747



Legend

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

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

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Hydrogeology & Groundwater

Derby Street, Kingswood, NSW 2747

Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive highly productive aquifers

Description of aquifers within the dataset buffer:

Description
Porous, extensive aquifers of low to moderate productivity
Porous, extensive highly productive aquifers

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

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

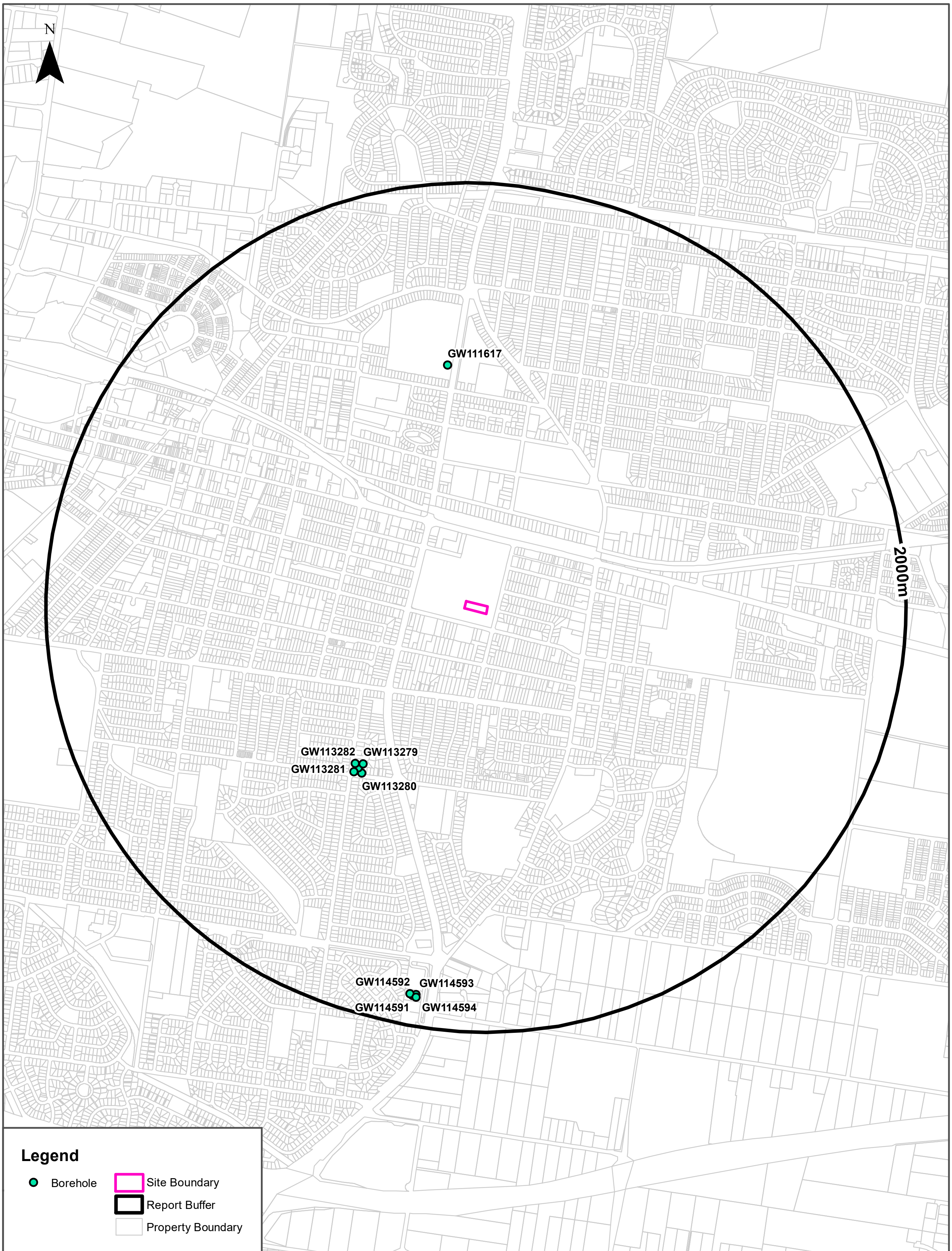
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

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

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

Groundwater Boreholes

Derby Street, Kingswood, NSW 2747



Scale: 0 100 200 400 600 800 1,000 1,200 Meters

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

Hydrogeology & Groundwater

Derby Street, Kingswood, NSW 2747

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
GW113279	10BL601835	Bore	Local Govt	Monitoring Bore	Monitoring Bore	The Prospect CC	02/05/2007	7.50	7.50					887m	South West
GW113282	10BL601835	Bore	Local Govt	Monitoring Bore	Monitoring Bore	The Prospect CC	02/05/2007	7.00	7.00					908m	South West
GW113283	10BL601835	Bore	Local Govt	Monitoring Bore	Monitoring Bore	The Prospect CC	02/05/2007	2.80	2.80					915m	South West
GW113280	10BL601835	Bore	Local Govt	Monitoring Bore	Monitoring Bore	The Prospect CC	02/05/2007	8.20	8.20					928m	South West
GW113281	10BL601835	Bore	Local Govt	Monitoring Bore	Monitoring Bore	The Prospect CC	02/05/2007	2.85	2.85					942m	South West
GW111617	10BL604801, 10BL604802, 10WA117803	Bore	Local Govt	Recreation (groundwater), Test Bore	Recreation (groundwater)		20/10/2011	210.00	210.00	2600	69.00	1.120		1131m	North
GW114593	10BL604457	Bore	Private	Monitoring Bore	Monitoring Bore		12/01/2011	7.50	7.50					1850m	South
GW114592	10BL604457	Bore	Private	Monitoring Bore	Monitoring Bore		12/01/2011	8.00	8.00					1851m	South
GW114591	10BL604457	Bore	Private	Monitoring Bore	Monitoring Bore		12/01/2011	7.00	7.00					1857m	South
GW114594	10BL604457	Bore	Private	Monitoring Bore	Monitoring Bore		12/01/2011	7.00	7.00					1863m	South

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW.

Hydrogeology & Groundwater

Derby Street, Kingswood, NSW 2747

Driller's Logs

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

Groundwater No	Drillers Log	Distance	Direction
GW111617	0.00m-0.50m CLAY BROWN 0.50m-1.00m SHALE BROWN 1.00m-113.00m SHALE GREY 113.00m-130.00m SANDSTONE GREY 130.00m-130.20m SANDSTONE GREY QUARTZ 130.20m-141.00m SANDSTONE GREY 141.00m-142.00m SANDSTONE GREY QUARTZ 142.00m-145.00m SANDSTONE GREY 145.00m-149.00m SANDSTONE GREY QUARTZ 149.00m-154.00m SANDSTONE GREY 154.00m-155.00m SANDSTONE GREY ,SILTSTONE BANDS 155.00m-158.50m SANDSTONE GREY 158.50m-160.00m SANDSTONE GREY QUARTZ 160.00m-161.00m SANDSTONE GREY 161.00m-162.00m SANDSTONE GREY ,SILTSTONE BANDS 162.00m-190.00m SANDSTONE GREY 190.00m-192.00m SANDSTONE GREY ,SILTSTONE BANDS 192.00m-198.50m SANDSTONE GREY 198.50m-200.00m SANDSTONE GREY QUARTZ 200.00m-203.00m SANDSTONE GREY 203.00m-209.00m SANDSTONE GREY QUARTZ 209.00m-210.00m SANDSTONE GREY	1131m	North
GW114593	0.00m-0.20m CONCRETE 0.20m-0.50m SILTY CLAY ,FIRM,MOIST,M/PLASTICITY 0.50m-0.80m SHALE WEATHERED,VERY HARD 0.80m-4.00m SHALE,VERY HARD,DRY,DARK BROWN 4.00m-7.50m SHALE,VERY HARD ,DRY,WHITE	1850m	South
GW114592	0.00m-0.20m CONCRETE 0.20m-0.50m SAND,M/GRAINED,MOIST DARK BROWN 0.50m-0.80m SHALE WITH MINOR CLAY 0.80m-6.00m SHALE DRY YELLOW/BROWN 6.00m-8.00m SHALE WHITE	1851m	South
GW114591	0.00m-0.10m CONCRETE 0.10m-0.50m CLAY WITH MINOR SAND M/GRAINED 0.50m-0.90m CLAY SOFT , MOIST,LOW PLASTICITY 0.90m-1.20m SHALE WEATHERED,VERY HARD,DRY,YELLOWISH BROWN 1.20m-3.50m SHALE VERY HARD DRY,YELLOWISH BROWN 3.50m-7.00m SHALE, VERY HARD,DRY,WHITE	1857m	South
GW114594	0.00m-0.12m CONCRETE 0.12m-0.50m SAND MINOR CLAY AND SHALE M/GRAINED 0.50m-0.70m SHALE MINOR CLAY MOIST BROWN 0.70m-5.00m SHALE VERY HARD,DRY YELLOW BROWN 5.00m-7.00m SHALE VERY HARD WHITE	1863m	South

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

Geology 1:100,000

Derby Street, Kingswood, NSW 2747

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Geology

Derby Street, Kingswood, NSW 2747

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
Qal	Fine-grained sand, silt and clay				Quaternary		Penrith	1:100,000
Qpc	Gravel, sand, silt, clay	Cranebrook Formation			Quaternary		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

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

Derby Street, Kingswood, NSW 2747

Naturally Occurring Asbestos Potential

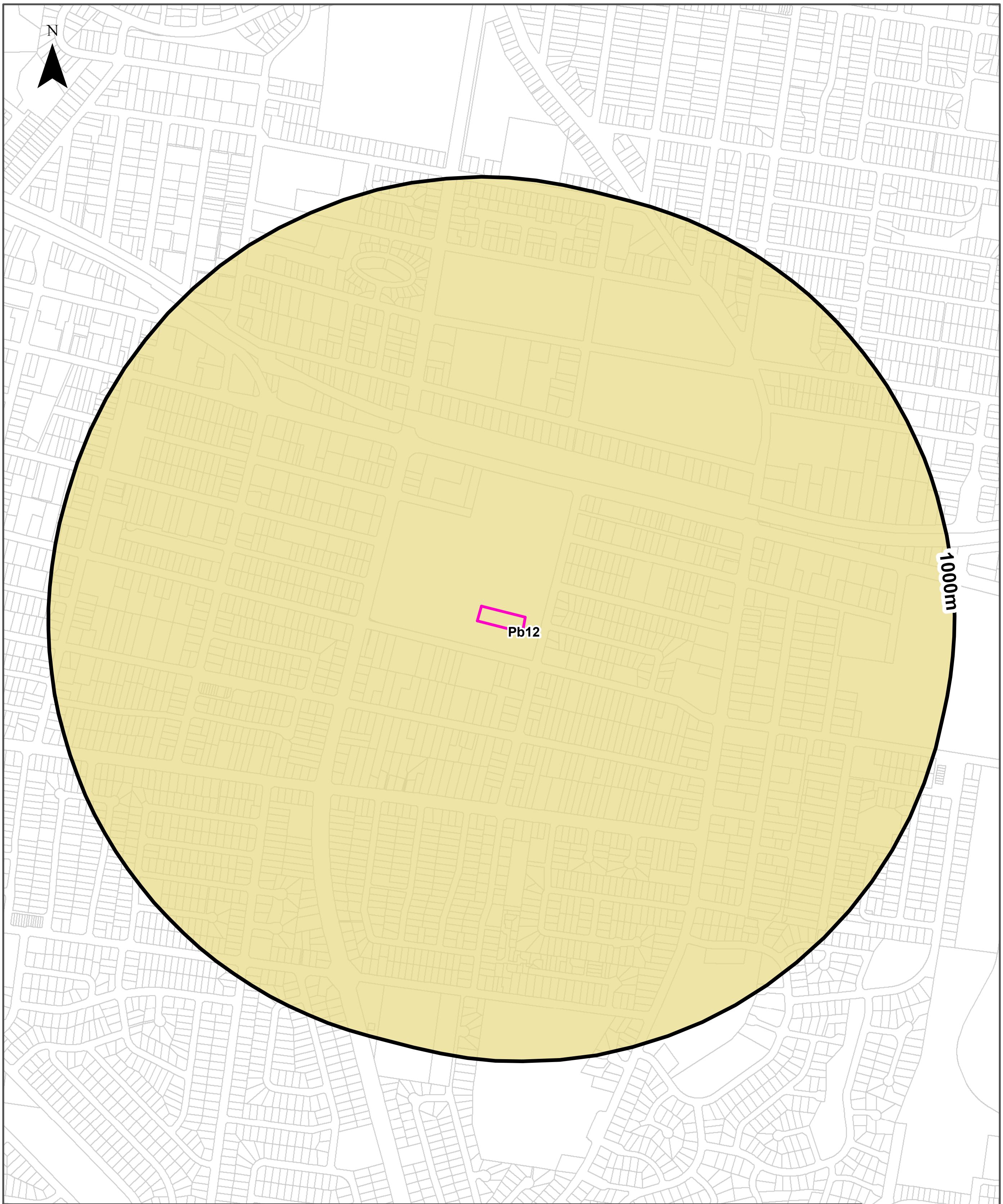
Naturally Occurring Asbestos Potential within the dataset buffer:

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

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

Derby Street, Kingswood, NSW 2747



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Australian Soil Classification Orders

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

Scale: 0 100 200 400 600 Meters

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

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Soils

Derby Street, Kingswood, NSW 2747

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

Atlas of Australian Soils Data Source: CSIRO

Soil Landscapes of Central and Eastern NSW

Derby Street, Kingswood, NSW 2747

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

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

Soils

Derby Street, Kingswood, NSW 2747

Soil Landscapes of Central and Eastern NSW

What are the on-site Soil Landscapes?

Soil Code	Name
9030lu	Luddenham

What are the Soil Landscapes within the dataset buffer?

Soil Code	Name
9030lu	Luddenham
9030sc	South Creek

Acid Sulfate Soils

Derby Street, Kingswood, NSW 2747

Environmental Planning Instrument - Acid Sulfate Soils

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

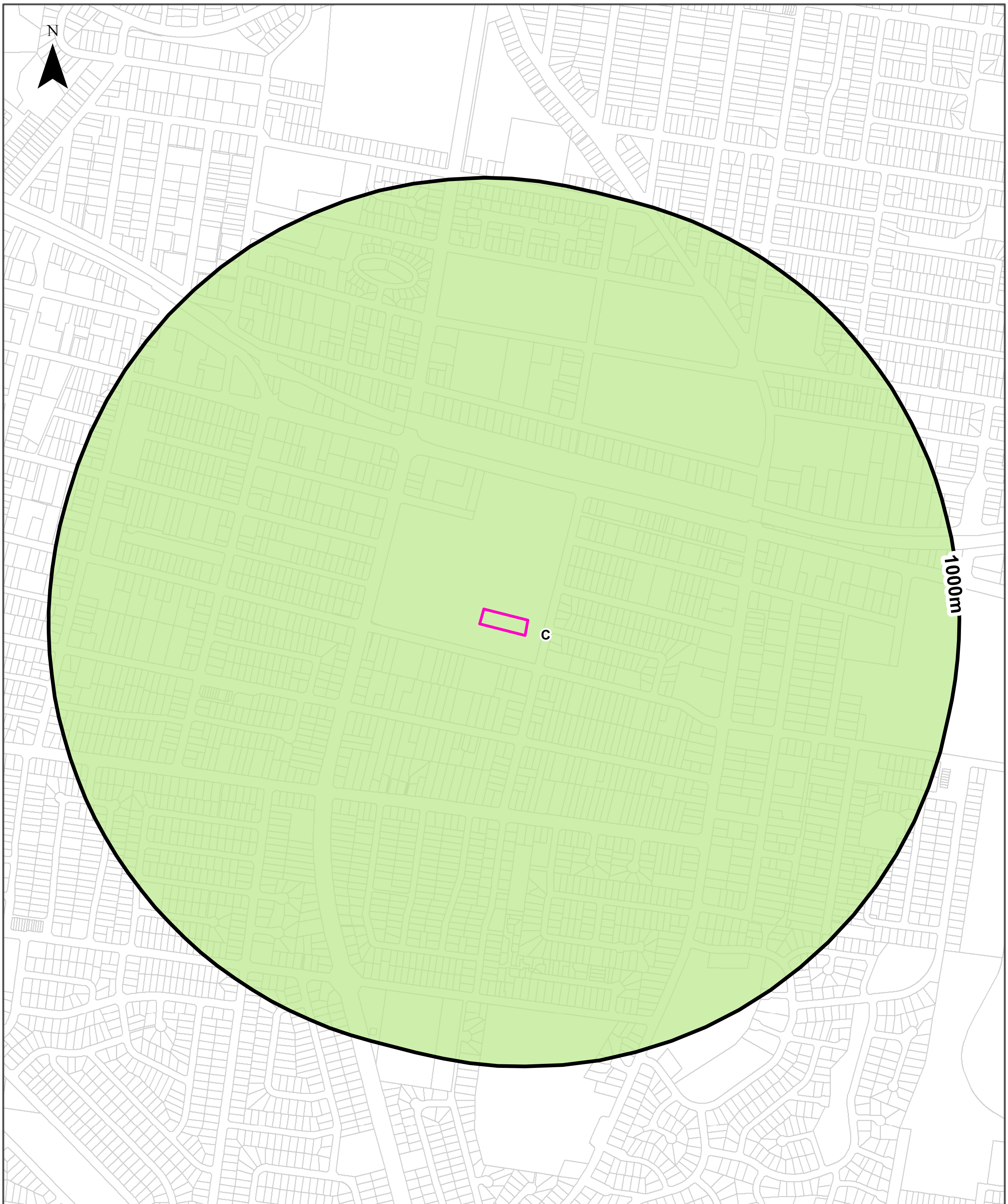
Soil Class	Description	EPI Name
N/A		

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

Derby Street, Kingswood, NSW 2747



Legend

Site Boundary
Report Buffer
Property Boundary

Probability of occurrence of Acid Sulfate Soils

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

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18February 2021

Acid Sulfate Soils

Derby Street, Kingswood, NSW 2747

Atlas of Australian Acid Sulfate Soils

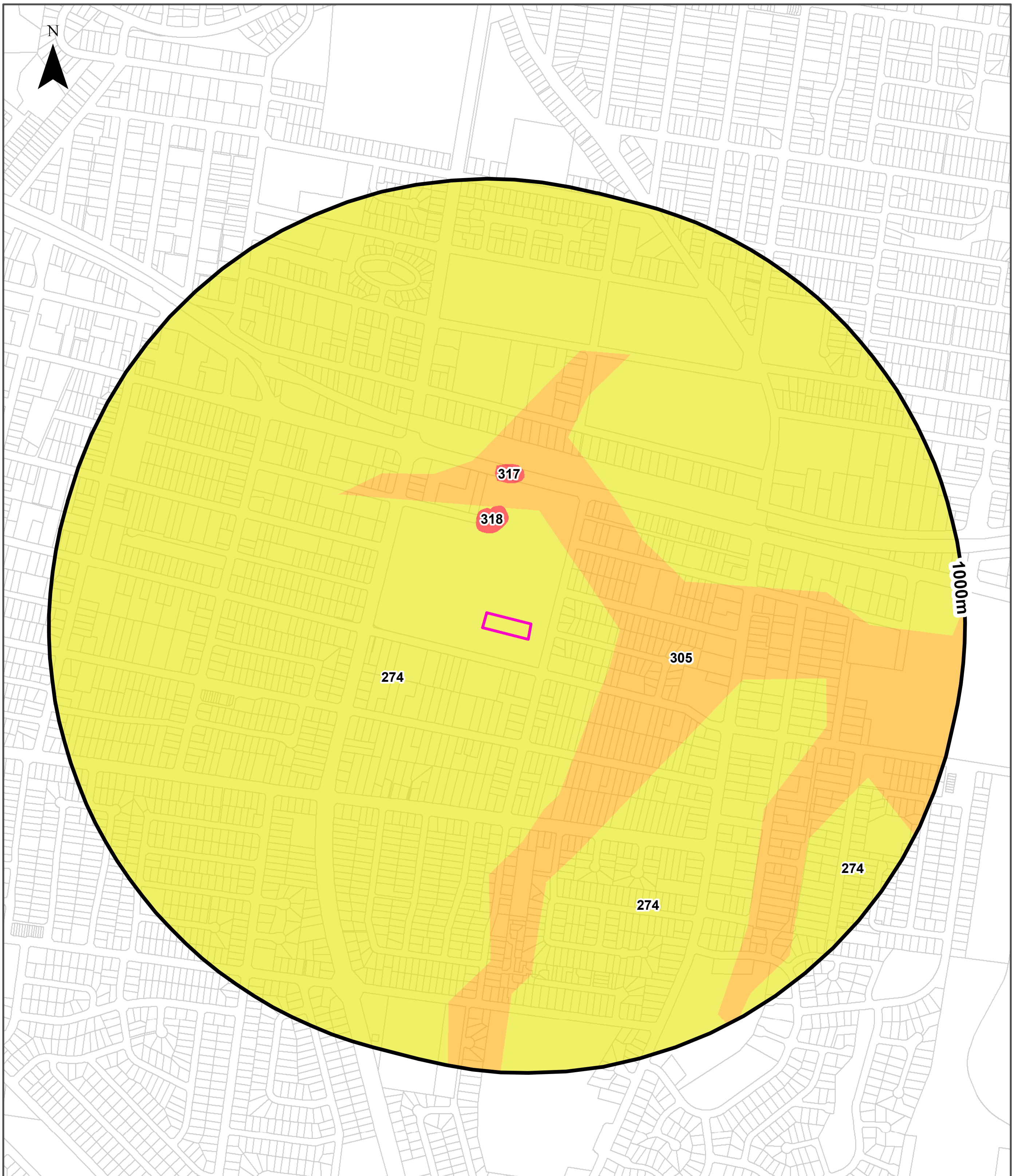
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

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

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

Dryland Salinity

Derby Street, Kingswood, NSW 2747



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Dryland Salinity - National Assessment

- Delineated risk area but no high hazard or risk rating for either 2000, 2020, 2050
- High hazard or risk in 2050 only
- High hazard or risk defined for 2050, but no assessment made for 2000 or 2020
- High hazard or risk in 2020 and 2050
- High hazard or risk in 2000 and 2050. 2020 not defined as high hazard
- High hazard or risk defined for all years: 2000, 2020, 2050

Salinity Potential of Western Sydney

- Area of Known Salinity
- Area of High Salinity Potential
- Area of Moderate Salinity Potential
- Area of Very Low Salinity Potential
- Area of Water

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Dryland Salinity

Derby Street, Kingswood, NSW 2747

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

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

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit

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
305	HIGH	Area of High Salinity Potential	162m	East
318	SALT	Area of Known Salinity	184m	North
317	SALT	Area of Known Salinity	303m	North

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

Mining

Derby Street, Kingswood, NSW 2747

Mining Subsidence Districts

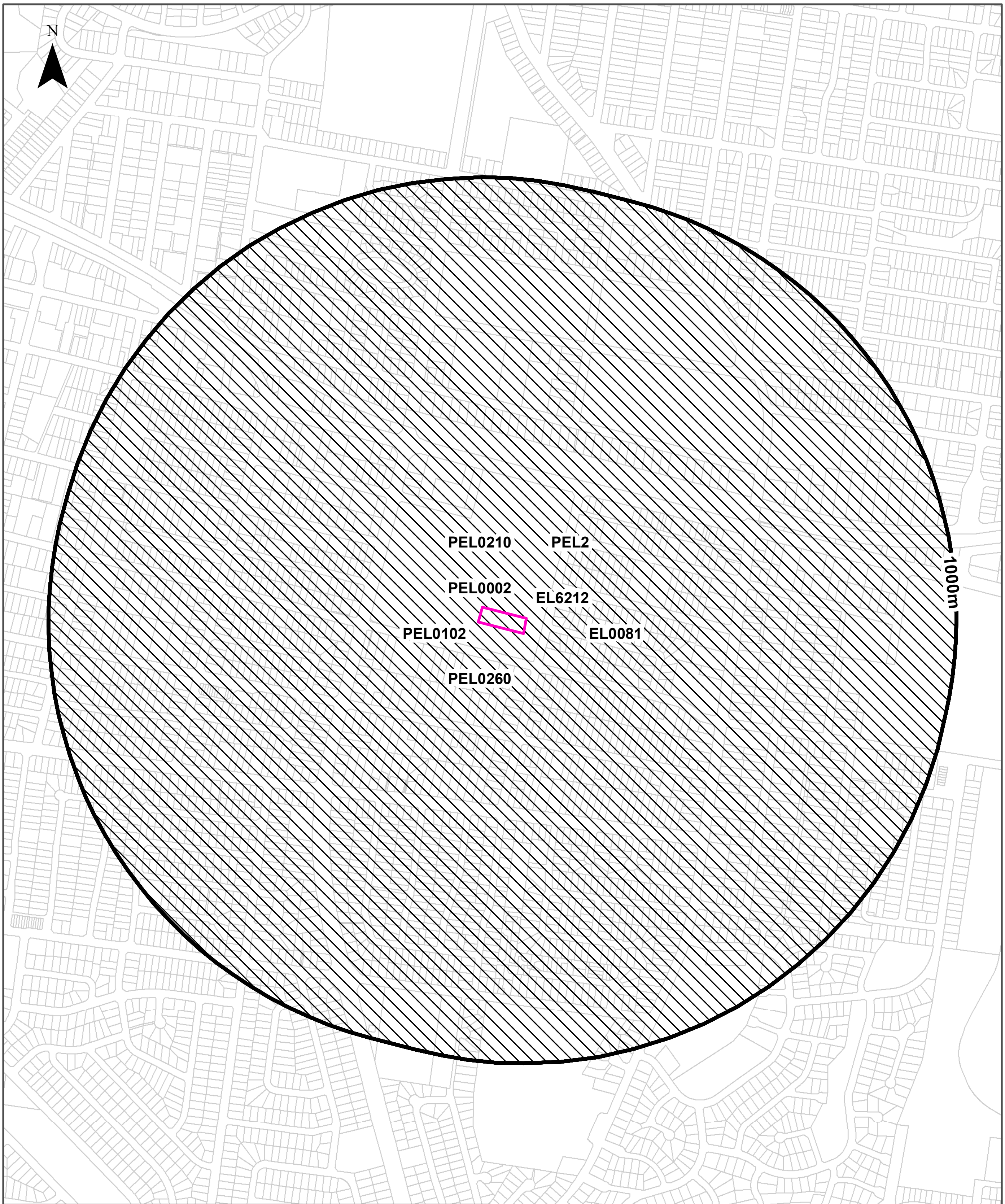
Mining Subsidence Districts within the dataset buffer:

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

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

Mining & Exploration Titles

Derby Street, Kingswood, NSW 2747



Legend

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

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Mining

Derby Street, Kingswood, NSW 2747

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist (m)	Dir'
N/A	No Records in Buffer								

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

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist (m)	Dir'
N/A	No Records in Buffer						

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

Mining

Derby Street, Kingswood, NSW 2747

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist (m)	Dir'
EL0081	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	01 Feb 1967	01 Feb 1968	MINERALS		0m	Onsite
EL6212	HOT ROCK ENERGY PTY LTD,LONGREACH OIL LIMITED	4 Mar 2004	3 Mar 2013	MINERALS	Geothermal	0m	Onsite
PEL0002	AGL UPSTREAM INVESTMENTS PTY LIMITED	29/03/1993	6/07/2015	PETROLEUM	Petroleum	0m	Onsite
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	Onsite
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	Onsite
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	9/09/1981	8/03/1993	PETROLEUM	Petroleum	0m	Onsite
PEL2	AGL UPSTREAM INVESTMENTS PTY LIMITED			MINERALS		0m	Onsite

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

State Environmental Planning Policy

Derby Street, Kingswood, NSW 2747

State Significant Precincts

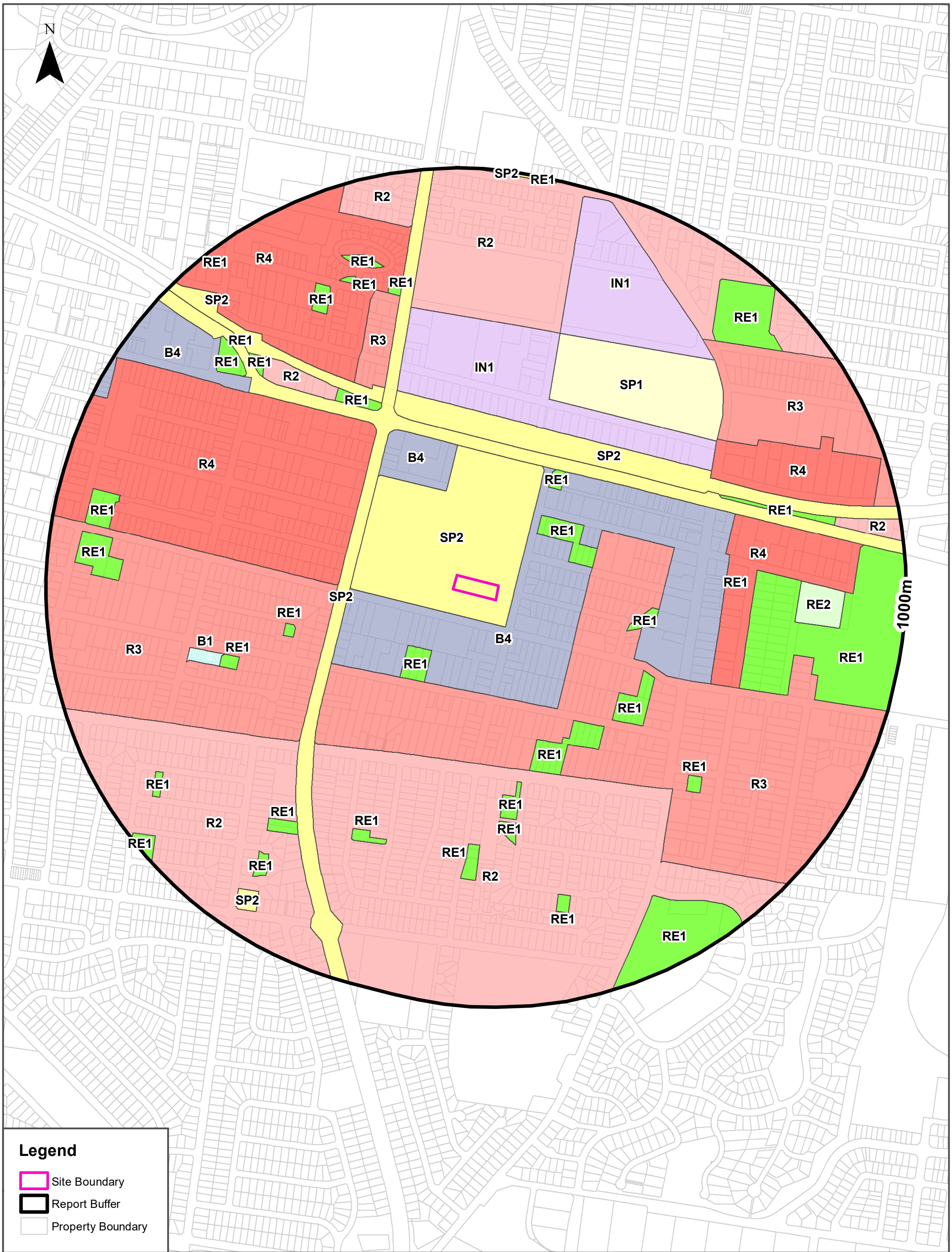
What SEPP State Significant Precincts exist within the dataset buffer?

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

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

EPI Planning Zones

Derby Street, Kingswood, NSW 2747



Scale:

0 100 200 400 600

Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2021
Planning: NSW Crown Copyright - Planning & Environment

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Environmental Planning Instrument

Derby Street, Kingswood, NSW 2747

Land Zoning

What EPI Land Zones exist within the dataset buffer?

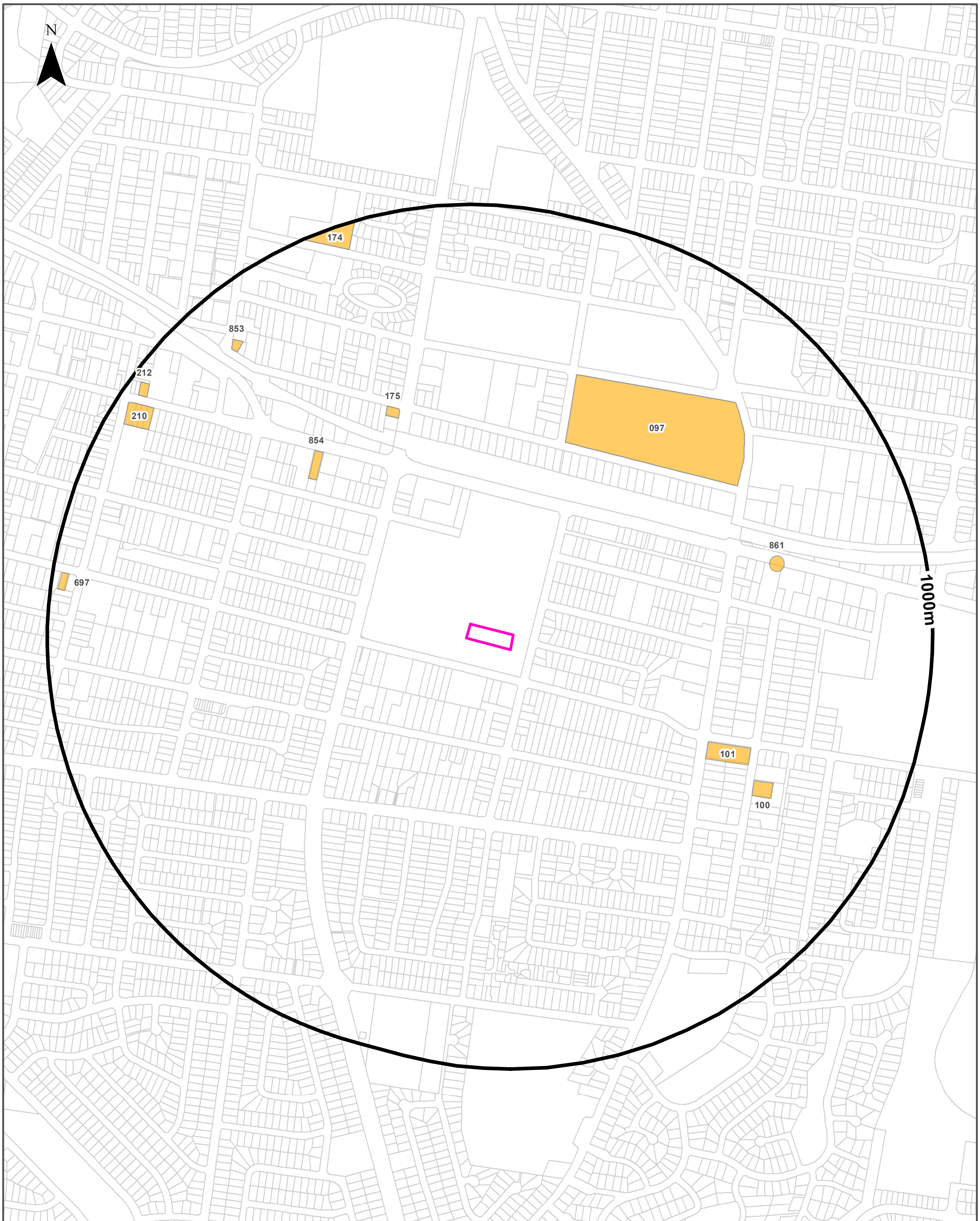
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP2	Infrastructure	Health Services Facilities	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	0m	Onsite
B4	Mixed Use		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	38m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	159m	North East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	160m	South West
B4	Mixed Use		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	209m	North West
R3	Medium Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	209m	South East
SP2	Infrastructure	Classified Road	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	246m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	272m	North East
R4	High Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	277m	West
R3	Medium Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	282m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	329m	East
SP2	Infrastructure	Railway	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	341m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	351m	South East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	377m	South East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	399m	West
IN1	General Industrial		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	18/12/2020		402m	North
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	404m	South
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	448m	South
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	450m	North West
SP2	Infrastructure	Railway	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	462m	North West
SP1	Special Activities	Cemetery	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	476m	North East
R3	Medium Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	494m	North
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	524m	North West
R2	Low Density Residential		Penrith Local Environmental Plan 2010	27/09/2019	27/09/2019	18/12/2020	Amendment No 22	527m	South West
R4	High Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	537m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	542m	South
R4	High Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	550m	East

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	551m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	556m	East
R4	High Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	583m	East
B1	Neighbourhood Centre		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	584m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	585m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	601m	South
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	621m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	627m	South West
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	629m	North East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	638m	South East
IN1	General Industrial		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	18/12/2020		639m	North East
R3	Medium Density Residential		Penrith Local Environmental Plan 2010	27/09/2019	27/09/2019	18/12/2020	Amendment No 22	646m	East
B4	Mixed Use		Penrith Local Environmental Plan 2010	26/04/2019	26/04/2019	18/12/2020	Amendment No 15	681m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	683m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	688m	South West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	701m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	715m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	718m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	729m	North
RE2	Private Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	732m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	738m	South
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	761m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	14/10/2016	14/10/2016	18/12/2020	Amendment No 11	768m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	778m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	794m	South West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	803m	North East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	813m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	821m	South East
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	837m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	842m	South West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	847m	West
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	863m	North
SP2	Infrastructure	Electricity Transmission	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	882m	South West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	949m	South West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	957m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	991m	North
SP2	Infrastructure	Water Supply System	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	18/12/2020	Amendment No 4	991m	North

Heritage Items

Derby Street, Kingswood, NSW 2747



Legend

Property Boundary
Site Boundary
Report Buffer
Commonwealth Heritage List
National Heritage List
State Heritage Items
EPI Heritage Items

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021
Heritage - NSW Crown Copyright - Planning & Environment

Coordinate System: GDA 1994 MGA Zone 56

Date: 18 February 2021

Heritage

Derby Street, Kingswood, NSW 2747

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
097	Penrith General Cemetery	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	476m	North East
854	Federation house	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	504m	North West
101	St. Phillips Anglican Church	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	519m	South East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
175	Cottage	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	521m	North West
861	Milestone	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	633m	East
100	Federation house and garden	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	659m	South East
853	Cottage	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	855m	North West
210	Penrith Public School and palm trees	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	897m	North West
174	Governor Phillip Special Hospital - original building	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	939m	North
212	Victorian terrace and Interwar shop	Item - General	Local	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/06/2020	943m	North West
697	Presbyterian manse (former)	Item - General	Local	Penrith Local Environmental Plan 2010	28/01/2015	25/02/2015	11/06/2020	960m	West

Natural Hazards - Bush Fire Prone Land

Derby Street, Kingswood, NSW 2747

Scale: 0 100 200 400 600 Meters	Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2021. Property Boundaries: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Natural Hazards

Derby Street, Kingswood, NSW 2747

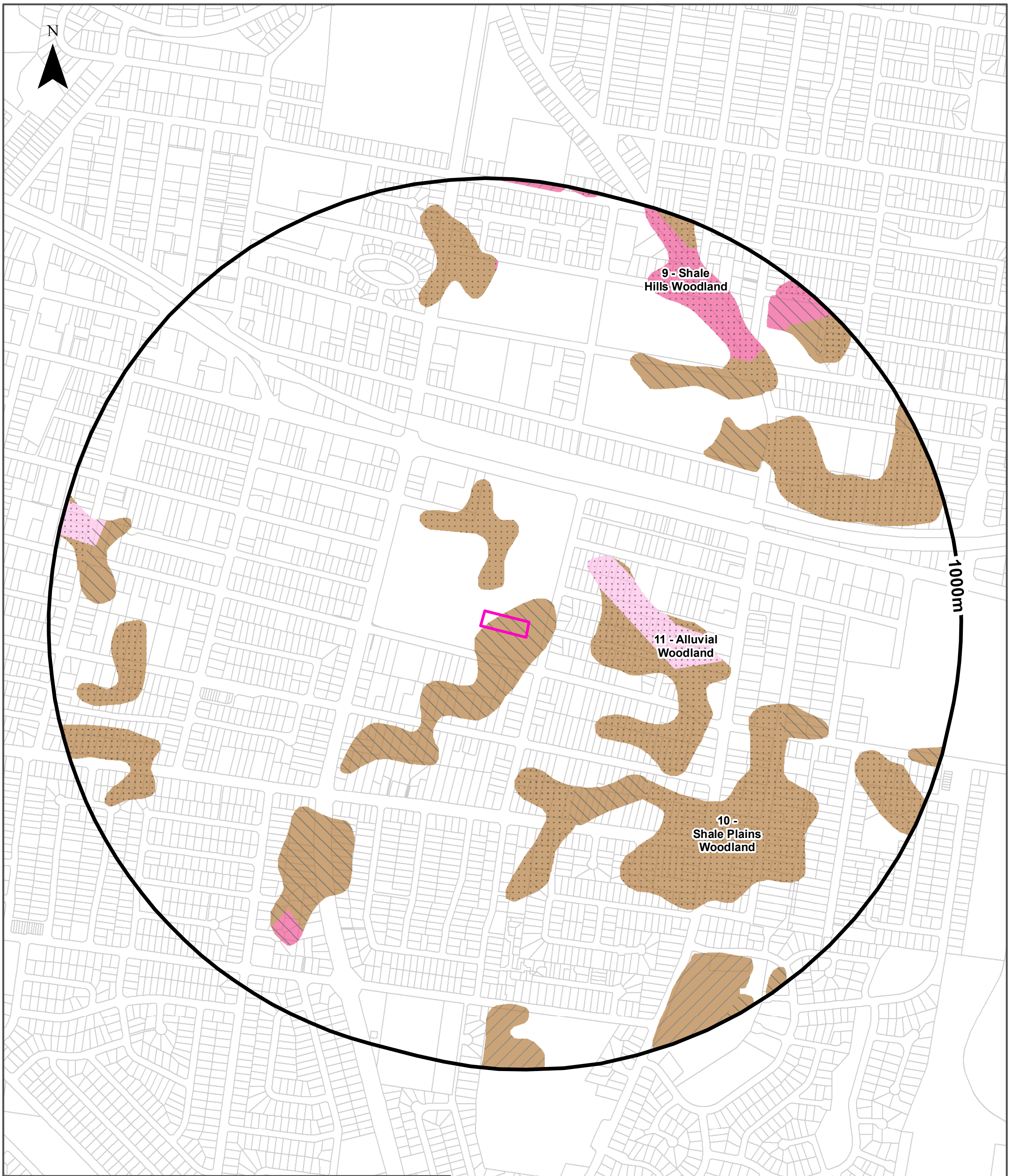
Bush Fire Prone Land

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

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	720m	South East
Vegetation Category 1	820m	South East

Ecological Constraints - Remnant Vegetation of the Cumberland Plain

Derby Street, Kingswood, NSW 2747



Legend

Site Boundary
Report Buffer
Property Boundary
RAMSAR Wetlands

Cumberland Plain Vegetation

Crown cover greater than 10%
Crown cover less than 10%
Crown cover less than 10% (urban areas)

Scale: 0 100 200 400 600 Meters

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

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Ecological Constraints

Derby Street, Kingswood, NSW 2747

Remnant Vegetation of the Cumberland Plain

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

Description	Crown Cover	Distance	Direction
10 - Shale Plains Woodland	Crown cover less than 10%	0m	Onsite
10 - Shale Plains Woodland	Crown cover less than 10% (urban areas)	47m	North
11 - Alluvial Woodland	Crown cover less than 10% (urban areas)	179m	East
9 - Shale Hills Woodland	Crown cover less than 10% (urban areas)	768m	North East
9 - Shale Hills Woodland	Crown cover less than 10%	792m	South West
10 - Shale Plains Woodland	Crown cover greater than 10%	827m	South East
11 - Alluvial Woodland	Crown cover less than 10%	900m	West
9 - Shale Hills Woodland	Crown cover greater than 10%	981m	North

Remnant Vegetation of the Cumberland Plain : NSW Office of Environment and Heritage

Ramsar Wetlands

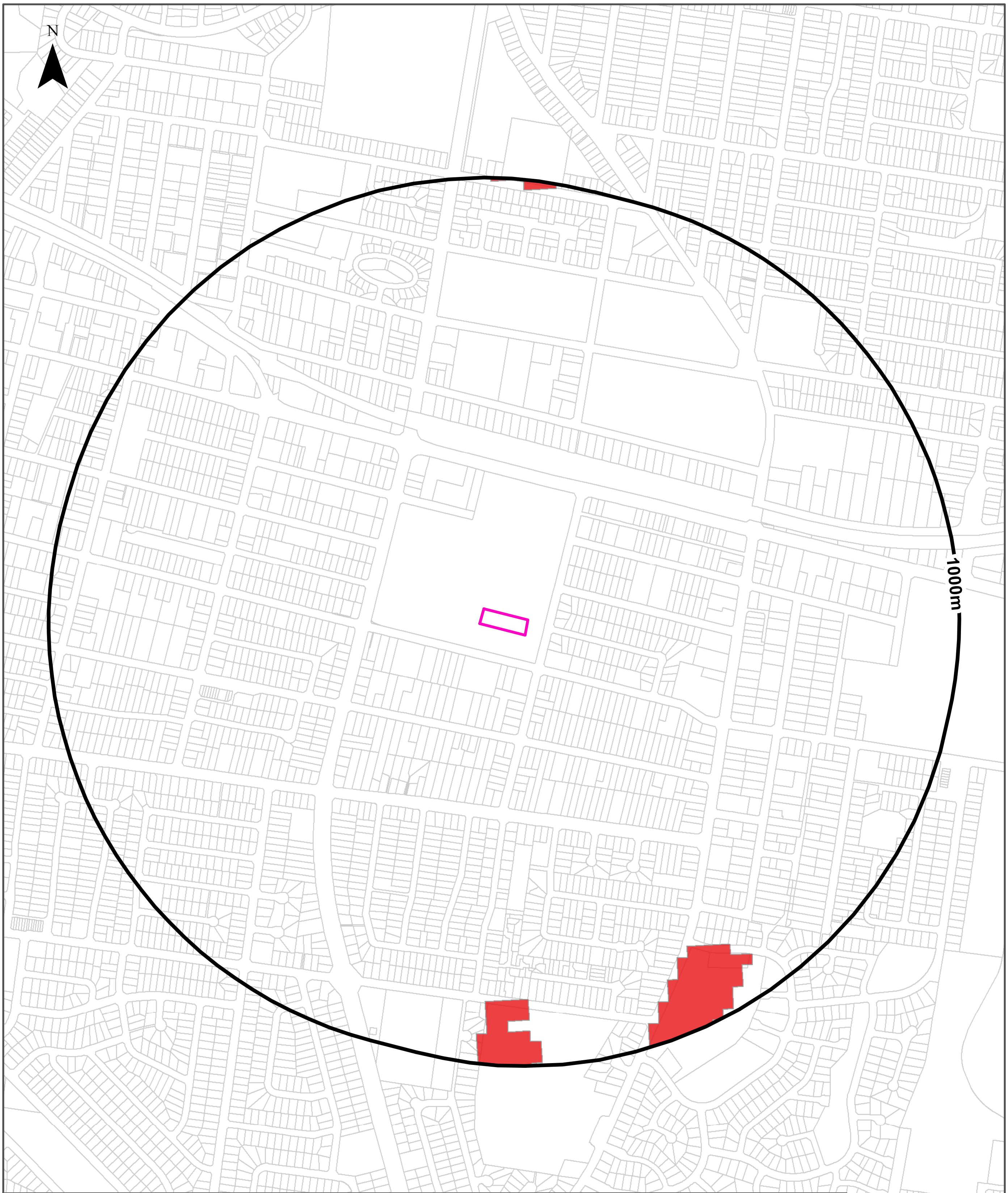
What Ramsar Wetland areas exist within the dataset buffer?

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

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Derby Street, Kingswood, NSW 2747



Legend

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

Scale: 0 100 200 400 600 Meters

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

Coordinate System:
GDA 1994 MGA Zone 56

Date: 18 February 2021

Ecological Constraints

Derby Street, Kingswood, NSW 2747

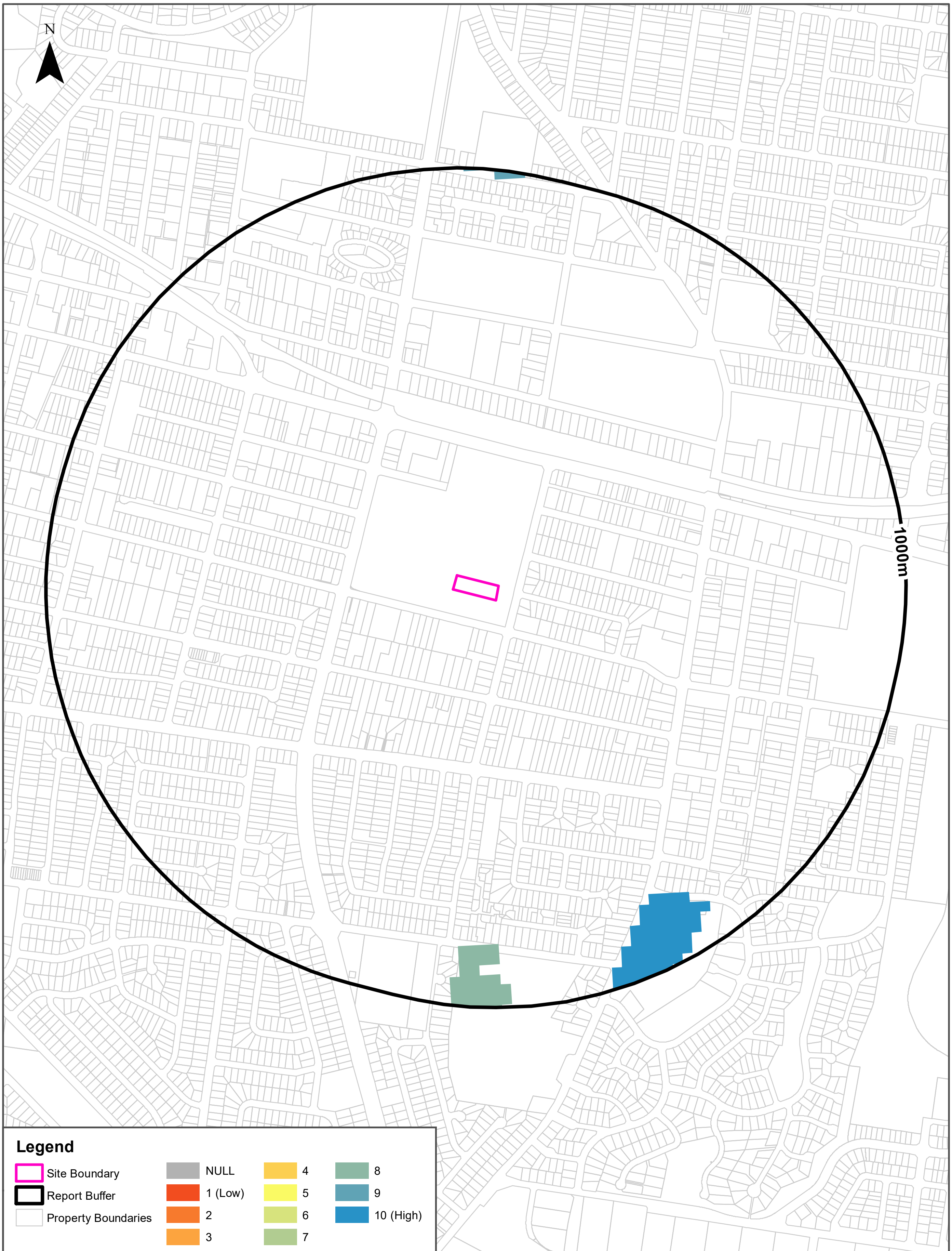
Groundwater Dependent Ecosystems Atlas

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	812m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

Derby Street, Kingswood, NSW 2747



Legend

Site Boundary	NULL	4	8
Report Buffer	1 (Low)	5	9
Property Boundaries	2	6	10 (High)
	3	7	

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2021	Coordinate System: GDA 1994 MGA Zone 56	Date: 18 February 2021

Ecological Constraints

Derby Street, Kingswood, NSW 2747

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	812m
Terrestrial	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	842m
Terrestrial	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	975m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

Derby Street, Kingswood, NSW 2747

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	Ardenna tenuirostris	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	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	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	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;JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Grantiella picta	Painted Honeyeater	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	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	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
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	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	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 longimembris	Eastern Grass Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	Not Sensitive	Not Listed	
Animalia	Gastropoda	Pommerhelix duralensis	Dural Land Snail	Endangered	Not Sensitive	Endangered	
Animalia	Insecta	Petalura gigantea	Giant Dragonfly	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	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
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	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
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	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	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 bynoeana	Bynoe's Wattle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Allocasuarina glareicola		Endangered	Not Sensitive	Endangered	
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	Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Hibbertia puberula		Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
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	
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	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	
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.

Location Confidences

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

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
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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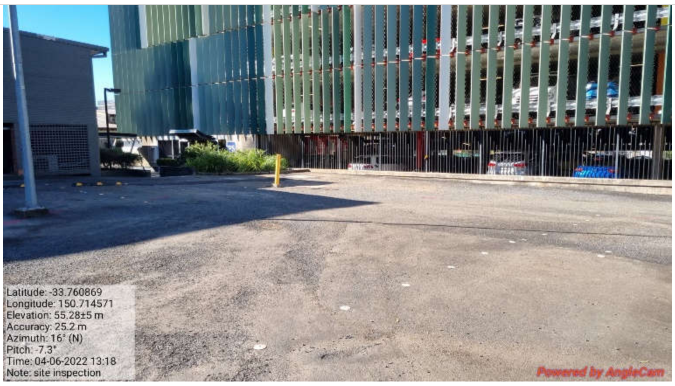
Site Photographs 4 June 2022

Project Ref: E35033PL
Site Address: TAMS, Derby Street, Kingswood, NSW
Selected Site Photos Dated: 4 June 2022

Photograph 1: Taken showing the western portion of the site adjacent the P5 multi-storey car park, facing south.

Photograph 2: Taken showing the central portion of the site, facing south-west. Note the asphaltic concrete pavement in poor condition at the surface.

Photograph 3: Taken showing the north-western portion of the site, facing west. Note the asphaltic concrete pavement in poor condition at the surface.



Photograph 4: Taken showing the central portion of the site, facing north-east.

Appendix C: 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 old suburbs with high 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-D: 'Commercial/Industrial'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	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)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH101	0-0.1	Fill: Gravelly sand	<4	<0.4	**26**	**10**	**6**	<0.1	**18**	**19**	**2.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH101 - [LAB_DUP]	0-0.1	Fill: Gravelly sand	<4	<0.4	**18**	**10**	**6**	<0.1	**13**	**20**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH101	1.0-1.2	Silty clay	<4	<0.4	**8**	**12**	**7**	<0.1	**3**	**11**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH102	0-0.1	Fill: Sandy gravelly clay	**6**	<0.4	**13**	**15**	**15**	<0.1	**9**	**32**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH103	0-0.1	Fill: Silty sandy clay	<4	<0.4	**16**	**29**	**11**	<0.1	**13**	**32**	**0.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH104	0-0.1	Fill: Gravelly sand	<4	<0.4	**8**	**38**	**3**	<0.1	**40**	**28**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH104	0.6-0.9	Silty clay	<4	<0.4	**5**	**11**	**5**	<0.1	**3**	**13**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH105	0-0.1	Fill: Sandy gravelly clay	<4	<0.4	**8**	**15**	**11**	<0.1	**6**	**30**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH106	0-0.1	Fill: Sandy gravelly clay	<4	<0.4	**9**	**13**	**10**	<0.1	**7**	**22**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH106	0.6-0.9	Silty clay	<4	<0.4	**7**	**13**	**7**	<0.1	**3**	**15**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH107	0-0.1	Fill: Gravelly sandy clay	<4	<0.4	**12**	**20**	**12**	<0.1	**5**	**26**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH107	0.8-1.1	Silty clay	<4	<0.4	**8**	**22**	**13**	<0.1	**4**	**28**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	.	Fill: Gravelly sand	<4	<0.4	**34**	**15**	**7**	<0.1	**26**	**27**	**0.77**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP1 - [LAB_DUP]	.	Fill: Gravelly sand	<4	<0.4	**33**	**15**	**7**	<0.1	**24**	**26**	**0.63**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP2	.	Fill: Gravelly sandy clay	**4**	<0.4	**17**	**23**	**15**	<0.1	**9**	**36**	**0.3**	<0.5	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Total Number of Samples			15	15	15	15	15	15	15	15	15	15	10	11	11	11	11	11	11	11	11	7
Maximum Value			6	<PQL	34	38	15	<PQL	40	36	2.4	<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-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH101	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH101 - [LAB_DUP]	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH101	1.0-1.2	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH102	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH103	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH104	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH104	0.6-0.9	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH105	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH106	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH106	0.6-0.9	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH107	0-0.1	Fill: Gravelly sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
BH107	0.8-1.1	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP1	.	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP1 - [LAB_DUP]	.	Fill: Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2	.	Fill: Gravelly sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2 - [LAB_DUP]	.	Fill: Gravelly sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					16	16	16	16	16	16	16	12
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.2

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
BH101	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH101 - [LAB_DUP]	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH101	1.0-1.2	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH102	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH103	0-0.1	Fill: Silty sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH104	0-0.1	Fill: Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH104	0.6-0.9	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH105	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0-0.1	Fill: Sandy gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0.6-0.9	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH107	0-0.1	Fill: Gravelly sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH107	0.8-1.1	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP1	.	Fill: Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP1 - [LAB_DUP]	.	Fill: Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP2	.	Fill: Gravelly sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP2 - [LAB_DUP]	.	Fill: Gravelly sandy clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

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			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH101	0-0.1	Coarse	<25	<50	<100	<100
BH101 - [LAB_DUP]	0-0.1	Coarse	<25	<50	<100	<100
BH101	1.0-1.2	Fine	<25	<50	<100	<100
BH102	0-0.1	Fine	<25	<50	<100	<100
BH103	0-0.1	Fine	<25	<50	<100	<100
BH104	0-0.1	Coarse	<25	<50	<100	<100
BH104	0.6-0.9	Fine	<25	<50	<100	<100
BH105	0-0.1	Fine	<25	<50	<100	<100
BH106	0-0.1	Fine	<25	<50	<100	<100
BH106	0.6-0.9	Fine	<25	<50	<100	<100
BH107	0-0.1	Fine	<25	<50	<100	<100
BH107	0.8-1.1	Fine	<25	<50	<100	<100
SDUP1	.	Coarse	<25	<50	<100	<100
SDUP1 - [LAB_DUP]	.	Coarse	<25	<50	<100	<100
SDUP2	.	Fine	<25	<50	<100	<100
SDUP2 - [LAB_DUP]	.	Fine	<25	<50	<100	<100
Total Number of Samples			16	16	16	16
Maximum Value			<PQL	<PQL	<PQL	<PQL

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

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		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		**COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH101	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH101 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH101	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH102	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH103	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH104	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH104	0.6-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH105	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH106	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH106	0.6-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH107	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.2**
BH107	0.8-1.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP1	.	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP1 - [LAB_DUP]	.	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP2	.	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP2 - [LAB_DUP]	.	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		16	16	16	16	16	16	16	16	16	12
Maximum Value		<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.2

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

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HIL-D:Commercial/Industrial

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**					**0.05**			**0.001**			**0.001**											**0.05**	**0.001**
4/06/2022	BH101	0-0.5	No	10	10,110	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH101	0-0.1	840.4	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
4/06/2022	BH101	0.5-0.8	NA	7	5,270	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/06/2022	BH102	0-0.5	No	6	4,310	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH102	0-0.1	576.76	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
4/06/2022	BH102	0.5-1.0	NA	5	3,890	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/06/2022	BH103	0-0.8	No	10	9,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH103	0-0.1	913.65	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
4/06/2022	BH104	0-0.5	No	6	4,830	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH104	0-0.1	996.6	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
4/06/2022	BH105	0-0.9	No	10	10,120	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH105	0-0.1	758.64	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
4/06/2022	BH106	0-0.6	No	6	4,190	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH106	0-0.1	955.47	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
4/06/2022	BH107	0-0.7	No	8	5,890	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297274	BH107	0-0.1	706.02	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

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				COMMERCIAL/INDUSTRIAL																			
							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)	>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	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH101	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	<4	**26**	**10**	**6**	**18**	**19**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH101 - [LAB_DUP]	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	<4	**18**	**10**	**6**	**13**	**20**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.08**
BH101	1.0-1.2	Silty clay	Fine	NA	NA	NA	<4	**8**	**12**	**7**	**3**	**11**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH102	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	**6**	**13**	**15**	**15**	**9**	**32**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH103	0-0.1	Fill: Silty sandy clay	Fine	NA	NA	NA	<4	**16**	**29**	**11**	**13**	**32**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.06**
BH104	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	<4	**8**	**38**	**3**	**40**	**28**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH104	0.6-0.9	Silty clay	Fine	NA	NA	NA	<4	**5**	**11**	**5**	**3**	**13**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH105	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	<4	**8**	**15**	**11**	**6**	**30**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH106	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	<4	**9**	**13**	**10**	**7**	**22**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH106	0.6-0.9	Silty clay	Fine	NA	NA	NA	<4	**7**	**13**	**7**	**3**	**15**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH107	0-0.1	Fill: Gravelly sandy clay	Fine	NA	NA	NA	<4	**12**	**20**	**12**	**5**	**26**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH107	0.8-1.1	Silty clay	Fine	NA	NA	NA	<4	**8**	**22**	**13**	**4**	**28**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP1	.	Fill: Gravelly sand	Coarse	NA	NA	NA	<4	**34**	**15**	**7**	**26**	**27**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.1**
SDUP1 - [LAB_DUP]	.	Fill: Gravelly sand	Coarse	NA	NA	NA	<4	**33**	**15**	**7**	**24**	**26**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.1**
SDUP2	.	Fill: Gravelly sandy clay	Fine	NA	NA	NA	**4**	**17**	**23**	**15**	**9**	**36**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.07**
SDUP2 - [LAB_DUP]	.	Fill: Gravelly sandy clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	NA
Total Number of Samples				0	0	0	15	15	15	15	15	15	16	11	16	16	16	16	16	16	16	16	15
Maximum Value				NA	NA	NA	6	34	38	15	40	36	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.2

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)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH101	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH101 - [LAB_DUP]	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH101	1.0-1.2	Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
BH102	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH103	0-0.1	Fill: Silty sandy clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH104	0-0.1	Fill: Gravelly sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH104	0.6-0.9	Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
BH105	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH106	0-0.1	Fill: Sandy gravelly clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH106	0.6-0.9	Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
BH107	0-0.1	Fill: Gravelly sandy clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
BH107	0.8-1.1	Silty clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
SDUP1	.	Fill: Gravelly sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP1 - [LAB_DUP]	.	Fill: Gravelly sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP2	.	Fill: Gravelly sandy clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	2500	6600	95	135	185	95	72
SDUP2 - [LAB_DUP]	.	Fill: Gravelly sandy clay	Fine	NA	NA	NA	--	--	--	--	--	--	370	--	215	170	2500	6600	95	135	185	95	--

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 PCBs	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		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**																									
BH101	0-0.1	Fill: Gravelly sand	<4	<0.4	**26**	**10**	**6**	<0.1	**18**	**19**	**2.4**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH101 - [LAB_DUP	0-0.1	Fill: Gravelly sand	<4	<0.4	**18**	**10**	**6**	<0.1	**13**	**20**	**0.4**	**0.08**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH101	1.0-1.2	Silty clay	<4	<0.4	**8**	**12**	**7**	<0.1	**3**	**11**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH102	0-0.1	Fill: Sandy gravelly clay	**6**	<0.4	**13**	**15**	**15**	<0.1	**9**	**32**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH103	0-0.1	Fill: Silty sandy clay	<4	<0.4	**16**	**29**	**11**	<0.1	**13**	**32**	**0.3**	**0.06**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH104	0-0.1	Fill: Gravelly sand	<4	<0.4	**8**	**38**	**3**	<0.1	**40**	**28**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH104	0.6-0.9	Silty clay	<4	<0.4	**5**	**11**	**5**	<0.1	**3**	**13**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH105	0-0.1	Fill: Sandy gravelly clay	<4	<0.4	**8**	**15**	**11**	<0.1	**6**	**30**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH106	0-0.1	Fill: Sandy gravelly clay	<4	<0.4	**9**	**13**	**10**	<0.1	**7**	**22**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH106	0.6-0.9	Silty clay	<4	<0.4	**7**	**13**	**7**	<0.1	**3**	**15**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH107	0-0.1	Fill: Gravelly sandy clay	<4	<0.4	**12**	**20**	**12**	<0.1	**5**	**26**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH107	0.8-1.1	Silty clay	<4	<0.4	**8**	**22**	**13**	<0.1	**4**	**28**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1	.	Fill: Gravelly sand	<4	<0.4	**34**	**15**	**7**	<0.1	**26**	**27**	**0.77**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1 - [LAB_DUP	.	Fill: Gravelly sand	<4	<0.4	**33**	**15**	**7**	<0.1	**24**	**26**	**0.63**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP2	.	Fill: Gravelly sandy clay	**4**	<0.4	**17**	**23**	**15**	<0.1	**9**	**36**	**0.3**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP2 - [LAB_DUP	.	Fill: Gravelly sandy 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	<1	NA
Total Number of Samples			15	15	15	15	15	15	15	15	15	15	11	11	11	11	11	16	16	16	16	16	16	16	16	16	7
Maximum Value			6	<PQL	34	38	15	<PQL	40	36	2.4	0.2	<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**

TABLE Q1
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	BH101	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	0.1	<0.1	<0.1	0.4	0.1	0.2	0.4	0.2	0.2	0.3	0.2	<0.1	<0.1	0.2
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	0.2	0.2	0.1	<0.2	0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.075	nc	nc	0.25	0.075	0.15	0.3	0.2	0.15	0.2	0.15	nc	nc	0.125
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	nc	120%	67%	67%	67%	0%	67%	100%	67%	nc	nc	120%
Inter	BH107	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	SDUP2	.	<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	0.07	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.075	0.075	nc	nc	nc	0.0475	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	67%	nc	nc	nc	95%	nc	nc	nc
Field	TB-S	.	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	4/06/22																									
Trip	TS-S1		-	-	-	-	81%	106%	129%	127%	130%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	4/06/22																									

			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	BH101	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	.	<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
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	BH107	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	SDUP2	.	NA	<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
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-S	.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	4/06/22																					
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	4/06/22																					

			Azinphos-methyl (Guthion	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	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	BH101	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	<4	<0.4	26	10	6	<0.1	18	19
laboratory	SDUP1	.	<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	34	15	7	<0.1	26	27
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	30	12.5	6.5	nc	22	23
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	27%	40%	15%	nc	36%	35%
Inter	BH107	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	<4	<0.4	12	20	12	<0.1	5	26
laboratory	SDUP2	.	<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	17	23	15	<0.1	9	36
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	3	nc	14.5	21.5	13.5	nc	7	31
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	34%	14%	22%	nc	57%	32%
Field	TB-S	.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	4/06/22																						
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	4/06/22																						

Result outside of QA/QC acceptance criteria

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

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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						
			MW101	MW101 [LAB_DUP]	MW104	MW107	WDUP1	WDUP2	WDUP2 [LAB_DUP]
Inorganic Compounds and Parameters									
pH		6.5 - 8.5	5.7	5.7	6.5	6.2	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**28000**	**28000**	**29000**	**29000**	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids									
Arsenic (As III)	1	24	**1**	**1**	**1**	<1	<1	**2**	NA
Cadmium	0.1	0.2	**2.5**	**2.4**	**0.6**	**0.8**	**2.3**	**0.6**	NA
Chromium (SAC for Cr III adopted)	1	3.3	**1**	<1	<1	**1**	<1	**2**	NA
Copper	1	1.4	<1	<1	**1**	**4**	<1	**2**	NA
Lead	1	3.4	<1	<1	<1	<1	<1	<1	NA
Total Mercury (inorganic)	0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA
Nickel	1	11	**220**	**210**	**8**	**130**	**210**	**9**	NA
Zinc	1	8	**180**	**180**	**50**	**330**	**180**	**52**	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)									
Benzene	1	950	<1	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2	<2
o-xylene	1	350	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs									
Dichlorodifluoromethane	10	NSL	<10	<10	<10	<10	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	100	<10	<10	<10	<10	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10	<10	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	700	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	1	90	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
Chloroform	1	370	<1	<1	<1	<1	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	1	1900	<1	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	240	<1	<1	<1	<1	<1	<1	<1
Benzene	1	950	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	1	900	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	1	330	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	6500	<1	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	1	1100	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	70	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	55	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1	<1	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2	<2
Styrene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	<1	<1	<1	<1	<1	<1
o-xylene	1	350	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	1	30	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	<1	<1	<1	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	85	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	<1	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)									
Naphthalene	0.2	16	**0.6**	**0.5**	<0.2	<0.2	<0.2	<0.1	NA
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Phenanthrene	0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Anthracene	0.1	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Fluoranthene	0.1	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA

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	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES MW101	MW101 [LAB_DUP]	MW104	MW107	WDUP1	WDUP2	WDUP2 [LAB_DUP]
Total Recoverable Hydrocarbons (TRH)											
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10	<10	<10	<10	<10	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	**82**	NA	<50	<50	**72**	<50	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)											
Benzene	1	1	-	-	<1	<1	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	600	-	-	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)											
Naphthalene	1	-	-	6.1	<1	<1	<1	<1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs											
Dichlorodifluoromethane	10	-	-	-	<10	<10	<10	<10	<10	<10	<10
Chloromethane	10	-	-	-	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	<10	<10	<10	<10	<10	<10
Bromomethane	10	-	-	-	<10	<10	<10	<10	<10	<10	<10
Chloroethane	10	-	-	-	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	1	250	-	-	<1	<1	<1	<1	<1	<1	<1
Chloroform	1		-	-	<1	<1	<1	<1	<1	<1	<1
2,2-dichloropropane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	1	3	-	-	<1	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Cyclohexane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	3	-	-	<1	<1	<1	<1	<1	<1	<1
Benzene	1	1	-	-	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	50	-	-	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	300	-	-	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	<1	<1	<1	<1
Bromoform	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	-	-	-	<2	<2	<2	<2	<2	<2	<2
Styrene	1	30	-	-	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
o-xylene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
n-propyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
2-chlorotoluene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
4-chlorotoluene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	<1	<1	<1	<1	<1	<1
n-butyl benzene	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	7	-	-	<1	<1	<1	<1	<1	<1	<1

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

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW101	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP1	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<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	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	nc	nc	nc	nc	nc
Inter	MW104	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP2	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<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	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	nc	nc	nc	nc	nc

		1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW101	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<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	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	nc	nc	nc	nc	nc
Inter	MW104	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP2	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<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	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	nc	nc	nc	nc	nc

		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
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
	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*
Intra	MW101	<10	82	<100	<100	<1	<1	<1	<2	<1	0.6	<0.1	<0.1	<0.1	<0.1
laboratory	WDUP1	<10	72	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN	nc	77	nc	nc	nc	nc	nc	nc	nc	0.35	nc	nc	nc	nc
	RPD %	nc	13%	nc	nc	nc	nc	nc	nc	nc	143%	nc	nc	nc	nc
Inter	MW104	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1
laboratory	WDUP2	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN	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
Field	TB-W1	<10	-	-	-	<1	<1	<1	<2	<1	-	-	-	-	-
Blank	9/06/2022														
Trip	TS-W1	-	-	-	-	107%	92%	102%	99%	97%	-	-	-	-	-
Spike	9/06/2022														

		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	*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	*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	MW101	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	2.5	1	<1	<1	<0.05	220	180
laboratory	WDUP1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	2.3	<1	<1	<1	<0.05	210	180
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.75	2.4	0.75	nc	nc	nc	215	180
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	8%	67%	nc	nc	nc	5%	0%
Inter	MW104	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	0.6	<1	1	<1	<0.05	8	50
laboratory	WDUP2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	2	0.6	2	2	<1	<0.05	9	52
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.5	0.6	1.25	1.5	nc	nc	8.5	51
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	0%	120%	67%	nc	nc	12%	4%
Field	TB-W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blank	9/06/2022																		
Trip	TS-W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spike	9/06/2022																		

Result outside of QA/QC acceptance criteria Value

Appendix D: Borehole Logs

JKEnvironments

ENVIRONMENTAL LOG

Log No. BH/MW101 1/1

SDUP1 (0-0.1)

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	Field Tests	Depth (m)	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION		0		FILL: Gravelly sand, fine to medium grained, brown, fine to coarse grained ironstone gravel, trace of clay nodules and ash.	M			SLIGHT HYDROCARBON ODOUR
	N = 11 17,6,5			FILL: Silty clayey sand, fine to medium grained, brown, trace of sandstone gravel.	M			SCREEN: 10.11kg 0-0.5m NO FCF
		1	CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			SCREEN: 5.27kg 0.5-0.8m NO FCF RESIDUAL
	N = 11 2,5,6			as above, but grey mottled red brown.	w<PL			RESIDUAL
		2	-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, red brown, with clay bands.	XW			BEDROCK
		3		SILTSTONE: red brown.	DW			
		4						
		5						GROUNDWATER MONITORING WELL INSTALLED TO 6.0m CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6m TO 3m. CASING 3m TO 0m. 2mm SAND FILTER PACK 6m TO 2.5m. BENTONITE SEAL 2.5m TO 2.0m. BACKFILLED WITH SAND (AND/OR CUTTINGS) TO THE SURFACE. COMPLETED WITH CONCRETED GATIC COVER.
		6						
				END OF BOREHOLE AT 6.5m				
		7						

SAMPLES: ES ASS ASB SAL DB

Graphic Log

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH102**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./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 COMPLETION							0			FILL: Sandy gravelly clay, low to medium plasticity, brown, fine to coarse grained, sub-angular igneous gravel, trace of ironstone and sandstone gravel and root fibres.	w<PL			SCREEN: 4.31kg 0-0.5m NO FCF
						N = 8 3,3,5				FILL: Silty clay, low to medium plasticity, orange brown, trace of igneous, sandstone and ironstone gravel and root fibres.	w<PL			SCREEN: 3.89kg 0.5-1.0m NO FCF
							1		CL-CI	Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone gravel and root fibres.	w<PL			RESIDUAL
										END OF BOREHOLE AT 1.5m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH103** 1/1

Environmental logs are not to be used for geotechnical purposes

SDUP4 (0-0.1)

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED TAMS BUILDING
Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A
Date: 4/6/22 **Datum:** -
Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION		N = 8 2,4,4	0			FILL: SIlty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of igneous gravel and root fibres.	M			SCREEN: 9.18kg 0-0.8m NO FCF
			1		CL-CI	Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone gravel and root fibres.	w<PL			RESIDUAL
			2 3 4 5 6 7			END OF BOREHOLE AT 1.5m				

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH/ MW104** 1/1

Environmental logs are not to be used for geotechnical purposes

SDUP4 (0-0.1)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	SAMPLES (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION			0			FILL: Gravelly sand, fine to medium grained, brown, fine to coarse grained, sub-angular igneous gravel, trace of clay nodules.	M			SCREEN: 4.63kg 0-0.5m NO FCF
		N = 6 3,3,3	1		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			RESIDUAL
		N = 15 4,7,8	2							
					-	SILTSTONE: brown.	XW			BEDROCK
			3			SILSTONE: brown and dark grey.	DW			
			4							
			5							GROUNDWATER MONITORING WELL INSTALLED TO 6.0m CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6m TO 3m. CASING 3m TO 0m. 2mm SAND FILTER PACK 6m TO 2.5m. BENTONITE SEAL 2.5m TO 1.5m. BACKFILLED WITH SAND (AND/OR CUTTINGS) TO THE SURFACE. COMPLETED WITH CONCRETED GATIC COVER.
			6							
						END OF BOREHOLE AT 6.5m				
			7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH105**

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	SAMPLES ES	ASS	ASB	SAL	DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
						N = 7 3,4,3	0			FILL: Sandy gravelly clay, low to medium plasticity, brown, fine to coarse grained, sub-angular igneous gravel, trace of clay nodules.				SCREEN: 10.12kg 0-0.9m NO FCF
							1		CL-CI	Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			RESIDUAL
							2 3 4 5 6 7			END OF BOREHOLE AT 1.5m				

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH106**

1/1

SDUP3 (0-0.1)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	SAMPLES ES	ASS	ASB	SAL	DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Sandy gravelly clay, low to medium plasticity, brown, fine to coarse grained, sub-angular igneous gravel, trace of asphalt fragments.	M			SCREEN: 4.19kg 0-0.6m NO FCF
						N = 7 2,3,4			CL-CI	Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			SLIGHT ORGANIC ODOUR RESIDUAL
							1			END OF BOREHOLE AT 1.0m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH/MW107 1/1

SDUP2 (0-0.1)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED TAMS BUILDING

Location: TAMS, DERBY STREET, KINGSWOOD, NSW

Job No.: E35033PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** N.M./T.H.

Groundwater Record	Samples (ES, ASS, ASB, SAL, DB)	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION		N = 9 3,4,5	0			FILL: Gravelly sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of igneous and sandstone gravel.	w<PL			SCREEN: 5.89kg 0-0.7m NO FCF SLIGHT ORGANIC ODOUR
		N = 22 6,9,13	1		CL-CI	Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			RESIDUAL
			2		-	SILTSTONE: red brown, trace of ironstone gravel.	XW			BEDROCK
			3			as above, but brown, no inclusions.	XW			GROUNDWATER MONITORING WELL INSTALLED TO 6.0m CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 3.0m. CASING 3.0m TO 0m. 2mm SAND FILTER PACK 6.0m TO 2.5m. BENTONITE SEAL 2.5m TO 2.0m. BACKFILLED WITH SAND (AND/OR CUTTINGS) TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
			4, 5, 6							
			7			END OF BOREHOLE AT 6.5m				

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	ROCK
FILL	CONGLOMERATE
TOPSOIL	SANDSTONE
CLAY (CL, CI, CH)	SHALE/MUDSTONE
SILT (ML, MH)	SILTSTONE
SAND (SP, SW)	CLAYSTONE
GRAVEL (GP, GW)	COAL
SANDY CLAY (CL, CI, CH)	LAMINITE
SILTY CLAY (CL, CI, CH)	LIMESTONE
CLAYEY SAND (SC)	PHYLLITE, SCHIST
SILTY SAND (SM)	TUFF
GRAVELLY CLAY (CL, CI, CH)	GRANITE, GABBRO
CLAYEY GRAVEL (GC)	DOLERITE, DIORITE
SANDY SILT (ML, MH)	BASALT, ANDESITE
PEAT AND HIGHLY ORGANIC SOILS (Pt)	QUARTZITE

OTHER MATERIALS

BRICKS OR PAVERS

CONCRETE

ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

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

Laboratory Classification Criteria

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

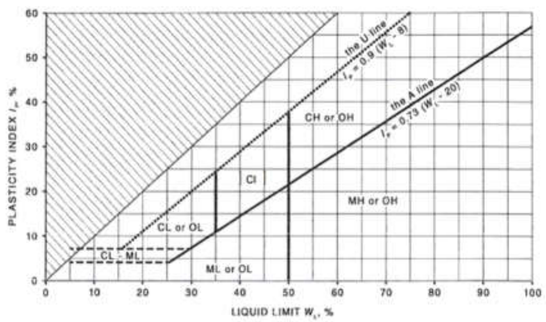
$$C_U = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

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

NOTES:

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



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LOG SYMBOLS

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

Log Column	Symbol	Definition	Density Index (I_D) Range (%)	SPT 'N' Value Range (Blows/300mm)
Density Index/ Relative Density (Cohesionless Soils)	VL	VERY LOOSE	≤ 15	0 – 4
	L	LOOSE	> 15 and ≤ 35	4 – 10
	MD	MEDIUM DENSE	> 35 and ≤ 65	10 – 30
	D	DENSE	> 65 and ≤ 85	30 – 50
	VD	VERY DENSE	> 85	> 50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.		

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

<table>
<tr><th colspan="2">Term</th><th colspan="2">Abbreviation</th><th>Definition</th></tr>
<tr><td colspan="2">Residual Soil</td><td colspan="2">RS</td><td>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.</td></tr>
<tr><td colspan="2">Extremely Weathered</td><td colspan="2">XW</td><td>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.</td></tr>
<tr><td>Highly Weathered</td><td rowspan="2">Distinctly Weathered (Note 1)</td><td>HW</td><td rowspan="2">DW</td><td>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.</td></tr>
<tr><td>Moderately Weathered</td><td>MW</td><td>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.</td></tr>
<tr><td colspan="2">Slightly Weathered</td><td colspan="2">SW</td><td>Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.</td></tr>
<tr><td colspan="2">Fresh</td><td colspan="2">FR</td><td>Rock shows no sign of decomposition of individual minerals or colour changes.</td></tr>
</table>

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

Rock Material Strength Classification

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

Appendix E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 297274

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E35033PL, Kingswood**
Number of Samples	21 Soil
Date samples received	06/06/2022
Date completed instructions received	06/06/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	14/06/2022
Date of Issue	14/06/2022

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference		297274-1	297274-3	297274-4	297274-7	297274-9
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH104
Depth		0-0.1	1.0-1.2	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	119	113	94	109	112

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		297274-10	297274-11	297274-13	297274-14	297274-15
Your Reference	UNITS	BH104	BH105	BH106	BH106	BH107
Depth		0.6-0.9	0-0.1	0-0.1	0.6-0.9	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	107	110	113	113	108

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		297274-16	297274-17	297274-20	297274-21
Your Reference	UNITS	BH107	SDUP1	TB-S	TS-S1
Depth		0.8-1.1	.	.	.
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	81%
Toluene	mg/kg	<0.5	<0.5	<0.5	106%
Ethylbenzene	mg/kg	<1	<1	<1	129%
m+p-xylene	mg/kg	<2	<2	<2	127%
o-Xylene	mg/kg	<1	<1	<1	130%
Naphthalene	mg/kg	<1	<1	<1	[NT]
Total +ve Xylenes	mg/kg	<1	<1	<1	[NT]
Surrogate aaa-Trifluorotoluene	%	118	113	117	120

svTRH (C10-C40) in Soil						
Our Reference		297274-1	297274-3	297274-4	297274-7	297274-9
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH104
Depth		0-0.1	1.0-1.2	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	83	73	72	77	74

svTRH (C10-C40) in Soil						
Our Reference		297274-10	297274-11	297274-13	297274-14	297274-15
Your Reference	UNITS	BH104	BH105	BH106	BH106	BH107
Depth		0.6-0.9	0-0.1	0-0.1	0.6-0.9	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	74	74	75	75	73

svTRH (C10-C40) in Soil			
Our Reference		297274-16	297274-17
Your Reference	UNITS	BH107	SDUP1
Depth		0.8-1.1	.
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date extracted	-	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50
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	%	76	74

PAHs in Soil						
Our Reference		297274-1	297274-3	297274-4	297274-7	297274-9
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH104
Depth		0-0.1	1.0-1.2	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
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	0.4	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	<0.1	0.1	<0.1
Pyrene	mg/kg	0.4	<0.1	<0.1	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	<0.05	0.06	<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	0.2	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	2.4	<0.05	<0.05	0.3	<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	%	83	79	80	77	78

PAHs in Soil						
Our Reference		297274-10	297274-11	297274-13	297274-14	297274-15
Your Reference	UNITS	BH104	BH105	BH106	BH106	BH107
Depth		0.6-0.9	0-0.1	0-0.1	0.6-0.9	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	08/06/2022	08/06/2022	07/06/2022	08/06/2022
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	%	87	81	87	81	81

PAHs in Soil			
Our Reference		297274-16	297274-17
Your Reference	UNITS	BH107	SDUP1
Depth		0.8-1.1	.
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date extracted	-	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	08/06/2022
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1
Pyrene	mg/kg	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	0.2
Chrysene	mg/kg	<0.1	0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.77
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	79	79

Organochlorine Pesticides in soil						
Our Reference		297274-1	297274-4	297274-7	297274-9	297274-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	08/06/2022
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	%	79	81	77	85	82

Organochlorine Pesticides in soil				
Our Reference		297274-13	297274-15	297274-17
Your Reference	UNITS	BH106	BH107	SDUP1
Depth		0-0.1	0-0.1	.
Date Sampled		04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	76

Organophosphorus Pesticides in Soil						
Our Reference		297274-1	297274-4	297274-7	297274-9	297274-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	08/06/2022
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	%	79	81	77	85	82

Organophosphorus Pesticides in Soil				
Our Reference		297274-13	297274-15	297274-17
Your Reference	UNITS	BH106	BH107	SDUP1
Depth		0-0.1	0-0.1	.
Date Sampled		04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	76

PCBs in Soil						
Our Reference		297274-1	297274-4	297274-7	297274-9	297274-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	08/06/2022
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	%	79	81	77	85	82

PCBs in Soil				
Our Reference		297274-13	297274-15	297274-17
Your Reference	UNITS	BH106	BH107	SDUP1
Depth		0-0.1	0-0.1	.
Date Sampled		04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	76

Acid Extractable metals in soil						
Our Reference		297274-1	297274-3	297274-4	297274-7	297274-9
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH104
Depth		0-0.1	1.0-1.2	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
Arsenic	mg/kg	<4	<4	6	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	26	8	13	16	8
Copper	mg/kg	10	12	15	29	38
Lead	mg/kg	6	7	15	11	3
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	18	3	9	13	40
Zinc	mg/kg	19	11	32	32	28

Acid Extractable metals in soil						
Our Reference		297274-10	297274-11	297274-13	297274-14	297274-15
Your Reference	UNITS	BH104	BH105	BH106	BH106	BH107
Depth		0.6-0.9	0-0.1	0-0.1	0.6-0.9	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	8	9	7	12
Copper	mg/kg	11	15	13	13	20
Lead	mg/kg	5	11	10	7	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	6	7	3	5
Zinc	mg/kg	13	30	22	15	26

Acid Extractable metals in soil			
Our Reference		297274-16	297274-17
Your Reference	UNITS	BH107	SDUP1
Depth		0.8-1.1	.
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date prepared	-	07/06/2022	07/06/2022
Date analysed	-	09/06/2022	09/06/2022
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	8	34
Copper	mg/kg	22	15
Lead	mg/kg	13	7
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	4	26
Zinc	mg/kg	28	27

Moisture						
Our Reference		297274-1	297274-3	297274-4	297274-7	297274-9
Your Reference	UNITS	BH101	BH101	BH102	BH103	BH104
Depth		0-0.1	1.0-1.2	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Moisture	%	9.4	15	16	17	3.3

Moisture						
Our Reference		297274-10	297274-11	297274-13	297274-14	297274-15
Your Reference	UNITS	BH104	BH105	BH106	BH106	BH107
Depth		0.6-0.9	0-0.1	0-0.1	0.6-0.9	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Moisture	%	18	12	16	18	16

Moisture			
Our Reference		297274-16	297274-17
Your Reference	UNITS	BH107	SDUP1
Depth		0.8-1.1	.
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date prepared	-	07/06/2022	07/06/2022
Date analysed	-	08/06/2022	08/06/2022
Moisture	%	12	9.8

Asbestos ID - soils NEPM - ASB-001						
Our Reference		297274-1	297274-4	297274-7	297274-9	297274-11
Your Reference	UNITS	BH101	BH102	BH103	BH104	BH105
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	14/06/2022	14/06/2022	14/06/2022	14/06/2022	14/06/2022
Sample mass tested	g	840.4	576.76	913.65	996.6	758.64
Sample Description	-	Brown coarse-grained soil & rocks	Brown clayey 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

Asbestos ID - soils NEPM - ASB-001			
Our Reference		297274-13	297274-15
Your Reference	UNITS	BH106	BH107
Depth		0-0.1	0-0.1
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date analysed	-	14/06/2022	14/06/2022
Sample mass tested	g	955.47	706.02
Sample Description	-	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
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	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
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

CEC			
Our Reference		297274-7	297274-10
Your Reference	UNITS	BH103	BH104
Depth		0-0.1	0.6-0.9
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date prepared	-	14/06/2022	14/06/2022
Date analysed	-	14/06/2022	14/06/2022
Exchangeable Ca	meq/100g	44	0.3
Exchangeable K	meq/100g	0.6	0.3
Exchangeable Mg	meq/100g	2.0	13
Exchangeable Na	meq/100g	0.7	3.2
Cation Exchange Capacity	meq/100g	48	17

Misc Inorg - Soil			
Our Reference		297274-7	297274-10
Your Reference	UNITS	BH103	BH104
Depth		0-0.1	0.6-0.9
Date Sampled		04/06/2022	04/06/2022
Type of sample		Soil	Soil
Date prepared	-	09/06/2022	09/06/2022
Date analysed	-	09/06/2022	09/06/2022
pH 1:5 soil:water	pH Units	8.3	4.2

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-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-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-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
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.

Method ID	Methodology Summary
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.
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-7	297274-4
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	09/06/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	111	107
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	111	107
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	113	107
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	118	106
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	108	108
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	108	108
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	112	110
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	112	1	119	110	8	111	108

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]	17	08/06/2022	08/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	09/06/2022	09/06/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	17	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	17	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	17	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	17	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	17	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	17	113	113	0	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	297274-4
Date extracted	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	114	111
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	75	81
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	87
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	114	111
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	75	81
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	87
Surrogate o-Terphenyl	%		Org-020	76	1	83	76	9	102	72

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/06/2022	07/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	08/06/2022	08/06/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	17	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	17	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	17	74	77	4	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	297274-4
Date extracted	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			08/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	92
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	91	89
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	95
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	<0.1	120	102	96
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	0.2	0.1	67	96	96
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.1	120	101	101
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	<0.1	67	85	97
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.3	<0.2	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.2	0.08	86	84	100
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	0.2	<0.1	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	80	1	83	78	6	84	81

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			[NT]	17	07/06/2022	07/06/2022		07/06/2022	[NT]
Date analysed	-			[NT]	17	08/06/2022	08/06/2022		07/06/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	90	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	91	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	95	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	17	0.1	<0.1	0	92	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	17	0.1	0.1	0	94	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	17	0.2	0.2	0	101	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	17	0.2	0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	17	0.1	0.1	0	91	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	17	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	17	0.1	0.1	0	88	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	17	79	78	1	81	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	297274-4
Date extracted	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	96
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	103	99
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	87	89
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	99	97
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	102
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	94	96
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	102
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	80
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	84	84
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	78	96
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	81	1	79	78	1	84	85

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/06/2022	07/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	08/06/2022	08/06/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	17	76	77	1	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	297274-4
Date extracted	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			08/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	134
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	87	87
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	99
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	114
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	102
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	89
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	90	100
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	82	1	79	78	1	84	85

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/06/2022	07/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	08/06/2022	08/06/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	17	76	77	1	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	297274-4
Date extracted	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			08/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
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	101	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	82	1	79	78	1	84	85

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/06/2022	07/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	08/06/2022	08/06/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	17	76	77	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	297274-4
Date prepared	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Date analysed	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	09/06/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	90	82
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	86	71
Chromium	mg/kg	1	Metals-020	<1	1	26	18	36	86	84
Copper	mg/kg	1	Metals-020	<1	1	10	10	0	92	109
Lead	mg/kg	1	Metals-020	<1	1	6	6	0	89	79
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	105	122
Nickel	mg/kg	1	Metals-020	<1	1	18	13	32	93	83
Zinc	mg/kg	1	Metals-020	<1	1	19	20	5	94	79

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	17	07/06/2022	07/06/2022		[NT]	[NT]
Date analysed	-			[NT]	17	09/06/2022	09/06/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	17	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	17	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	17	34	33	3	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	17	15	15	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	17	7	7	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	17	26	24	8	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	17	27	26	4	[NT]	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date prepared	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date prepared	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[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

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.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Harry Leonard

Sample Login Details	
Your reference	E35033PL, Kingswood
Envirolab Reference	297274
Date Sample Received	06/06/2022
Date Instructions Received	06/06/2022
Date Results Expected to be Reported	14/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	21 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4
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	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	CEC	Misc Inorg - Soil	On Hold
BH101-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH101-0.5-0.7											✓
BH101-1.0-1.2	✓	✓	✓				✓				
BH102-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH102-0.6-0.9											✓
BH102-1.0-1.2											✓
BH103-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH103-0.9-1.2											✓
BH104-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH104-0.6-0.9	✓	✓	✓				✓		✓	✓	
BH105-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH105-0.9-1.2											✓
BH106-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH106-0.6-0.9	✓	✓	✓				✓				
BH107-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH107-0.8-1.1	✓	✓	✓				✓				
SDUP1-.	✓	✓	✓	✓	✓	✓	✓				
SDUP3-.											✓
SDUP4-.											✓
TB-S-.	✓										
TS-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.

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: E35033PL
Date Results Required: STANDARD
Page: 1 of 1

FROM: JKEnvironments
REAR OF 115 WICKS ROAD
MACQUARIE PARK, NSW 2113
P: 02-9888 5000 F: 02-9888 5001
Attention: Harry Leonard / Nic Maricic
hleonard@jkenvironments.com.au
nmaricic@jkenvironments.com.au

Location: Kingswood
Sampler: NM

Sample Preserved in Esky on Ice — Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	WA Asbestos (500mL)	pH/CEC	Clay content (%)	BTEX						
4/06/2022	1	BH101	0-0.1	G, A	0.1	F: Gravelly Sand	X		X									
4/06/2022	2	BH101	0.5-0.7	G, A	0.7	F: Silty clay												
4/06/2022	3	BH101	1.0-1.2	G, A	0	Silty Clay		X										
4/06/2022	4	BH102	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	5	BH102	0.6-0.9	G, A	0	F: Silty clay												
4/06/2022	6	BH102	1.0-1.2	G, A	0	Silty clay												
4/06/2022	7	BH103	0-0.1	G, A	0	F: Silty sandy clay	X		X	X								
4/06/2022	8	BH103	0.9-1.2	G, A	0	Silty clay												
4/06/2022	9	BH104	0-0.1	G, A	0	F: Gravelly sand	X		X									
4/06/2022	10	BH104	0.6-0.9	G, A	0	Silty clay		X		X								
4/06/2022	11	BH105	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	12	BH105	0.9-1.2	G, A	0	Silty clay												
4/06/2022	13	BH106	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	14	BH106	0.6-0.9	G, A	0	Silty clay		X										
4/06/2022	15	BH107	0-0.1	G, A	0.2	F: Gravelly sandy clay	X		X									
4/06/2022	16	BH107	0.8-1.1	G, A	0	Silty clay		X										
4/06/2022	17	SDUP1	Duplicate	G, A	-	Duplicate	X											
4/06/2022	—	SDUP2	Duplicate	G, A	-	Duplicate	X											
4/06/2022	18	SDUP3	Duplicate	G, A	-	Duplicate												
4/06/2022	19	SDUP4	Duplicate	G, A	-	Duplicate												
4/06/2022	20	TB-S1	Blank	G	-	Blank						X						
4/06/2022	21	TS-S1	Spike	G	-	Spike						X						

Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200
Job No: 297274
Date Received: 06/06/22
Time Received: 1400
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack

Remarks (comments/detection limits required):
SDUP1 - Intra-laboratory duplicate
SDUP2 - Inter-laboratory duplicate (Melb)

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By: NM	Date: 06/06/2022	Time: 1400	Received By: Christine ELS 470	Date: 06/06/22

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

CERTIFICATE OF ANALYSIS 31869

Client Details	
Client	JK Environments
Attention	Nicholas Maricic
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	**E35033PL**
Number of Samples	1 Soil
Date samples received	08/06/2022
Date completed instructions received	08/06/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details	
Date results requested by	16/06/2022
Date of Issue	15/06/2022

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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		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	10/06/2022
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	%	101

TRH Soil C10-C40 NEPM		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	11/06/2022
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	%	80

PAHs in Soil		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	11/06/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.1
Pyrene	mg/kg	0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j&k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.07
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}	%	104

OCP in Soil		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	11/06/2022
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	96

OP in Soil		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	11/06/2022
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	96

PCBs in Soil		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date extracted	-	09/06/2022
Date analysed	-	11/06/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate 2-fluorobiphenyl	%	98

Acid Extractable metals in soil		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date digested	-	10/06/2022
Date analysed	-	11/06/2022
Arsenic	mg/kg	4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	17
Copper	mg/kg	23
Lead	mg/kg	15
Mercury	mg/kg	<0.1
Nickel	mg/kg	9
Zinc	mg/kg	36

Moisture		
Our Reference		31869-1
Your Reference	UNITS	SDUP2
Date Sampled		04/06/2022
Type of sample		Soil
Date prepared	-	10/06/2022
Date analysed	-	11/06/2022
Moisture	%	17

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105°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-021/022	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. 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	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, For OCs 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.

Method ID	Methodology Summary
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-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
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	31869-1
Date extracted	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	09/06/2022
Date analysed	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	10/06/2022
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	100	94
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	100	94
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	89	84
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	94	92
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	99	92
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	109	101
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	105	100
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	109	1	101	102	1	107	98

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	31869-1
Date extracted	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	09/06/2022
Date analysed	-			10/06/2022	1	11/06/2022	11/06/2022		10/06/2022	10/06/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	85	82
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	78	75
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	93	92
TRH >C_{10}-C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	85	82
TRH >C_{16}-C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	78	75
TRH >C_{34}-C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	93	92
Surrogate o-Terphenyl	%		Org-020	79	1	80	79	1	79	74

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			11/06/2022	[NT]	[NT]	[NT]	[NT]	11/06/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[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]	106	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	110	[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]	96	[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]	120	[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	104	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: OCP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			11/06/2022	[NT]	[NT]	[NT]	[NT]	11/06/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	92	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: OP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			11/06/2022	[NT]	[NT]	[NT]	[NT]	11/06/2022	[NT]
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Diazinon	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Dichlorovos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Fenitrothion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Malathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	92	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			11/06/2022	[NT]	[NT]	[NT]	[NT]	11/06/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	102	[NT]	[NT]	[NT]	[NT]	106	[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	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Date analysed	-			11/06/2022	[NT]	[NT]	[NT]	[NT]	11/06/2022	[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]	106	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	104	[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.

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 RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Nicholas Maricic

Sample Login Details	
Your reference	E35033PL
Envirolab Reference	31869
Date Sample Received	08/06/2022
Date Instructions Received	08/06/2022
Date Results Expected to be Reported	16/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6.2
Cooling Method	Icepack
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
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
SDUP2	✓	✓	✓	✓	✓	✓	✓

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.

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: E35033PL Date Results Required: STANDARD Page: 1 of 1	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard / Nic Maricic hleonard@jkenvironments.com.au nmaricic@jkenvironments.com.au

Location: Kingswood

Sampler: NM

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	WA Asbestos (500mL)	pH/CEC	Clay content (%)	BTEX						
4/06/2022	1	BH101	0-0.1	G, A	0.1	F: Gravelly Sand	X		X									
4/06/2022	2	BH101	0.5-0.7	G, A	0.7	F: Silty clay												
4/06/2022	3	BH101	1.0-1.2	G, A	0	Silty Clay		X										
4/06/2022	4	BH102	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	5	BH102	0.6-0.9	G, A	0	F: Silty clay												
4/06/2022	6	BH102	1.0-1.2	G, A	0	Silty clay												
4/06/2022	7	BH103	0-0.1	G, A	0	F: Silty sandy clay	X		X	X								
4/06/2022	8	BH103	0.9-1.2	G, A	0	Silty clay												
4/06/2022	9	BH104	0-0.1	G, A	0	F: Gravelly sand	X		X									
4/06/2022	10	BH104	0.6-0.9	G, A	0	Silty clay		X		X								
4/06/2022	11	BH105	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	12	BH105	0.9-1.2	G, A	0	Silty clay												
4/06/2022	13	BH106	0-0.1	G, A	0	F: Sandy gravelly clay	X		X									
4/06/2022	14	BH106	0.6-0.9	G, A	0	Silty clay		X										
4/06/2022	15	BH107	0-0.1	G, A	0.2	F: Gravelly sandy clay	X		X									
4/06/2022	16	BH107	0.8-1.1	G, A	0	Silty clay		X										
4/06/2022	17	SDUP1	Duplicate	G, A	-	Duplicate	X											
(1) 4/06/2022	—	SDUP2	Duplicate	G, A	-	Duplicate	X											
4/06/2022	18	SDUP3	Duplicate	G, A	-	Duplicate												
4/06/2022	19	SDUP4	Duplicate	G, A	-	Duplicate												
4/06/2022	20	TB-S1	Blank	G	-	Blank						X						
4/06/2022	21	TS-S1	Spike	G	-	Spike						X						

Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
Job No: 297274
Date Received: 06/06/22
Time Received: 1400
Received By: CH
Temp: Cool/Ambient 4°C
Cooling: Ice/Icepack

Envirolab Services 25 Research Drive Croydon South VIC 3136 Ph: (03) 9763 2500
Job No: 31869
Date Received: 8/6/22
Time Received: 2:35pm
Received by: AP
Temp: Cool/Ambient 6.2
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):
SDUP1 - Intra-laboratory duplicate
SDUP2 - Inter-laboratory duplicate (Melb)

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By: NM	Date: 06/06/2022	Time:	Received By:	Date:
ELS Sydney C.Mackenzie	7/6/22 1130	1400	Christine ELS SYD	06/06/22

Envirolab Services Pty Ltd
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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 297775

Client Details

Client	JK Environments
Attention	Harry Leonard, Nic Marricic
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E35033PL, Kingswood**
Number of Samples	6 Water
Date samples received	10/06/2022
Date completed instructions received	10/06/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	20/06/2022
Date of Issue	20/06/2022

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

Results Approved By
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		297775-1	297775-2	297775-3	297775-4
Your Reference	UNITS	MW101	MW104	MW107	WDUP1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		297775-1	297775-2	297775-3	297775-4
Your Reference	UNITS	MW101	MW104	MW107	WDUP1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water
Bromoform	μg/L	<1	<1	<1	<1
m+p-xylene	μg/L	<2	<2	<2	<2
Styrene	μg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	μg/L	<1	<1	<1	<1
o-xylene	μg/L	<1	<1	<1	<1
1,2,3-trichloropropane	μg/L	<1	<1	<1	<1
Isopropylbenzene	μg/L	<1	<1	<1	<1
Bromobenzene	μg/L	<1	<1	<1	<1
n-propyl benzene	μg/L	<1	<1	<1	<1
2-chlorotoluene	μg/L	<1	<1	<1	<1
4-chlorotoluene	μg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	μg/L	<1	<1	<1	<1
Tert-butyl benzene	μg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	μg/L	<1	<1	<1	<1
1,3-dichlorobenzene	μg/L	<1	<1	<1	<1
Sec-butyl benzene	μg/L	<1	<1	<1	<1
1,4-dichlorobenzene	μg/L	<1	<1	<1	<1
4-isopropyl toluene	μg/L	<1	<1	<1	<1
1,2-dichlorobenzene	μg/L	<1	<1	<1	<1
n-butyl benzene	μg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	μg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	μg/L	<1	<1	<1	<1
Hexachlorobutadiene	μg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	μg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	99	95	105	98
Surrogate toluene-d8	%	103	99	99	101
Surrogate 4-BFB	%	101	101	101	102

vTRH(C6-C10)/BTEXN in Water						
Our Reference		297775-1	297775-2	297775-3	297775-4	297775-5
Your Reference	UNITS	MW101	MW104	MW107	WDUP1	TS-W1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	[NA]
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	107%
Toluene	µg/L	<1	<1	<1	<1	92%
Ethylbenzene	µg/L	<1	<1	<1	<1	102%
m+p-xylene	µg/L	<2	<2	<2	<2	99%
o-xylene	µg/L	<1	<1	<1	<1	97%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	99	95	105	98	98
Surrogate toluene-d8	%	103	99	99	101	92
Surrogate 4-BFB	%	101	101	101	102	95

vTRH(C6-C10)/BTEXN in Water		
Our Reference		297775-6
Your Reference	UNITS	TB-W1
Date Sampled		9/06/2022
Type of sample		Water
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	98
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	102

svTRH (C10-C40) in Water					
Our Reference		297775-1	297775-2	297775-3	297775-4
Your Reference	UNITS	MW101	MW104	MW107	WDUP1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
TRH C_{10} - C_{14}	µg/L	72	<50	<50	62
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	70	<50	<50	60
TRH >C_{10} - C_{16}	µg/L	82	<50	<50	72
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	82	<50	<50	72
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	80	<50	<50	70
Surrogate o-Terphenyl	%	98	106	130	82

PAHs in Water - Low Level					
Our Reference		297775-1	297775-2	297775-3	297775-4
Your Reference	UNITS	MW101	MW104	MW107	WDUP1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Naphthalene	µg/L	0.6	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.56	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	98	96	95	83

HM in water - dissolved					
Our Reference	UNITS	297775-1	297775-2	297775-3	297775-4
Your Reference		MW101	MW104	MW107	WDUP1
Date Sampled		9/06/2022	9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water	Water
Date prepared	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Arsenic-Dissolved	µg/L	1	1	<1	<1
Cadmium-Dissolved	µg/L	2.5	0.6	0.8	2.3
Chromium-Dissolved	µg/L	1	<1	1	<1
Copper-Dissolved	µg/L	<1	1	4	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	220	8	130	210
Zinc-Dissolved	µg/L	180	50	330	180

Miscellaneous Inorganics				
Our Reference		297775-1	297775-2	297775-3
Your Reference	UNITS	MW101	MW104	MW107
Date Sampled		9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water
Date prepared	-	10/06/2022	10/06/2022	10/06/2022
Date analysed	-	10/06/2022	10/06/2022	10/06/2022
pH	pH Units	5.7	6.5	6.2
Electrical Conductivity	µS/cm	28,000	29,000	29,000

Cations in water Dissolved				
Our Reference		297775-1	297775-2	297775-3
Your Reference	UNITS	MW101	MW104	MW107
Date Sampled		9/06/2022	9/06/2022	9/06/2022
Type of sample		Water	Water	Water
Date digested	-	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	16/06/2022	16/06/2022	16/06/2022
Calcium - Dissolved	mg/L	62	270	210
Magnesium - Dissolved	mg/L	980	1,200	1,200
Hardness	mgCaCO 3 /L	4,200	5,500	5,300

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-W1	[NT]
Date extracted	-			16/06/2022	1	16/06/2022	17/06/2022		16/06/2022	[NT]
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	117	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	105	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	102	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	111	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	96	1	99	97	2	102	[NT]
Surrogate toluene-d8	%		Org-023	99	1	103	100	3	99	[NT]
Surrogate 4-BFB	%		Org-023	104	1	101	102	1	99	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			16/06/2022	1	16/06/2022	17/06/2022		16/06/2022	[NT]
Date analysed	-			17/06/2022	1	17/06/2022	19/06/2022		17/06/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	116	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	116	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	111	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	118	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	96	1	99	96	3	102	[NT]
Surrogate toluene-d8	%		Org-023	99	1	103	98	5	99	[NT]
Surrogate 4-BFB	%		Org-023	104	1	101	103	2	99	[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	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	[NT]
Date analysed	-			16/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	72	61	17	98	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	90	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	109	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	82	72	13	98	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	90	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	109	[NT]
Surrogate o-Terphenyl	%		Org-020	113	1	98	93	5	111	[NT]

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	297775-2
Date extracted	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Date analysed	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	0.6	0.5	18	105	97
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	101
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	101
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	104
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	106
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	121	111
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	119	111
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	106
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	107	1	98	86	13	97	93

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	297775-2
Date prepared	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	95	105
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	2.5	2.4	4	95	88
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	1	<1	0	97	102
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	89
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	96	84
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	114	111
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	220	210	5	97	93
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	180	180	0	105	106

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	[NT]
Date analysed	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	[NT]
pH	pH Units		Inorg-001	[NT]	1	5.7	5.7	0	101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	28000	28000	0	103	[NT]

QUALITY CONTROL: Cations in water Dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	297775-2
Date digested	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Date analysed	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	62	57	8	96	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	980	900	9	91	#
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	1	4200	3900	7	[NT]	[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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Harry Leonard, Nic Marricic

Sample Login Details	
Your reference	E35033PL, Kingswood
Envirolab Reference	297775
Date Sample Received	10/06/2022
Date Instructions Received	10/06/2022
Date Results Expected to be Reported	20/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4
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
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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
MW101	✓	✓	✓	✓	✓	✓	✓	✓
MW104	✓	✓	✓	✓	✓	✓	✓	✓
MW107	✓	✓	✓	✓	✓	✓	✓	✓
WDUP1	✓	✓	✓	✓	✓			
TS-W1		✓						
TB-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: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E35033PL Date Results Required: STANDARD Page: 1 of 1	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard / Nic Maricic hleonard@jkenvironments.com.au nmaricic@jkenvironments.com.au

Location: Kingswood — Sample Preserved in Esky on Ice

Sampler: NM — 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			
9/06/2022	1	MW101	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	2	MW104	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	3	MW107	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	4	WDUP1	2xG1, 4xV, H, PVC		Duplicate		X	X									
9/06/2022	-	WDUP2	2xG1, 4xV, H, PVC		Duplicate		X	X									
9/06/2022	5	TS-W1	1xV		Spike								X				
9/06/2022	6	TB-W1	1xV		Blank								X				

ENVIROLAB Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
~~Job No:~~ 297775
Date Received: 10/6/22
Time Received: 1500
Received by: KW
Temp: Cool/~~Ambient~~
Cooling: Ice/Icepack 4°C
Security: Intact/Broken/None

Remarks (comments/detection limits required):

All analysis PQLs to ANZECC (2000) Detection Limits Please.

Please send WDUP2 to Melbourne for analysis

Sample Containers:
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:
Nic Maricic	10.6.22	1:00pm	Katy Wayne	10/6/22 1500

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

CERTIFICATE OF ANALYSIS 31972

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E35033PL**
Number of Samples	2 Water
Date samples received	15/06/2022
Date completed instructions received	15/06/2022

Analysis Details

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

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

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

Report Details

Date results requested by	22/06/2022
Date of Issue	22/06/2022

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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
P.Adams.

Pamela Adams, Laboratory Manager

VOCs in water - Routine Level		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
Type of sample		Water
Date extracted	-	17/06/2022
Date analysed	-	17/06/2022
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 - Routine Level		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
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	%	100
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	92

vTRH(C6-C10)/BTEXN in Water		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
Type of sample		Water
Date extracted	-	17/06/2022
Date analysed	-	17/06/2022
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 -C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Total +ve Xylenes	µg/L	<1
Total BTEX in water	µg/L	<1
Surrogate Dibromofluoromethane	%	105
Surrogate toluene-d8	%	105
Surrogate 4-BFB	%	91

TRH Water(C10-C40) NEPM		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
Type of sample		Water
Date extracted	-	17/06/2022
Date analysed	-	17/06/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	74

PAHs in Water - Low Level		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
Type of sample		Water
Date extracted	-	17/06/2022
Date analysed	-	20/06/2022
Naphthalene	µg/L	<0.1
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j&k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Total +ve PAH's	µg/L	NIL (+)VE PAH
Benzo(a)pyrene TEQ	µg/L	<0.5
Surrogate p-Terphenyl-d_{14}	%	118

HM in water - dissolved		
Our Reference		31972-1
Your Reference	UNITS	WDUP2
Date Sampled		09/06/2022
Type of sample		Water
Date prepared	-	16/06/2022
Date analysed	-	16/06/2022
Arsenic-Dissolved	μg/L	2
Cadmium-Dissolved	μg/L	0.6
Chromium-Dissolved	μg/L	2
Copper-Dissolved	μg/L	2
Lead-Dissolved	μg/L	<1
Nickel-Dissolved	μg/L	9
Zinc-Dissolved	μg/L	52
Mercury-Dissolved	μg/L	<0.05

Method ID	Methodology Summary
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	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. 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.
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. 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: VOCs in water - Routine Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	103	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	104	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	105	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	120	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	110	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	96	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water - Routine Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	104	1	100	102	2	104	[NT]
Surrogate toluene-d8	%		Org-023	101	1	101	101	0	101	[NT]
Surrogate 4-BFB	%		Org-023	90	1	92	93	1	98	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	90	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	90	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	89	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	90	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	85	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	93	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	90	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	98	[NT]
Surrogate Dibromofluoromethane	%		Org-023	109	1	105	107	2	104	[NT]
Surrogate toluene-d8	%		Org-023	106	1	105	106	1	100	[NT]
Surrogate 4-BFB	%		Org-023	89	1	91	91	0	91	[NT]

QUALITY CONTROL: TRH Water(C10-C40) NEPM					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	31972-1
Date extracted	-			17/06/2022	[NT]	[NT]	[NT]	[NT]	17/06/2022	17/06/2022
Date analysed	-			17/06/2022	[NT]	[NT]	[NT]	[NT]	17/06/2022	17/06/2022
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	77	67
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	84
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	107
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	77	67
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	84
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	107
Surrogate o-Terphenyl	%		Org-020	72	[NT]	[NT]	[NT]	[NT]	71	68

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			17/06/2022	[NT]	[NT]	[NT]	[NT]	17/06/2022	[NT]
Date analysed	-			20/06/2022	[NT]	[NT]	[NT]	[NT]	20/06/2022	[NT]
Naphthalene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Acenaphthylene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Fluorene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Phenanthrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Benzo(b,j&k)fluoranthene	µg/L	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	112	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			16/06/2022	[NT]	[NT]	[NT]	[NT]	16/06/2022	[NT]
Date analysed	-			16/06/2022	[NT]	[NT]	[NT]	[NT]	16/06/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	[NT]	[NT]	105	[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 - 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 RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E35033PL
Envirolab Reference	31972
Date Sample Received	15/06/2022
Date Instructions Received	15/06/2022
Date Results Expected to be Reported	22/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	2 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7.3
Cooling Method	Icepack
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	VOCs in water - Routine Level	vTRH(C6-C10)/BTEXN in Water	TRH Water(C10-C40) NEPM	PAHs in Water - Low Level	HM in water - dissolved	On Hold
WDUP2	✓	✓	✓	✓	✓	
WDUP1						✓

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.

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: Date Results Required: Page:	E35033PL STANDARD 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard / Nic Maricic hleonard@jkenvironments.com.au nmaricic@jkenvironments.com.au

Location: Kingswood — Sample Preserved in Esky on Ice

Sampler: NM — 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			
9/06/2022	1	MW101	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	2	MW104	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	3	MW107	2xG1, 4xV, H, PVC		Water		X	X	X					X			
9/06/2022	4	WDUP1	2xG1, 4xV, H, PVC		Duplicate		X	X									
9/06/2022	-	WDUP2	2xG1, 4xV, H, PVC		Duplicate		X	X									
9/06/2022	5	TS-W1	1xV		Spike								X				
9/06/2022	6	TB-W1	1xV		Blank								X				

2
1
2
10 15/6

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 297775
Date Received: 10/6/22
Time Received: 1500
Received by: KW
Temp: Cool/Ambient
Cooling: Ice/Icepack 4°C
Security: Intact/Broken/None

ENVIROLAB
Job No: 319729
Date Received: 15/6/22
Time Received: 2-30pm
Received by: LD
Temp: Cool/Ambient 7.3°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

All analysis PQLs to ANZECC (2000) Detection Limits Please.

Please send WDUP2 to Melbourne for analysis

Sample Containers:
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:
Nic Maricic	10.6.22	1:00pm	Katy Wayne	10/6/22 1500

Relinquished by christine Elssyd
ELS 14/6/22 1115

Appendix F: Report Explanatory Notes

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)[25] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[26]. 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;

[25] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)
[26] 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%.

$$\frac{(\text{Spike Sample Result} - \text{Sample Result}) \times 100}{\text{Concentration of Spike Added}}$$

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 investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH101 0-0.1m)	Approximately 10% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Inter-laboratory duplicate (soil)	SDUP2 (primary sample BH107 0-0.1m)	As above	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Intra-laboratory duplicate (water)	WDUP1 (primary sample MW101)	Approximately 30% of primary samples	Heavy metals, TRH/BTEX, PAHs and VOCs
Inter-laboratory duplicate (water)	WDUP2 (primary sample MW104)	As above	Heavy metals, TRH/BTEX, PAHs and VOCs
Trip spike (soil)	TS-S1 (04/06/2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (soil)	TB-S1 (04/06/2022)	One for the investigation to demonstrate adequacy of storage and transport methods	BTEX
Trip spike (water)	TS-W1 (09/06/2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Trip blank (water)	TB-W1 (09/06/2022)	One for the investigation to demonstrate adequacy of storage and transport methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1 to Table Q2 inclusive) attached to the investigation 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 and published drinking water guidelines for waters.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

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. Field sampling procedures were designed 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 generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

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 anthracene PQL for groundwater analysis which was 10 times greater than the ecological SAC and the PQL for vinyl chloride in groundwater which was approximately 33 times greater than the health-based SAC. In light of the PAH concentrations reported for soil and groundwater, JKE is 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 investigation. Vinyl chloride (and the extended suite of VOCs in general) are not CoPC and were included in the analysis schedule for screening purposes. Therefore, the high vinyl chloride PQL is not significant.

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 and heavy metals in SDUP1/BH101 (0-0.1m). As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole;
- Elevated RPDs were reported for several PAH compounds and heavy metals in SDUP2/BH107 (0-0.1m). As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole;
- Elevated RPDs were reported for several heavy metals and naphthalene in WDUP1/MW101 and several heavy metals in WDUP2/MW104. The RPD exceedances are attributed to an increased sediment load in the lower part of the well given that the samples needed to be collected without steady state conditions being achieved.

Values outside the acceptable limits have largely been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. Some results are due to concentrations being reported very close to the PQLs which makes the RPDs less reliable. Overall, the data were robust and acceptable.

Field/Trip Blanks

During the investigation, one soil trip blank 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 ranged from 81% to 129% and 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 investigation.

A review of the laboratory QA/QC data identified the following minor non-conformance:

- Percentage spike recovery was not possible for some cations (calcium and magnesium) in the groundwater sampled from MW104 due to high concentrations of elements in the sample. However, an acceptable recovery was obtained for the laboratory control sample.

C. DATA QUALITY SUMMARY

JKE is 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 investigation. 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 investigation. It is also noted that JKE has undertaken groundwater investigations throughout various parts of the hospital during redevelopment projects over the past five or more years and the groundwater results were broadly consistent with the results obtained previously.

Appendix H: Field Work Documents

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	**E35033PL**
Project:	Proposed TAMS Building	**Well No.:**	MW101
Location:	TAMS, Derby Street, KINGSWOOD, NSW	**Depth (m):**	6.18m

WELL FINISH

X	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Peri-pump	**SWL – Before:**	1.66m
Date:	9.6.22	**Time – Before:**	0830
Undertaken By:	NM	**Total Vol Removed:**	9L
Pump Program No:	Low	**PID (ppm):**	0.5

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
5	1.88	0.5		17.3	5.9	13859	6.22	247.7
10	2.13	1		17.6	5.9	15614	6.06	216.8
15	2.40	1.5		18.1	5.2	17772	5.83	173.0
20	2.61	2		18.3	4.8	18240	5.71	165.3
25	2.84	2.5		18.5	4.6	18627	5.66	161.1
30	3.06	3		18.5	4.3	19103	5.66	157.5
35	3.18	3.5		18.5	4.1	19610	5.71	154.8
40	3.28	4		18.5	4.0	19988	5.73	153.3
45	3.40	4.5		18.4	4.2	20179	5.71	152.0
50	3.60	5		18.5	4.0	20365	5.70	151.5

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

No silt load, poor recharge

Sampling Containers Used: 4 **x glass amber,** 8 **x BTEX vials,** 2 **x HNO3 plastic,** 0 **x H2SO4 plastic,** 2 **x unpreserved plastic**

YSI used: 4

WDUP1

Tested By: Nicholas Maricic	**Remarks:**
Date Tested: 9.6.22	- Steady state conditions
Checked By: HL	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 14/06/2022	

JKEnvironments

Client:	Health Infrastructure	Job No.:	E35033PL
Project:	Proposed TAMS Building	Well No.:	MW104
Location:	TAMS, Derby Street, KINGSWOOD, NSW	Depth (m):	6.15m

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri-pump	SWL – Before:	2.27m
Date:	9.6.22	Time – Before:	1030
Undertaken By:	NM	Total Vol Removed:	9L
Pump Program No:	Low	PID (ppm):	3.3

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
5	2.52	0.5		20.7	5.1	23576	6.34	144.5
10	3.09	1		21.5	4.8	24439	6.40	143.9
15	3.22	2		21.5	4.5	24464	6.40	143.0
20	3.49	3		21.3	4.5	24164	6.42	141.9
25	3.67	4		21.2	4.3	24152	6.38	141.4
30	3.82	5		21.2	4.3	24239	6.35	141.0
35	4.01	6		21.5	4.1	24615	6.31	140.4
40	4.22	7		21.5	3.9	24754	6.30	139.7

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

No silt load, poor recharge

Sampling Containers Used: 4 x glass amber, 8 x BTEX vials, 2 x HNO3 plastic, 0 x H2SO4 plastic, 0 x unpreserved plastic

YSI used: 4

WDUP2

Tested By: Nicholas Maricic	**Remarks:**
Date Tested: 9.6.22	- Steady state conditions
Checked By: HL	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 14/06/2022	

JKEnvironments

Client:	Health Infrastructure	Job No.:	E35033PL
Project:	Proposed TAMS Building	Well No.:	MW107
Location:	TAMS, Derby Street, KINGSWOOD, NSW	Depth (m):	6.18m

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri-pump	SWL – Before:	2.61m
Date:	9.6.22	Time – Before:	11:40
Undertaken By:	NM	Total Vol Removed:	
Pump Program No:	low	PID (ppm):	6.0

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
2	2.75m	0.5		20.4	7.4	25703	6.62	133.5
10	2.99	1		20.9	5.7	25796	6.14	133.1
15	3.24	2		20.9	5.5	25616	6.09	132.4
20	3.62	3		21.0	5.1	25340	6.05	131.7
25	3.85	4		21.0	5.0	25174	6.01	131.4
30	4.12	5		21.0	4.8	25156	5.95	131.2

Comments: Odours (YES / NO), NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 1 x HNO3 plastic, x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Nicholas Maricic	**Remarks:**
Date Tested: 9.6.22	- Steady state conditions
Checked By: HL	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 14/06/2022	

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	Health Infrastructure
Project:	Proposed TAMS Building
Location:	TAMS, Derby Street, KINGSWOOD, NSW
Job Number:	E35033PL

PID

Make: Minirae	Model:	Unit: Green (Hire)	Date of last factory calibration: 20/4/22
Date of calibration: 8.6.22		Name of Calibrator: NM	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.1 ppm		Error in measured reading: ± 0.1 ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID

Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	Health Infrastructure		
Project:	Proposed TAMS Building		
Location:	TAMS, Derby Street, KINGSWOOD, NSW		
Job Number:	E35033PL		
DISSOLVED OXYGEN			
Make: YSI		Model: Quattro	
Date of calibration: 9.6.22		Name of Calibrator: NM	
Span value: 70% to 130%			
Measured value: 86%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI		Model: Quattro	
Date of calibration: 9.6.22		Name of Calibrator: NM	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: Dec 23	Lot No: 372831
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: Dec 23	Lot No: 380832
Measured reading of Buffer 1: 7.02			
Measured reading of Buffer 2: 4.00			
Slope: ~~100.6~~		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI		Model: Quattro	
Date: 9.6.22	Name of Calibrator: NM		Temperature: 18.8 °C
Calibration solution: Conductivity Standard		Expiry date: Oct 23	Lot No: 381243
Theoretical conductivity at temperature (see solution container): 1008 µS/cm			
Measured conductivity: 1006 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI		Model: Quattro	
Date of calibration: 9.6.22		Name of Calibrator: NM	
Calibration solution: ORP Test Solution		Expiry date: 1/26	Lot No: 7221
Theoretical redox value: 240mV			
Measured redox reading: 241.2 mV		Measured reading Acceptable (Yes/No):	

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	E35033PL
Project:	Proposed TAMS Building	**Well No.:**	MW101
Location:	TAMS, Derby Street, KINGSWOOD, NSW	**Depth (m):**	6.10

WELL FINISH DETAILS

Gatic Cover ☒ **Standpipe** ☐ **Other (describe)** ☐

WELL DEVELOPMENT DETAILS

Method:	Dev Pump	**SWL – Before (m):**	5.96m
Date:	4.6.22	**Time – Before:**	1254
Undertaken By:	NM	**SWL – After (m):**	Dry
Total Vol. Removed:	0.2L	**Time – After:**	~~1~~ 1300
PID Reading (ppm):	2.3		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.2	18.1	8.7	14218	6.10	229.~~6~~

Comments:Odours (YES / NO) NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)

YSI Used: 5

Tested By:	NM	**Remarks:**
Date Tested:	4.6.22	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	HL	
Date:	07/06/2022	

JKEnvironments

Client:	Health Infrastructure	Job No.:	E35033PL
Project:	Proposed TAMS Building	Well No.:	MW104
Location:	TAMS, Derby Street, KINGSWOOD, NSW	Depth (m):	6.16

WELL FINISH DETAILS

Gatic Cover ☒ Standpipe ☐ Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev Pump	SWL – Before (m):	Dry
Date:	4.6.22	Time – Before:	1306
Undertaken By:	NM	SWL – After (m):	
Total Vol. Removed:	—	Time – After:	
PID Reading (ppm):	2.1		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
	Dry				

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 5

Tested By:	NM	**Remarks:**
Date Tested:	4.6.22	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	HL	
Date:	07/06/2022	

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	**E35033PL**
Project:	Proposed TAMS Building	**Well No.:**	MW107
Location:	TAMS, Derby Street, KINGSWOOD, NSW	**Depth (m):**	6.20m

WELL FINISH DETAILS

Gatic Cover ☒ Standpipe ☐ Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev Pump	**SWL – Before (m):**	Dry
Date:	4.6.22	**Time – Before:**	1310
Undertaken By:	NM	**SWL – After (m):**	Dry
Total Vol. Removed:	—	**Time – After:**	
PID Reading (ppm):	1.2		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (μS/cm)	pH	Eh (mV)
	Dry				

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 5

Dry

Tested By:	NM	**Remarks:** - Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date Tested:	4.6.22	
Checked By:	HL	
Date:	07/06/2022	

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	Health Infrastructure
Project:	Proposed TAMS Building
Location:	TAMS, Derby Street, KINGSWOOD, NSW
Job Number:	E35033PL

PID			
Make: Minirae	Model:	Unit: Green	Date of last factory calibration: 13.5.23
Date of calibration: 3.6.22		Name of Calibrator: NM	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± 0.1 ppm	
Measured reading Acceptable (Yes/No):			

PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	Health Infrastructure		
Project:	Proposed TAMS Building		
Location:	TAMS, Derby Street, KINGSWOOD, NSW		
Job Number:	E35033PL		
DISSOLVED OXYGEN			
Make: YSI		Model: Quattro	
Date of calibration: 4.6.22		Name of Calibrator: NM	
Span value: 70% to 130%			
Measured value: 91%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI		Model: Quattro	
Date of calibration: 4.6.22		Name of Calibrator: NM	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: Dec 23	Lot No: 372831
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: Dec 23	Lot No: 380832
Measured reading of Buffer 1: 7.00			
Measured reading of Buffer 2: 3.99			
Slope:		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI		Model: Quattro	
Date: 4.6.22	Name of Calibrator: NM		Temperature: 10 °C
Calibration solution: Conductivity Standard		Expiry date: Oct 23	Lot No: 381203
Theoretical conductivity at temperature (see solution container): 1008 µS/cm			
Measured conductivity: 1018 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI		Model: Quattro	
Date of calibration: 4.6.22		Name of Calibrator: NM	
Calibration solution: ORP Test Solution		Expiry date: 1/26	Lot No: 7221
Theoretical redox value: 240mV			
Measured redox reading: 240 mV		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), (2021). 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

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 (Resilience and Hazards) 2021 (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, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia