



**Regional
NSW**

South Jerrabomberra Regional Job Precinct

Technical Report - Soils, Geology and
Contamination

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South Jerrabomberra Regional Job Precinct

Technical Report - Soils, Geology and Contamination



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Acronyms and Abbreviations

Name	Description
AHD	Australian Height Datum
AEC	Area of environmental concern
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CHC	Chlorinated Hydrocarbons
CLM	Contaminated Land Management Act 1997
CoPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DP	Deposited Plan
DPI	Department of Primary Industries
DRNSW	Department of Regional NSW
DSI	Detailed Site Investigation
ERM	Environmental Resources Management Australia Pty Ltd
m	Metre
m bgl	Metres Below Ground Level
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW EPA	New South Wales Environment Protection Authority
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PACM	Potential Asbestos Containing Material
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
PFAS	Per and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulphonate
POEO Act	Protection of the Environment Operations Act 1997
PSI	Preliminary Site Investigation
QPRC	Queanbeyan Palerang Regional Council
QPRSC	Queanbeyan Palerang Regional Sports Complex
RJPs	Regional Job Precincts
SAQP	Sampling and Analysis Quality Plan
SVOC	Semi-volatile Organic Compounds
TDS	Total Dissolved Solids
TRH	Total Recoverable Hydrocarbons
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by the Department of Regional NSW (DRNSW or “the Client”) to undertake a program of environmental and heritage studies to support the development of the South Jerrabomberra Regional Job Precinct (South Jerrabomberra RJP) Master Plan.

This report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the RJP within the context of the proposed Master Plan (August 2022). This technical report has been designed to test the preferred structure plan that was developed as part of an Integration Workshop and aims to establish the relevant specifications and requirements to assist in the development of the master plan.

ERM has prepared this technical report based on a desktop review of background information relating to soil salinity, acid sulfate soils and potential for contamination at the site and preliminary investigations including a site inspection.

In summary, the key findings of the assessment were:

Salinity

- Based on regional soil mapping, no salinity hazard was identified for the soil landscapes within the investigation area. The salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan.

Acid Sulfate Soils

- Based on regional soil mapping there is an extremely low to low probability for acid sulfate soils occurring. The potential risk of acid sulfate soils is unlikely to represent a significant constraint on the proposed Master Plan.

Potential Contamination

- Potential contamination was identified based on the desktop review (no sampling was undertaken) at specific sites which are currently (or formerly) operated potentially contaminating industries and/or activities, including:
 - Tralee Sand & Gravel Pit
 - 7-Eleven Jerrabomberra
 - On-site Commercial / Industrial Land Uses
- The remaining land has the broad potential for contamination from hazardous building materials (such as asbestos) associated with built structures and/or infrastructure (current or former), chemical storage and use including but not limited to underground or above-ground chemical storage tanks, uncontrolled waste dumping.
- In addition to the above it is important to note that there is a broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping, which should be assessed further prior to approval of development to prevent potential exposure to contamination hazards.
- Contaminated groundwater associated with known contaminated sites to the north of the RJP. If beneficial re-use of groundwater within the RJP is proposed further investigation would be required to assess potential for draw-down of existing contamination in groundwater associated with contaminated sites outside the RJP. Proposals for beneficial re-use of groundwater should avoid extraction of groundwater near known contaminated sites adjacent to the RJP.

The following recommendations should be considered during the appropriate phases of the planning process:

- The potential impact of existing contaminated groundwater outside the RJP (adjacent industrial sites north of the RJP) on the quality of extraction of groundwater for beneficial re-use should be further investigated concurrent with the hydrogeology assessment.
- The Master Plan proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective. The exceptions to this are:
 - Areas proposed for recreational use.
- The Master Plan proposes key changes to zoning which may trigger the following key decision points:
 - Where the land is proposed for sensitive land-uses such as recreation and zones which permit child-care centres or educational facilities, further assessment may be triggered under the SEPP; and
 - Where the land is currently used for potentially contaminating activities and change is proposed under the Master Plan to a similar or less sensitive land-use further assessment may not be triggered under the SEPP, but we note that due diligence is advised and consideration should be given to the overarching principles of the SEPP.
- In addition to the above, it is important to note that there is broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping. This potential contamination should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Land Contamination Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) and/or uncontrolled waste dumping (e.g., oil drums, asbestos) prior to development commencement. A clear framework for management of these risk is needed for public safety and to mitigate the potential for substantial cost and time delays.
- If further assessment is triggered under the SEPP, this can be undertaken by the proponent at the individual site level during the development application stage. Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required). The use of suitably qualified and experienced consultants (certified by a scheme currently recognised by NSW EPA) in conducting third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent.

1. INTRODUCTION

1.1 Overview

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by the Department of Regional NSW (DRNSW or “the Client”) to undertake a program of environmental and heritage studies to support the development of the South Jerrabomberra Regional Job Precinct (South Jerrabomberra RJP) Master Plan. The location and boundaries of the South Jerrabomberra RJP (“the RJP” or “the site”) are illustrated on **Figure 1**.

This report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the South Jerrabomberra RJP within the context of the proposed Master Plan.

This technical report has been designed to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development of the master plan.

1.2 Project Background

The Regional Job Precincts (RJPs) have been identified by the NSW Government as areas of land that are of local significance based on economic enablers. To attract investors, the NSW Government is seeking to create a place-based planning framework that streamlines the approval process, removing statutory barriers, and enhancing investment certainty.

This investigation seeks to deliver outcomes in the following RJP objectives:

- Remove planning complexity and delays as a barrier to regional economic growth; and
- Focus on outcomes and evidence, rather than compliance and assessment.

DRNSW have identified three (3) precincts for assessment as part of this engagement:

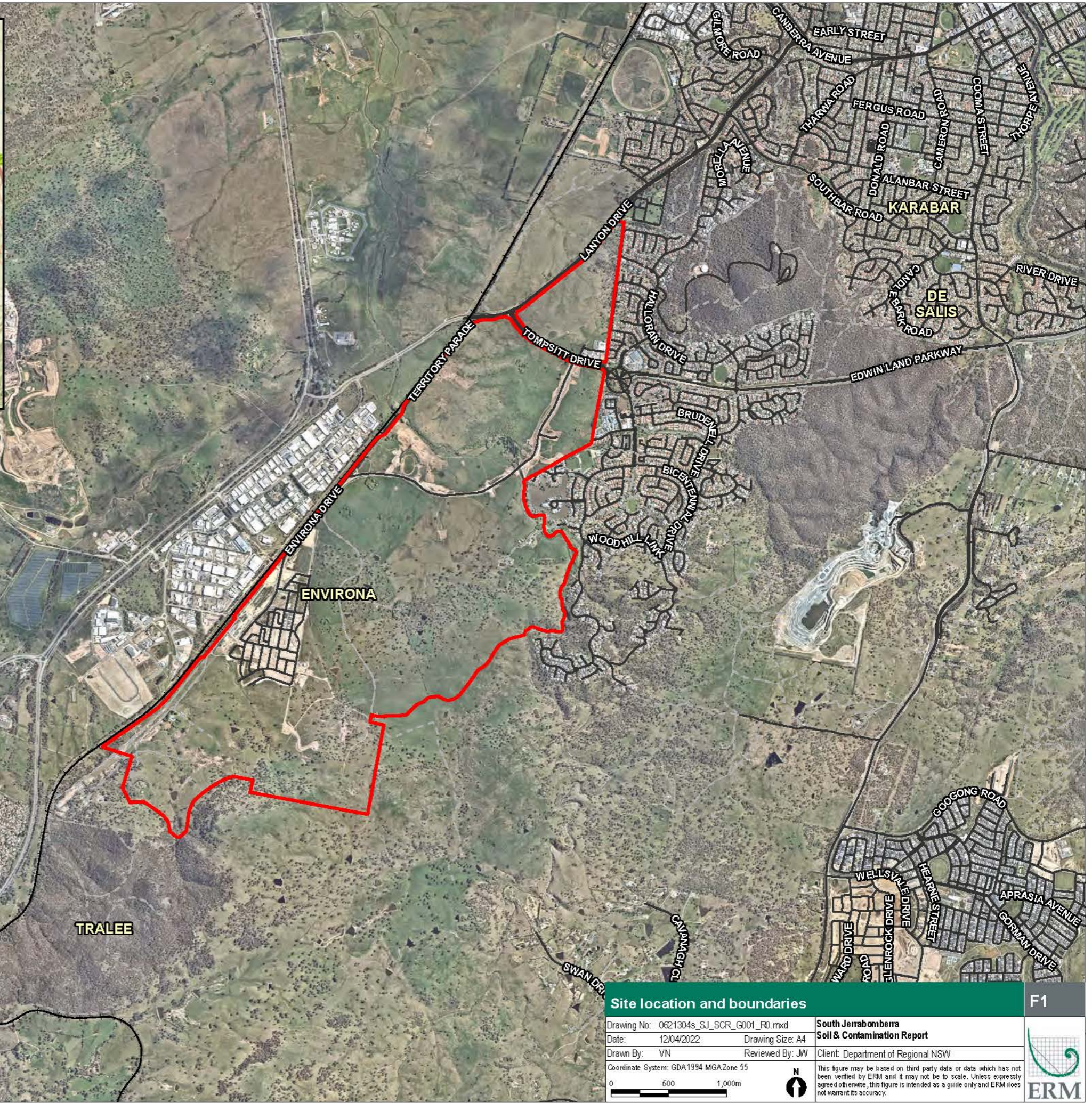
- Albury
- Richmond Valley
- South Jerrabomberra

The purpose of the RJP process is to support regional investment and job creation. This is achieved through the creation of precincts that are attractive to investors through streamlined statutory planning processes, identification of land uses that facilitate complementary businesses, and a whole-of-Government approach to resolution of historic development constraints.

1.3 Investigation Area

The Investigation Area is located in inland NSW, on the eastern border of the ACT, and area includes:

- Area 1 - Poplars Technology Park
- Area 2 - Proposed high school
- Area 3 - Proposed regional sport facility
- Area 4 - Environa
- Area 5 - South Tralee residential development

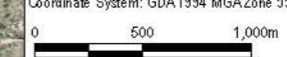


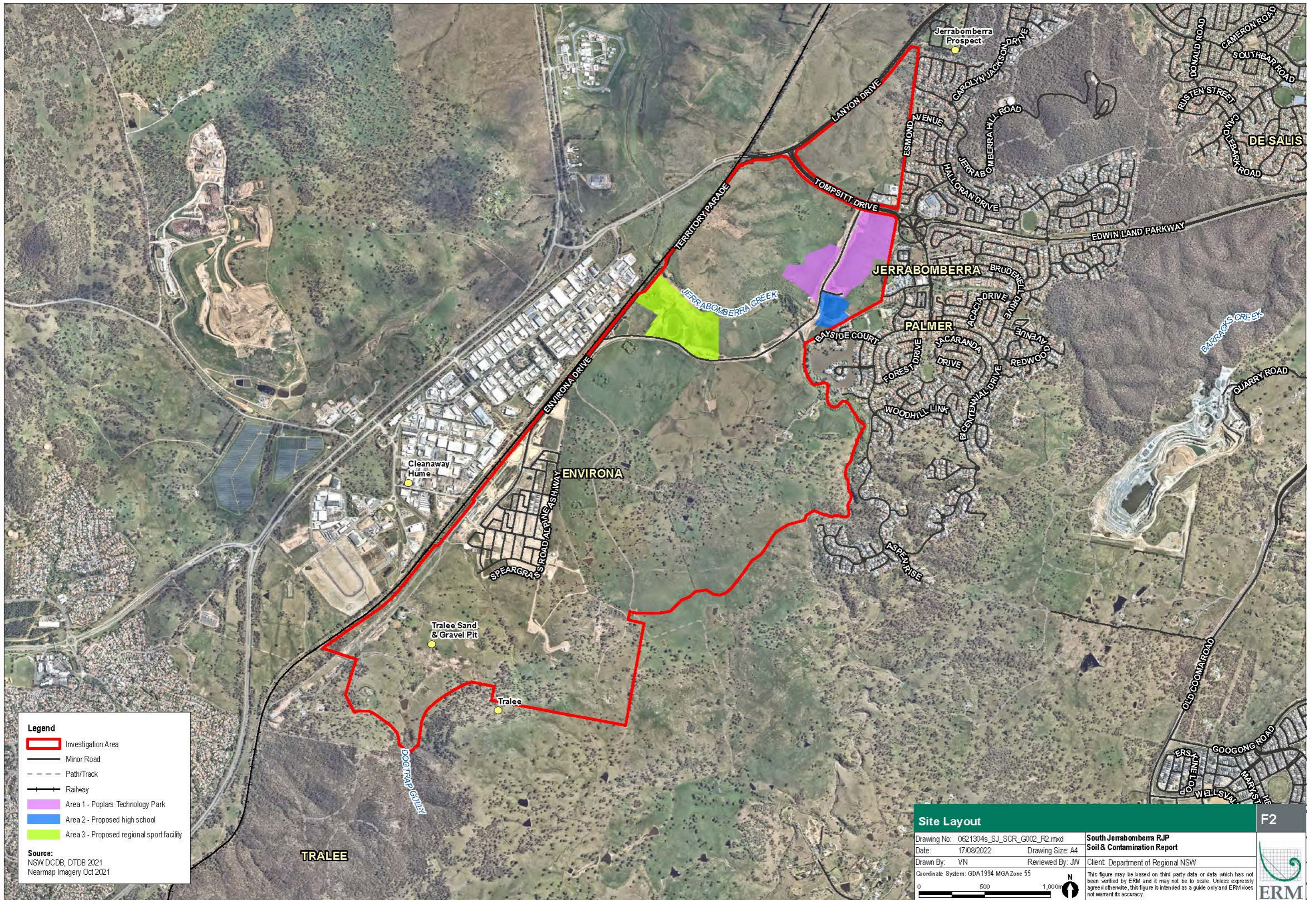
Legend

- Investigation Area
- Minor Road
- Path/Track
- + Railway

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Site location and boundaries		F1
Drawing No: 0621304s_SJ_SCR_G001_R0.mxd	South Jemabomberra Soil & Contamination Report	
Date: 12/04/2022	Drawing Size: A4	Client: Department of Regional NSW
Drawn By: VN	Reviewed By: JW	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
Coordinate System: GDA1994 MGAZone 55		ERM





Legend

- Investigation Area
- Minor Road
- Path/Track
- + Railway
- Area 1 - Poplars Technology Park
- Area 2 - Proposed high school
- Area 3 - Proposed regional sport facility

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Site Layout		F2
Drawing No: 0621304s_SJ_SCR_G002_F2.mxd		South Jerrabomberra RJP
Date: 17/08/2022		Soil & Contamination Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA1994 MGAZone 55		
<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>0 500 1,000m</p> </div> <div style="flex: 0.2; text-align: center;"> <p>N</p> </div> </div>		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

1.4 Purpose of this report

This Technical Report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the RJP within the context of the proposed Master Plan.

A Baseline Analysis Report was prepared by ERM which presented a desktop analysis of soils, contamination and geology issues at the Site to aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues within the South Jerrabomberra RJP.

Subsequent to the Baseline Analysis Report, ERM has undertaken site inspection and analysis of the interactions between the proposed Master Plan and the known opportunities and constraints in relation to soils, geology and contamination. The purpose of this report is to test the preferred structure plan that was developed as part of a series of Integration Workshops and establish the relevant specifications and requirements to assist in the development of the master plan.

1.5 Objective

The objective of these works was to undertake a desktop Preliminary Site Investigation (PSI) that refines the current understanding of soils, geology, potential contamination, salinity and soil aggressivity issues at the Site and aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues. This information has then been utilised to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development and finalisation of the master plan.

1.6 Scope of Works

To meet the project objective, ERM completed the following scope of works:

- Review of background information relating to the site, including:
 - Previous investigations relating to site contamination;
 - The NSW Environment Protection Authority (EPA) Contaminated Land Register;
 - Historical and recent aerial photographs;
 - Relevant government databases; and
 - Published soil, geology and topographic maps.
- An initial site inspection was undertaken by ERM concurrently with the site familiarisation tour on 8 December 2021 and a further site inspection to identify any potential changes since that time was completed on 7 April 2022.
- Preparation of this report.

Investigation work was conducted with reference to relevant parts of the following guidelines:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM (1999)) (as amended May 2013) – herein referred to as the ASC NEPM (2013);
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme* (3rd edition); and
- NSW EPA (2020) *Contaminated Land Guidelines, Consultants Reporting on Contaminated Land* (May 2020).

2. ENVIRONMENT AND PLANNING LEGISLATION

2.1 Overview

In order to facilitate an assessment of the proposed impacts of potential soils / contamination issues on the South Jerrabomberra RJP process and in the context of some recent changes to the planning framework within NSW, the following sections provide a brief overview of the relevant legislative framework that will inform the testing of the preferred structure plan and review of the proposed master plan.

2.2 *Environmental Planning and Assessment Act 1979 (NSW)*

The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) is the primary instrument under which planning and development is carried out in NSW. The EP&A Act sets out a framework under which the three statutory environmental planning instruments - State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs) are made. The EP&A Act is also the overarching instrument that assigns responsibility for the regulation of contaminated land that is not considered to be contaminated significantly enough to warrant regulation by EPA.

2.3 *SEPP (Resilience and Hazards) 2021 – replacement of SEPP55*

State Environmental Planning Policy (Resilience and Hazards) 2021 (which incorporates, as Chapter 4, guidance formerly included in SEPP No. 55 *Remediation of Land*) is one of the key statutory planning instruments used to regulate contaminated land under the EP&A Act. Specifically, Clause 4.6 of the SEPP (Resilience and Hazards) prohibits a consent authority from approving development on land unless it has discharged its responsibilities with regard to assessing the contamination status of that land.

Importantly, in the context of this report, Clause 4.6 (4) sets out the specific circumstances / lands which would trigger a requirement for further assessment of potential contamination as being:

- (a) *land that is within an investigation area,*
- (b) *land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,*
- (c) *to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital—land—*
 - (i) *in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and*
 - (ii) *on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).*

2.4 *Contaminated Land Management Act*

The *Contaminated Land Management Act 1997* (NSW) (CLM Act) is the legislative instrument in NSW which defines “contamination” as follows:

The presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

The stated objective of the CLM Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation. Sites at which the contamination is considered “significant enough to warrant regulation” are therefore regulated by the EPA under the CLM Act whilst contamination at other sites (i.e., those where contamination is not considered significant enough to warrant regulation by the EPA) are managed via the land use planning process (normally by the local council). The CLM Act provides the EPA with various responsibilities and powers to enable it to effectively regulate and manage significantly contaminated sites in NSW in order to meet the stated objectives of the CLM Act.

3. SITE BACKGROUND REVIEW

3.1 Site identification

The site identification information is presented within the table below:

Table 1: Site Identification Details

Item	Description
Site Address	<ul style="list-style-type: none"> ■ South Jerrabomberra, Jerrabomberra, NSW, 2619
Legal Description	<ul style="list-style-type: none"> ■ Lots IDs are presented in Table 1, Appendix A
Local Government Area	<ul style="list-style-type: none"> ■ Queanbeyan Palerang Regional Council (QPRC)
Current Zoning	<p>There are currently multiple LEPs that cover the investigation area including Queanbeyan LEP (South Jerrabomberra) 2012 and Queanbeyan LEP (West Jerrabomberra) 2013. A consolidated LEP is being proposed for the Queanbeyan-Palerang LGA. The following zoning currently apply within the investigation area:</p> <ul style="list-style-type: none"> ■ B1 Neighbourhood Centre ■ B4 Mixed Use ■ B7 Business Park ■ DM Deferred Matter (zoned for rural purposes under Queanbeyan LEP 1998) ■ E2 Environmental Conservation ■ IN2 Light Industrial ■ R2 Low Density Residential ■ RE1 Public Recreation ■ RE2 Private Recreation ■ RU2 Rural Landscape Zone ■ SP2 Infrastructure
Geographical Co-Ordinates	<ul style="list-style-type: none"> ■ 35° 23' 31.2" S 149° 10' 48" E (Approximate centre of Site)
Site Location and Site Layouts	<ul style="list-style-type: none"> ■ Figure 1 and Figure 2

3.2 Site Setting

The following sections summarise the information obtained during the site background and history desktop review.

Copies of all database search results are provided in **Appendix A**.

Table 2: Site Setting Details

Item	Description
Site area	950 hectares
Current land use	<p>There are currently multiple LEPs that cover the investigation area including Queanbeyan LEP (South Jerrabomberra) 2012 and Queanbeyan LEP (West Jerrabomberra) 2013. Figure 3 summarises the current land-uses. Primarily rural uses including the activities applicable under the following zoning:</p> <ul style="list-style-type: none"> ■ B1 Neighbourhood Centre ■ B4 Mixed Use ■ B7 Business Park ■ DM deferred Matter (zoned for rural purposes under Queanbeyan LEP 1998) ■ E2 Environmental Conservation ■ IN2 Light Industrial ■ R2 Low Density Residential ■ RE1 Public Recreation ■ RE2 Private Recreation ■ RU2 Rural Landscape Zone ■ SP2 Infrastructure
Surrounding Land use	<p>The land uses surrounding the site include:</p> <ul style="list-style-type: none"> ■ North west Reserve Park ■ North east: low density residential area and mine site (approximately 2.2 km from the site boundaries) ■ South east Undeveloped open space ■ East Low density residential area (Jerrabomberra) ■ West: Industrial/ commercial area (Hume, ACT)
Site Elevation	580-860 m relative to Australian Height Datum (AHD)

3.3 Topography

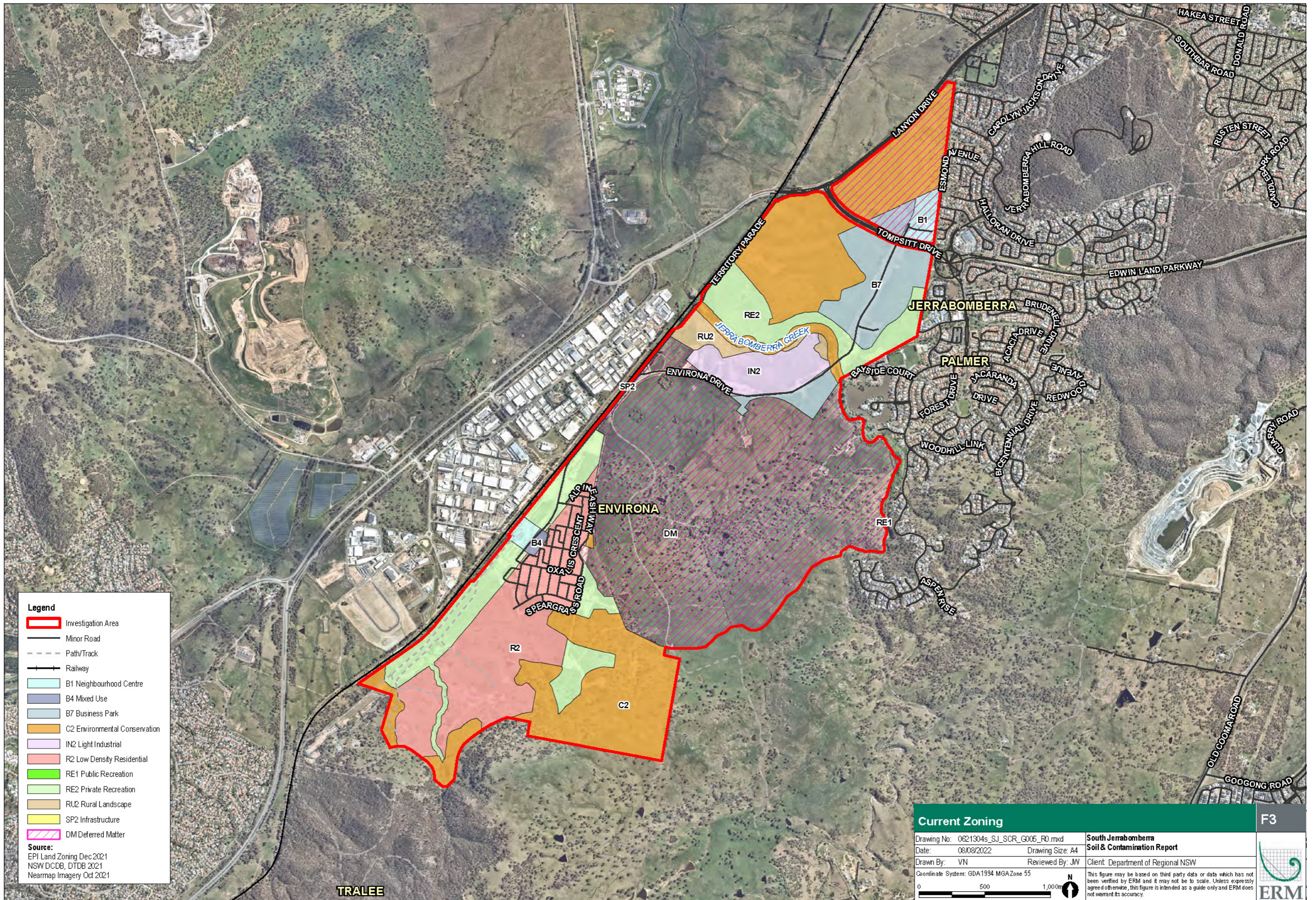
The Site comprises a mix of low-lying lands adjacent to Jerrabomberra Creek, generally gentle sloping land with one minor peak to the north, and gentle to steep sloping lands to the south with a number of peaks and ridgelines.

3.4 Hydrology

Natural surface water bodies at the Site were identified as:

- Jerrabomberra Creek flows through the northern portion of the site and flows from east to west. It forms part of the eastern boundary of the Site (between the Site and the residential areas of Jerrabomberra), forms part of the wider Murrumbidgee catchment, and flows into Lake Burley Griffin in the ACT; and
- Dogtrap Gully flows through the south western portion of the Site and flows from south to north.

A review of aerial imagery also indicates the presence of several ephemeral drainage lines and farm dams located within the Site boundary.



Legend

- Investigation Area
- Minor Road
- Path/Track
- Railway
- B1 Neighbourhood Centre
- B4 Mixed Use
- B7 Business Park
- C2 Environmental Conservation
- IN2 Light Industrial
- R2 Low Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU2 Rural Landscape
- SP2 Infrastructure
- DM Deferred Matter

Source:
 EPI Land Zoning Dec 2021
 NSW DCDB, DTDB 2021
 Nearmap Imagery Oct 2021

Current Zoning		F3
Drawing No: 0621304s_SJ_SCR_G005_R0.mxd	South Jerrabomberra Soil & Contamination Report	
Date: 08/08/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	
Client: Department of Regional NSW		
Coordinate System: GDA1994 MGAZone 55		
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3.5 Geology

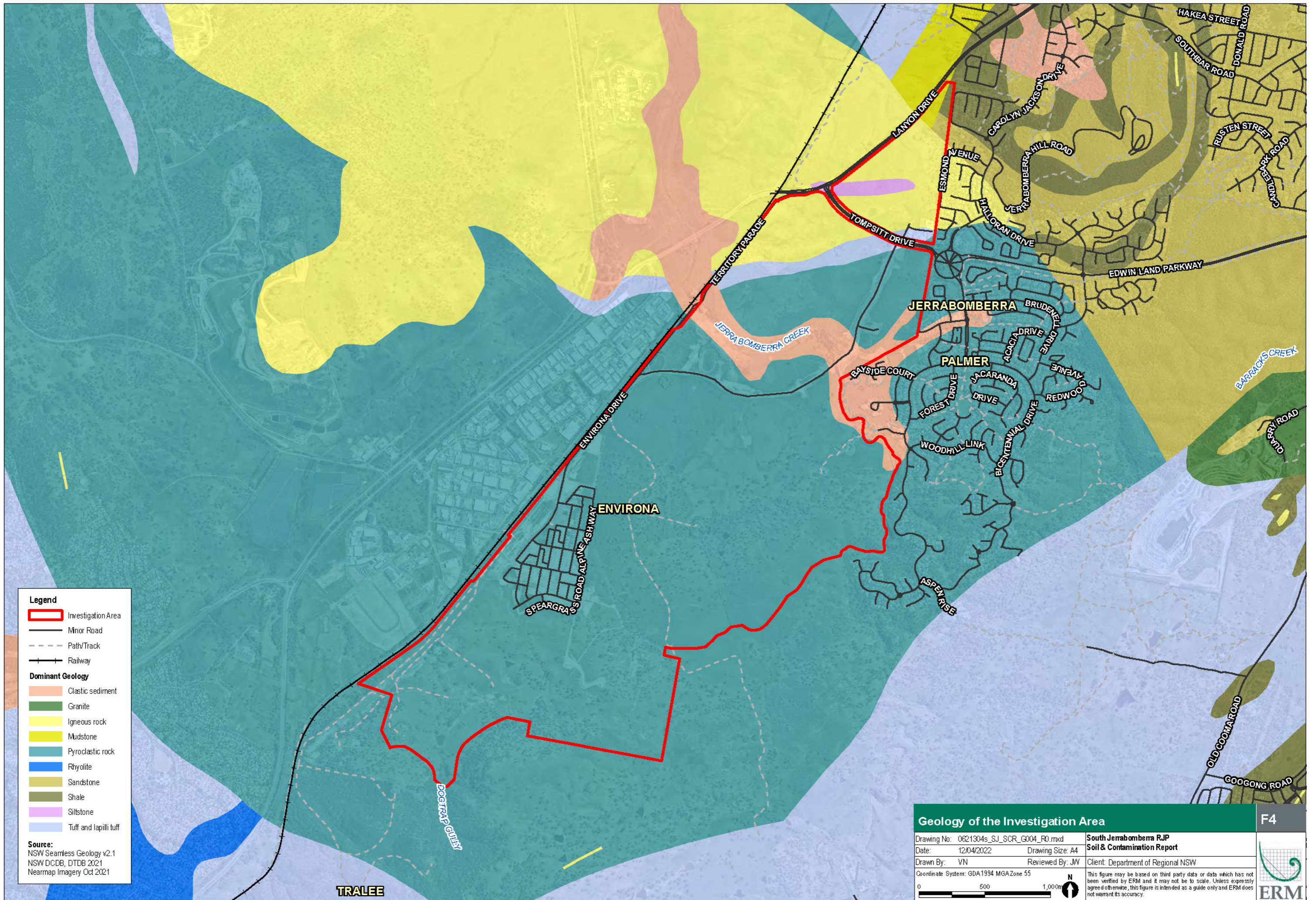
The geology of the investigation area is graphically represented in Figure 4. Geology mapping from the Canberra 1:100 000 Geological Map indicates that the Site is underlain by the following geological units:

- Adaminaby Group sandstone comprising of brown and buff to grey, thin-thick-bedded, fine-to coarse grained mica-quartz (+/- feldspar) sandstone, interbedded with laminated siltstone and mudstone sporadic chert-rich units, from lower Ordovician age and formation of Abercrombie Formation
- Alluvium clastic sediment comprising of unconsolidated grey to brown to beige humic (\pm) micaceous silty clay, quartz (\pm) lithic silt, fine to medium grained quartz-rich to quartz-lithic sand polymictic pebble to cobble gravel (as sporadic lenses); sporadic palaeosol horizons, from Quaternary age
- Douro Group pyroclastic rock comprising of rhyodacitic ignimbrite and minor volcanoclastic and argillaceous sedimentary rocks, from Upper Silurian age, formation of Deakin Volcanics
- Douro Group ash tuff, lapillistone, and lapilli tuff comprising of unnamed tuff, sandstone and shale, from Upper Silurian age, formation of Deakin Volcanics
- Douro Group fine grained igneous rock comprising of blue and mauve-grey porphyritic rhyodacite, volcanoclastic and epiclastic tuff (as a waterlaid deposit), tuffaceous shale, from Upper Silurian age, formation of Deakin Volcanics
- Douro Group siltstone comprising of tuffaceous siltstone and shale, from Upper Silurian age, formation of Deakin Volcanics
- Ungrouped Cowra-Yass Zone units mudstone comprising of mudstone, siltstone, minor sandstone, limestone, hornfels, dacitic ignimbrite volcanoclastics, minor agglomerate and lithic tuff, from Lower Silurian age and formation of Canberra Formation; and
- Ungrouped Cowra-Yass Zone units shale comprising of shale mudstone, siltstone, minor sandstone, from Lower Silurian age and formation of State Circle Shale.

3.6 Hydrogeology

The publicly available information on hydrogeology (as referenced in Appendix A) indicated the following:

- Groundwater aquifers on the site and surrounding buffer area (2 km) were described as extensive low to moderate productive aquifers; with hydrogeologic unit of Palaeozoic and Pre-Cambrian Fractured Rock (low permeability) aquifers;
- A search of registered groundwater bores identified 6 on-site bores and 38 bores within the 2 km search radius. Standing water levels were measured between 7 m bgl to 40 m bgl;
- The registered bores are reported to be used for a mix of household (in total 9 with 3 being on the site), irrigated agriculture (1), water supply (2), recreation (1), exploration or research (1) and unknown purposes;
- Aquatic ecosystem on the site and within 500 m buffer rely highly to moderately on the surface expression of groundwater; and
- Terrestrial ecosystem within 500 m buffer have a low dependency on the subsurface expression of groundwater.



Legend

- Investigation Area
- Minor Road
- Path/Track
- + Railway
- Dominant Geology**
- Clastic sediment
- Granite
- Igneous rock
- Mudstone
- Pyroclastic rock
- Rhyolite
- Sandstone
- Shale
- Siltstone
- Tuff and lapilli tuff

Source:
 NSW Seamless Geology v2.1
 NSW DCDB, DTDB 2021
 Nearmap Imagery Oct 2021

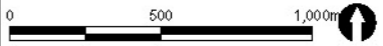
Geology of the Investigation Area

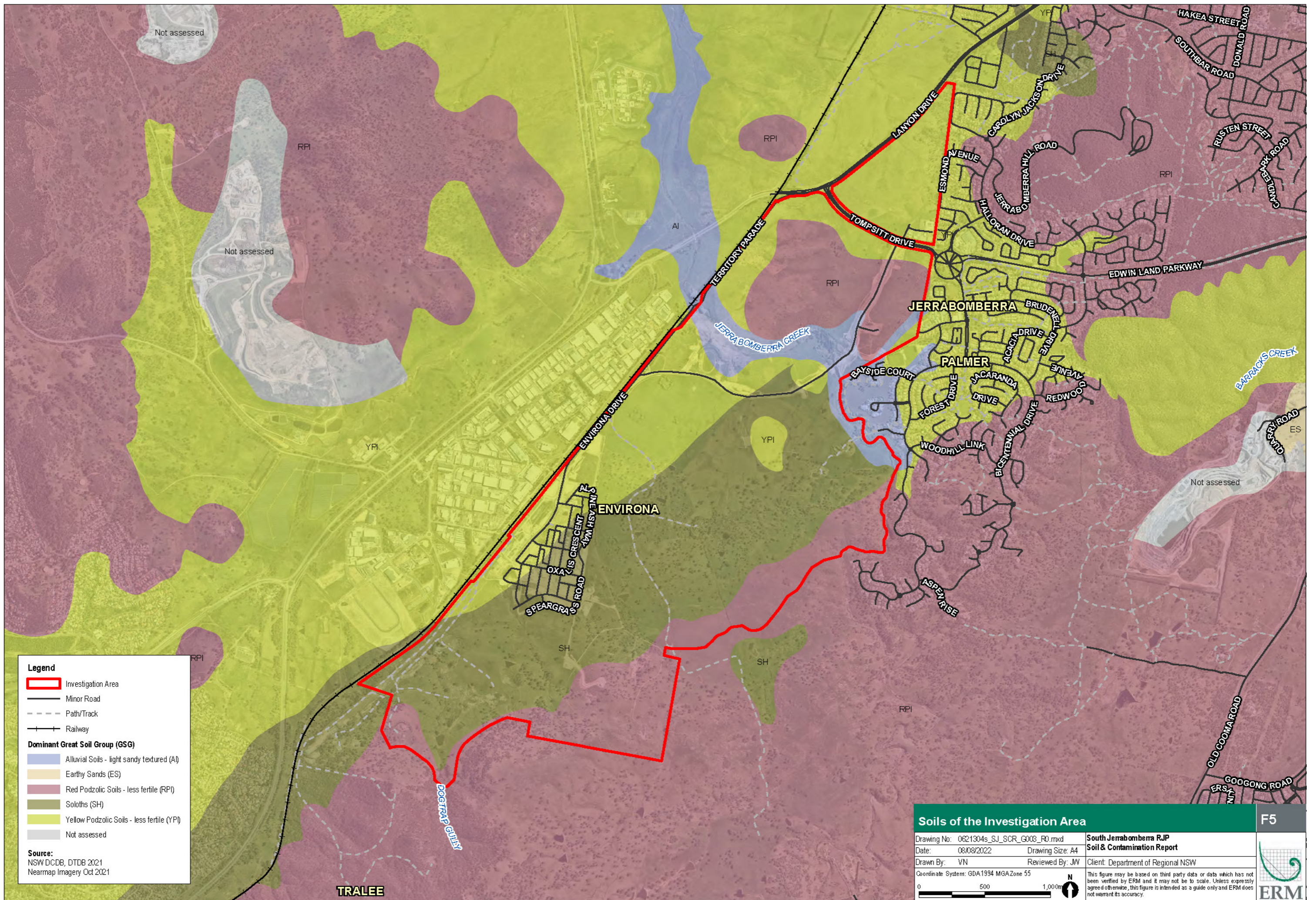
Drawing No: 0621304s_SJ_SCR_G004_R0.mxd
 Date: 12/04/2022 Drawing Size: A4
 Drawn By: VN Reviewed By: JW
 Coordinate System: GDA1994 MGAZone 55

**South Jerrabomberra RJP
 Soil & Contamination Report**
 Client: Department of Regional NSW

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

F4





Legend

- Investigation Area
- Minor Road
- Path/Track
- Railway

Dominant Great Soil Group (GSG)

- Alluvial Soils - light sandy textured (AI)
- Earthy Sands (ES)
- Red Podzolic Soils - less fertile (RPI)
- Soloths (SH)
- Yellow Podzolic Soils - less fertile (YPI)
- Not assessed

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Soils of the Investigation Area		F5
Drawing No: 0621304s_SJ_SCR_G003_R0.mxd	South Jerrabomberra RJP	
Date: 08/08/2022	Soil & Contamination Report	
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA1994 MGAZone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

4. PREVIOUS INVESTIGATIONS

The Site and surrounding area have been previously investigated for assessment of potential contaminants of concern. A summary of the investigation areas and results are as follows:

Table 3: Summary of Previous Investigation Findings

Investigated area	CoPC	Exceedance	Potential sources	Comment & Conclusion
Northern portion of the Site, Poplars 1,5,6,7,8,9,11	<ul style="list-style-type: none"> ■ Arsenic ■ OCPs and OPPs ■ Petroleum hydrocarbons ■ Metals ■ Asbestos ■ Nitrates and pathogens 	<ul style="list-style-type: none"> ■ Asbestos ■ Petroleum hydrocarbons ■ Metals ■ OCPs (Aldrin dieldrin) 	<ul style="list-style-type: none"> ■ Sheep spray site ■ Fuel dispenser ■ Former piggery 	<ul style="list-style-type: none"> ■ Remediation proposed in the Coffey (2018) Remediation Action Plan (RAP) to address seven potential Areas of Environmental Concern (AECs). The RAP was reviewed and approved by a Site Auditor in 2018. ■ Whilst it is understood that the proposed remediation works have been completed, a validation report and / or Site Audit Statement has not been provided for review.
North Tralee Site²	<ul style="list-style-type: none"> ■ <i>"There is potential for some contamination of the Site"</i> 	<ul style="list-style-type: none"> ■ No detailed site investigation report reviewed. 	<ul style="list-style-type: none"> ■ No detailed site investigation report reviewed. 	<ul style="list-style-type: none"> ■ No investigation reports were available to review the potential for contamination.
South Tralee³	<ul style="list-style-type: none"> ■ Bonded asbestos cement, lead based paints, pesticides 	<ul style="list-style-type: none"> ■ not detected in soil 	<ul style="list-style-type: none"> ■ Former structures 	<ul style="list-style-type: none"> ■ Homestead and Surrounds (no unacceptable risk)
	<ul style="list-style-type: none"> ■ Organophosphates, organochlorines, heavy metals, nitrogen and phosphorus 	<ul style="list-style-type: none"> ■ zinc (soil) > ESL ■ hydrocarbons (soil) > ESL 	<ul style="list-style-type: none"> ■ termite treatment ■ deposits of sheeting ■ use of galvanised steel in the construction of the woolshed ■ maintenance of farm machinery 	<ul style="list-style-type: none"> ■ Sheep Shearing Sheds and Surrounds (low risk)
	<ul style="list-style-type: none"> ■ Arsenic and dieldrin (soil), cadmium, copper, nickel, and zinc (groundwater) 	<ul style="list-style-type: none"> ■ arsenic (soil) > standards for the potential land-use ■ cadmium, copper, nickel, zinc (groundwater) > recommended concentration 	<ul style="list-style-type: none"> ■ Not identified 	<ul style="list-style-type: none"> ■ Sheep Dip (Groundwater contamination, moderate risk to future users of groundwater and that further sampling should be carried out.)

Investigated area	CoPC	Exceedance	Potential sources	Comment & Conclusion
	<ul style="list-style-type: none"> ■ Hydrocarbons (2.0 mbgl), lead 	<ul style="list-style-type: none"> ■ lead > ESL 	<ul style="list-style-type: none"> ■ Refuelling and maintenance of aircraft ■ Leaking above ground storage tank no longer on site. 	<ul style="list-style-type: none"> ■ Aircraft Hangar (low risk because the proposed land-use is located within the road alignment)
	<ul style="list-style-type: none"> ■ NA 	<ul style="list-style-type: none"> ■ NA 	<ul style="list-style-type: none"> ■ unknown 	<ul style="list-style-type: none"> ■ Area of Disturbed Soil (borrow pit and/or landfill area)
Regional Sports Complex ⁴	<ul style="list-style-type: none"> ■ Asbestos ■ PCBs ■ Fill material of unknown origin ■ General waste and debris 	<ul style="list-style-type: none"> ■ ACM ■ PCBs ■ Potentially others 	<ul style="list-style-type: none"> ■ Historical speedway and other commercial / industrial uses of the site and illegal waste disposal. 	<ul style="list-style-type: none"> ■ Cardno prepared a Review of Environmental Factors (REF) for preconstruction works on the Regional Sport Complex site. Preconstruction works comprised the following remediation works: <ul style="list-style-type: none"> ○ Removal of ACM ○ Removal of PCB containing light fittings (13 in total). ○ Excavation of a small former landfill ○ Removal of general waste and debris

1. Coffey (16 Sep. 2020), Poplars Developments, Additional Phase 2 Environmental Site Assessment, South Poplars, Proposed Secondary School Site Extension Area, Jerrabomberra, NSW, 754-CBREN278296-R01a
2. Willana (Aug. 2015), Supplementary Report to the North Tralee Local Environmental Study
3. Council assessment report (May – June 2018), citing the *South Tralee Detailed Site Investigation report, SMEC reference 3002452-01/RV01, 20 July 2015*. Given this development has now been approved and works commenced it is understood that works to address these issues have been undertaken or are underway, however additional documentation is required to confirm this.
4. Cardno (August 2021) *Statement of Environmental Effects Queanbeyan Palerang Regional Sports Complex (QPRSC)* citing the *Cardno Review of Environmental Factors Queanbeyan-Palerang Regional Sports Complex – Preconstruction Stage*
5. Environmental Strategies (February 2012) *Interim Advice Number 1 Review of Phase 1 and Phase 2 ESA "The Poplars" 300 Lanyon Drive, Queanbeyan, NSW*
6. Coffey (October 2003) *Phase 1 Preliminary Land Contamination Study, "The Poplars" 300 Lanyon Drive, Queanbeyan, NSW*.
7. Coffey (September 2011) *Sampling, Analysis and Quality Plan for the Poplars Development Area, Queanbeyan*.
8. Coffey (November 2011) *Phase 2 Environmental Site Assessment "The Poplars" 300 Lanyon Drive, Jerrabomberra*.
9. Douglas Partners (September 2018) *Contamination Testing Lot 6 DP719108, Jerrabomberra*
10. Coffey (2018) *Remedial Action Plan - Botanical Stage 1 Development (North Poplars) South Jerrabomberra, NSW*
 Arcadis (February 2018) *Updated Interim Advice 3: Review of Remediation Action Plan – Botanical Stage 1 Development (North Poplars) South Jerrabomberra, NSW*

5. SITE INSPECTION

An initial site inspection was undertaken by ERM concurrently with the site familiarisation tour on 8 December 2021 and a further site inspection to identify any potential changes since that time was completed on 7 April 2022. In addition, observations made by other ERM consultants during heritage fieldworks undertaken on 22-23 March 2022 have also been summarised herein. It is noted that given the scale of the site, access constraints and limited visibility of the ground surface due to thick vegetation / lush grass not all areas of the site were inspected, however a sufficiently broad overview of potential AECs and other contamination issues was gathered to inform this assessment.

In addition to the current and former industrial site uses identified in the PSI and described in further detail in Section 7, the key observations made in relation to potential areas of contamination included:

- 1 x rusted steel drum identified in the vicinity of the former piggery within the Poplars precinct (as discussed in Environmental Strategies, 2012).
- Earthmoving plant laydown / parking and construction compound areas associated with civil works for the South Tralee residential development.

It is also noted that attempts were made to identify / ground truth the location of a “garbage dump” that was identified within the heritage research however this was unable to be located. The dump is described as “PHS8 (Garbage dump) – this is a small garbage dump in a 30 m x 12 m erosion blowout beside a fenceline near the western boundary of South Poplars. Garbage includes a 1940s beer bottle, a 1960s drink can, a green wine bottle and an old metal watering can (CMG Reference: E215690 N592760). (Source Archaeological Heritage Surveys, 2003 ‘*The Poplars*’, *Queanbeyan, NSW: Cultural Heritage Assessment*).

Relevant photographs taken during the ERM field inspections are incorporated in the photographic log included as Appendix B.

6. PRELIMINARY SOIL ASSESSMENT

6.1 Soil Landscapes

Soils within the site are broadly classified into four different types including Kurosols (Yellow Podzolic soil) covering the north and along the western boundary of the site, Natric Kurosols (Soloths) in central-southern part of the site and Kurosols (Red Podzolic soil) along the south eastern boundary of the site with some pockets on the north portion of the site and small area (on the central to top of the site) with Rudosols.

Available mapping from the South Jerrabomberra dataset ([eSPADE v2.1 \(nsw.gov.au\)](https://www.nsw.gov.au/eSPADE-v2.1)) indicates that a total of five different soil landscapes are present across the Site as follows:

- Williamsdale
- Burra
- Ginninderra Creek
- Luxor Variant B
- Campbell

A detailed description of the identified soil landscapes within the Investigation Area is presented below and graphically in **Figure 5**.

Table 4: Summary of Soil Landscape Mapping

Soil Landscape	Description
Williamsdale	<ul style="list-style-type: none"> ■ Landscape— undulating rises, fans, valley flats and depressions on Silurian Volcanics of the Canberra Lowlands. Includes significant areas of pediplain. Local relief 5 - 50 m; elevation 550 - 650 m; waning footslopes (<10%). Little or no rock outcrop. The original woodland has been cleared. Grassland areas have been extensively altered ■ Soils — moderately deep, moderately well-drained Yellow Chromosols (Yellow Podzolic Soils) on Red and Brown Kandosols (Red and Yellow Earths) on upper rises and fan elements. Moderately to very deep, poorly to imperfectly drained Sodosols (Solodic Soils and Solodized Solonetz Soils) on lower rises and fan elements ■ Limitations— hardsetting, erodible, dispersible soils (localised). Acidic topsoils. Seasonal waterlogging; complex terrain; flood hazard (localised); run-on; dieback
Burra	<ul style="list-style-type: none"> ■ Landscape (primary referred to as 'ba')— undulating to rolling low hills and alluvial fans on Silurian volcanics. Local relief <90 m; elevation 650 - 900 m; long (>300 m), waning and gently to moderately inclined hillslopes, footslopes and fans (slopes 5 - 30%). Localised terracettes are common. Almost completely cleared woodland. ■ Landscape Variant (referred to as 'baa')—fans more prevalent, with less rocky and slightly deeper soils than ba. ■ Soils— shallow (<60 cm), well-drained Rudosols (Lithosols) and Tenosols (Lithosols/Earthy Sands) on crests and upper slopes. Moderately deep (<90 cm), moderately well-drained Red Kurosols (Red Podzolic Soils) and Red Kandosols (Red Earths) on midslopes and most lower slopes. Moderately deep (<100 cm), slowly to moderately well-drained Brown Chromosols (Yellow Podzolic Soils) and Brown Kandosols (Yellow Earths) along minor drainage lines and on some lower slopes. ■ Limitations— strongly acid soils with low fertility and low available waterholding capacity. Subsoils have low permeability. Moderate mass movement hazard (terracing); sheet erosion risk; run-on; localised shallow soils

Soil Landscape	Description
Ginninderra Creek	<ul style="list-style-type: none"> ■ Landscape—gently undulating floodplain on Quaternary alluvium. Local relief <10 m; elevation 540 - 680 m; slopes generally <3%. Many imperfectly drained areas. Extensively cleared riparian woodland. ■ Soil— deep (>100 cm), imperfectly drained Sodic Brown Chromosols (Brown and Yellow Podzolic Soils) on margins of the unit. Deep (>100 cm), poorly drained Stratic Rudosols (Alluvial Soils) on floodplain elements. ■ Limitations— infertile, highly erodible soils. Imperfect drainage (localised); flood hazard; run-on; waterlogging; gully erosion risk; wind erosion hazard (aeolian materials); non-cohesive soils (sands); engineering hazard; complex terrain.
LUXOR Variant b	<ul style="list-style-type: none"> ■ Landscape — waning lower slope fans on colluvium. Local relief <30 m; elevation 580 - 670 m; moderately inclined slopes (< 20%). Cleared woodlands with few remaining trees. ■ Landscape Variant lua— layered colluvium with infilled 'lenses' of alluvium/colluvium. ■ Landscape Variant lub— numerous small areas of colluvium interspersed with small ridges of in situ hillslope material. ■ Soils— variable depth (40 - 160 cm), moderately well-drained stony Red Kandosols (Red Earths) on upper margin of the landscape. Deep (>100 cm), imperfectly to poorly drained Magnesic-Natric Kurosols (Yellow Podzolic Soils) on lower slopes. ■ Limitations— saline and dispersible subsoils. Complex terrain (localised); mass movement hazard; run-on (localised); seasonal waterlogging (localised); sheet erosion risk; gully erosion risk; engineering hazard (localised).
CAMPBELL	<ul style="list-style-type: none"> ■ Landscape— rounded steep to rolling volcanic mountains and hills of the Murrumbidgee Valley. Local relief 100 - 350 m; elevation 600 - 1100 m; long hillslopes (>20%), often with terracettes. Rock outcrop is common as tombstone-sized and shaped rows of vertically dipping tuffs. Open-forest to low woodland on exposed crests and frost hollows. Clearing has occurred on lower slopes. ■ Soils— shallow (<30 cm), rapidly drained Rudosols (Lithosols) on crests and near rock outcrops. Moderately deep (<70 cm), moderately well-drained Red Chromosols (Red Podzolic Soils) and Yellow Chromosols (Yellow Podzolic Soils) on sideslopes. Variable depth (usually 60 - 120 cm), imperfectly drained Brown Sodosols (Solodic and Solonized Solonetz Soils) with Grey Chromosols and Hydrosols (Gleyed Podzolic Soils) along drainage lines. ■ Soil Variant caa— finer heavier soils. ■ Soil Variant cab— on sandstone with shallow, stony duplex soils. ■ Soil Variant cac— deep, bleached A2 horizons. ■ Limitations— soils are shallow, infertile and acidic. Subsoils have low permeability and are hardsetting. Steep slopes; rock outcrop; sheet erosion risk; localised waterlogging (springs).

6.2 Salinity and Soil Aggressivity

6.2.1 Desktop Review

Available mapping indicates soil landscapes within the investigation area are subject to a low salinity hazard.

6.2.2 Soil Sampling and Analysis

On this basis, no preliminary soil sampling or laboratory analysis was undertaken for salinity.

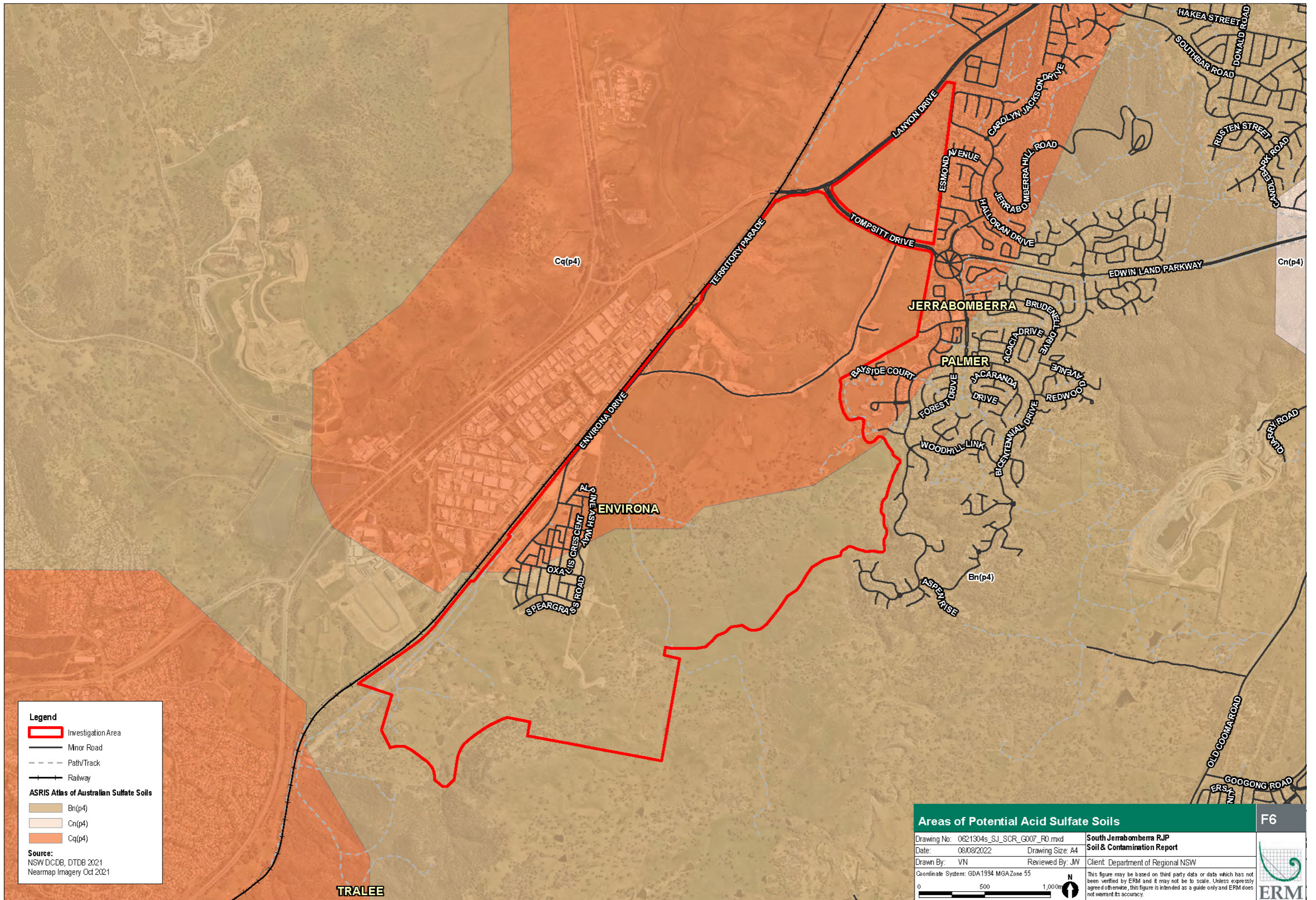
6.3 Acid Sulfate Soils

6.3.1 Desktop Review

Available mapping from the Atlas of Australian Acid Sulfate Soil, as shown on **Figure 6** indicates that there is an extremely low to low potential for acid sulfate soils to be present within the Site.

6.3.2 Soil Sampling and Analysis

On this basis, no preliminary soil sampling or laboratory analysis was undertaken for potential acid sulfate soils.



Legend

- Investigation Area
- Minor Road
- Path/Track
- + Railway

ASRIS Atlas of Australian Sulfate Soils

- Bn(p4)
- Cn(p4)
- Cq(p4)

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Areas of Potential Acid Sulfate Soils		F6
Drawing No: 0621304s_SJ_SCR_G007_R0.mxd	South Jerrabomberra RJP	
Date: 08/08/2022	Soil & Contamination Report	
Drawn By: VN	Reviewed By: JW	
Client: Department of Regional NSW		
Coordinate System: GDA1994 MGAZone 55		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">500</div> <div style="margin-right: 10px;">1,000m</div> <div style="text-align: center;"> N </div> </div>		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

7. PRELIMINARY CONTAMINATION ASSESSMENT

7.1 Site History

7.1.1 Aerial Photographs

Historical aerial photographs (**Appendix A**) were reviewed to assess potential historical land use practices undertaken within and surrounding the site. A summary of information obtained from the review is presented within the table below.

Table 5: Summary of Historical Photographs

Year	Description
1961 – Black & White	<ul style="list-style-type: none"> ■ Site Area: The site consists of undeveloped/ agricultural land with a house and farm in located on the east side of the Site. A railway line is present along the western boundary of the site. Some roads are within the site, including Tompsitt Drive in north part. Jerrabomberra Creek flow through the northern portion of the Site and Dog Trap Gully through south east corner of the Site. ■ Surrounding Area: The surrounding area is primarily comprised of agricultural land and/or undeveloped land. The Queanbeyan Nature Reserve is located at the north west of the Site. The Lake Jerrabomberra is located at east of the Site. The road Lanyon Drive is adjacent to the north west boundary of the Site.
1968 – Black & White	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since previous aerial photography except for the southern portion of the site that shows land disturbance and clearance. ■ Surrounding Area: No significant changes were observed for the land surrounding the site since previous aerial photography.
1976 – Black & White	<ul style="list-style-type: none"> ■ Site Area: A car racing track (the former Tralee Speedway) and associated infrastructure appear on the western boundary to the central portion of the Site with the rest of the Site remaining largely unchanged. ■ Surrounding Area: minor industrial development has occurred on west side of the Site between the Goulburn-Bombala Railway and Monaro Highway.
1985– Black & White	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since previous aerial photography ■ Surrounding Area: More industrial development can be observed on west side of the Site.
1995 – Colour	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since previous aerial photography ■ Surrounding Area: Development of industrial construction has increased on west side of the Site with establishment of house tracks on south east. Residential development has started in north-east to the east of the Site.
1998 – Colour	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since the previous aerial photography ■ Surrounding Area: More industrial and residential development can be observed in west and north east sides of the site, respectively.
2008 – Colour	<ul style="list-style-type: none"> ■ Site Area: The Site is generally consistent with previous aerial imagery ■ Surrounding Area: The Alexander Maconochie Centre (a correctional facility), has been developed in north west of the Site with an ambulance helipad (helipad RFS South Pod) to the south of that. In the north east, the residential area has extended more towards the east with an increase on the number of houses. Few houses appear to have pool in their yard.
2010 & 2012 – Colour	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since the previous aerial photography ■ Surrounding Area: No significant changes were observed for the land surrounding the site.

Year	Description
2015 & 2018 – Colour	<ul style="list-style-type: none"> ■ Site Area: a residence and new road infrastructure have been developed on the centre of the Site. ■ Surrounding Area: Some land disturbance including excavation can be observed on the western part of the site adjacent the Hume industrial area.
2021 – Colour	<ul style="list-style-type: none"> ■ Site Area: new development and land clearance with some associated excavation appears on the western portion of the Site. A new road and bridge have been developed within the site that connects Tomsitt Drive in the north east of the Site to the western portions of the site. ■ Surrounding Area: No obvious changes can be observed for land surrounding the Site

7.1.2 Historical Business Records

A search of historical business records and land titles for the site and surrounding area (200 m radius) was undertaken from the 1930s to date. The results of the search are summarised below, and a copy of historical business records is provided within **Appendix A**.

Table 6: Summary of Historical Business Records

Period	Registered Business Types
1930s	<ul style="list-style-type: none"> ■ No Records
1940s	<ul style="list-style-type: none"> ■ No Records
1950s	<ul style="list-style-type: none"> ■ No Records
1960s	<ul style="list-style-type: none"> ■ No Records
1970s	<ul style="list-style-type: none"> ■ No Records
1980s	<ul style="list-style-type: none"> ■ Carriers-Heavy Industrial Transportation ■ Earth Moving &/or Excavating Contractors ■ Sand Soil & Gravel Retailers ■ Furniture Exterior/Outdoor ■ Graziers ■ Ice Cream Vendors ■ Landscape Gardening services & supplies ■ Primary Metal Products ■ Transport & transportation Services
1990s	<ul style="list-style-type: none"> ■ Steel Fabrication Manufacturers ■ Steel Merchants ■ Welding ■ Electrical Wholesalers ■ Fuel Merchants & buyer ■ Petroleum and coal Products n.e.c. (not elsewhere classified) ■ Metal Merchants ■ Landscape Gardening Services& Supplies ■ Nurseries-Retail/ Supplier ■ Packing & Filling Contractors ■ Playground Equipment Design & Installation ■ Sand Soil & Gravel Retailers ■ Timber-Retailer/Trader ■ Scaffolding Sale or Hire ■ Builder Handyman Contractor Equipment Sale or Hire ■ Earth Moving &/or Excavating Contractors ■ Sand Soil & Gravel producers & Wholesalers ■ Transport & transportation Services

Period	Registered Business Types
	<ul style="list-style-type: none"> ■ Building Contractors Renovations Alteration & Extension ■ Cabinetry Makers ■ Door & Gate Fitting & Hardware ■ Joinery services ■ Roof Construction Specialists ■ Furniture Storage & Removals
2000s	<ul style="list-style-type: none"> ■ Fencing contractors ■ Kitchen renovations & equipment-new ■ Shop & office fitting design & fit-outs ■ Wedding services ■ Piano tuning & repairs ■ Concrete-form ties formwork & accessories ■ Transit centre ■ Envelope Manufacturers &/or Wholesalers ■ Door & gate fittings hardware ■ Building contractors-general ■ Earth moving &/or excavating contractors ■ Foundation garments& accessories-retailers & repairers ■ Graphite supplies ■ Builder handyman contractor equipment sale/hire ■ Postage meters & franking machines sales service & repair ■ Architect ■ Office & business supplies ■ Sport cards & collectables ■ Building contractors general ■ Building contractors renovation alterations & extensions ■ Roof construction specialists ■ Roof truss & wall frame construction ■ Shop & office fitting design & fit-outs ■ Air conditioning industrial & commercial ■ Air conditioning installations/repairs ■ Electrical power line construction & fittings ■ Furniture Storage & Removals ■ Storage general facility and service ■ Building design and drafting services ■ Train services ■ Fruit & vegetable Wholesalers ■ Hotel restaurant & club supplies ■ Carriers-heavy industrial transportation ■ Ice supplies ■ Home repair and maintenance ■ Graziers ■ Nurseries-retail
2010	<ul style="list-style-type: none"> ■ Carpenters joiners & fitters ■ Balustrades timber & metal ■ Crane & travel tower hire or servicing ■ Paper & plastic container manufacturers & supplies ■ Transport & transportation Services ■ Earth Moving &/or Excavating Contractors ■ Cleaning chemical steam pressure contractors ■ Furniture designer-made order

Period	Registered Business Types
	<ul style="list-style-type: none"> ■ Garden & gardening supplier ■ Kitchen renovation and equipment- new ■ Door & gate equipment automatic ■ Drainers and drainage services ■ Builder handyman contractor sale/ hire ■ Recyclers ■ Bus/ track repairs ■ Carriers-heavy industrial transportation ■ Cold storage refrigeration ■ Engineers-motor & repairers ■ Landscape gardening services and suppliers ■ Glass merchants & installation services glaziers ■ Roof construction specialists ■ Roof truss & wall frame construction ■ Shop & office fitting design & fit-outs ■ welding ■ Nurseries-retail ■ Steel merchant
2015	<ul style="list-style-type: none"> ■ Furniture design made and order ■ Garden & gardening supplier ■ Kitchen renovation and equipment- new ■ Electrical contractors and consultants ■ Gates & fences ■ Couriers ■ Builder handyman contractor sale/ hire ■ Wedding video & DVD services ■ Envelope Manufacturers &/or Wholesalers ■ Transport& transportation Services ■ Concrete-form ties formwork & accessories ■ Scaffolding sale or hire ■ Windows-aluminium & metallic ■ Concrete-form ties formwork & accessories ■ Door and gate fitting ■ Carriers-light transportation ■ Concrete contractors paving specialist ■ Earth moving &/or excavating contractors ■ Telecommunication consultants ■ Bus& truck repair ■ Joinery services ■ Furniture storage and removals ■ Car & truck body trimmers ■ Relocation services & consultants ■ Petrol station and garages ■ Engineers-motor & repairers ■ Carriers-heavy industrial transportation ■ Buildings relocatable/ transportable- commercial ■ Engineering-diesel repair specialist ■ Recyclers ■ Petrol stations & garages ■ Concrete-reinforcing products ■ Scrap metal merchants

Period	Registered Business Types
	<ul style="list-style-type: none"> ■ Doctors and medical practitioners ■ Airport shuttle transit services ■ Alternative health service providers ■ Audio visual equipment sales hire or services ■ Batteries- automotive & marine ■ Brokers-business consultancy ■ Carpenters joiners & fitters ■ Building contractors general ■ Carpenter furniture & upholstery cleaning ■ Cleaning industrial/ commercial contractors ■ Cleaning services-domestic ■ Cloth lines portable & rotary ■ Computer equipment hardware office ■ Computer equipment repairs and upgrade services ■ Concrete gutters & kerbs ■ Dishwashing machines servicing & parts ■ Dog and cat grooming ■ Driving school ■ Electrical contractors and consultant ■ Engineers- motor & repairers ■ Entertainment musicians & agents ■ Fashion jewellery & accessories- importers & Wholesalers ■ Fencing contractors ■ Gardening services ■ Glass merchants/ installation services glaziers ■ Hardware retailers ■ Home improvement renovation services ■ Home repairs & maintenance ■ Hot water system sales installation & repairs ■ Insurance- fire marine casualty accident& general ■ Joinery services ■ Landscape design and consultants ■ Lawn cutting & garden maintenance ■ Legal costing & support services ■ Martial arts & self-defence schools& supplier ■ Millinery retailers ■ Musician hire & musicians' agents ■ Pest control services ■ Pet shops & accessories ■ Plumber & gasfitters ■ Roof repair & roof cleaning & maintenance ■ Security alarm system & consultants ■ Signwriters ■ Solar energy equipment & machinery ■ Stone masons stonework & masonry ■ Television antennas retail & installation ■ Tilers-wall & floor ■ Washing machines & dryers- services parts & repairs ■ Windows-aluminium metallic ■ Windscreens new & repairs

7.2 Past and Present Potentially Contaminating Activities

A search of past and present potentially contaminating activities is detailed within the following sections. Figures illustrating the location of identified activities are detailed within **Appendix A**.

7.2.1 NSW EPA Contaminated Land Search

A search of the NSW EPA contaminated land database under the CLM Act 1997 undertaken for the site and a 1 km buffer area indicated the following have been notified to NSW EPA:

Table 7: Summary of Findings NSW EPA Contaminated Land Records

Site Name	Address	Activity that caused Contamination	EPA Site Management Class	Distance (m)	Direction
Caltex Service Station	Lanyon Dr Cnr McCrae St (1 Suraci Place) Queanbeyan West	Service Station	Regulation under CLM Act not required	915	North-west

7.2.2 NSW EPA Contaminated Lands Records of Notice

A search of the NSW EPA Contaminated Land Records of Notice database was undertaken for the site and 1 km buffer and indicates there are no Contaminated Land Records of Notice.

7.2.3 NSW EPA PFAS Investigation Program

A search of the NSW EPA PFAS investigation program database indicated no PFAS impact was identified at the site or within the 2 km report buffer area.

7.2.4 NSW EPA Former Gaswork Investigation Program

A search of the NSW EPA PFAS investigation program database indicated no gasworks impact was identified at the site or within the 2 km report buffer area.

7.2.5 National Pollutant Inventory Industrial Facilities

A search of the National Pollutant Inventory (NPI) register indicated the following sites to be located within the 2000 m search buffer area:

Table 8: Summary of Search of National Pollutant Inventory (NPI) Register

Facility Name	Address	Primary ANZSIC Class	Latest Report	Distance from Site (m)	Direction
Koppers, Hume	Tralelee St, Hume	Reconstituted Wood Product Manufacturing	2018/2019	90	West
Hume Asphalt Plant	36 Sawmill Circuit Hume	Other Petroleum and coal Product Manufacturing	2018/2019	95	West
Integrated Forest Products (Receivers & Managers Appointed)	2 Tralee St, Hume	Log Sawmilling	2006/2007	550	West
HMAS Harman	Canberra Avenue, Harman	Defence	2015/2016	820	North

Facility Name	Address	Primary ANZSIC Class	Latest Report	Distance from Site (m)	Direction
Mugga Lane Landfill	Mugga Lane, Canberra	Waste Treatment and Disposal Services	2018/2019	1400	West
Mugga Lane	Mugga La, Symonston	Other Electricity Generation	2018/2019	1400	West
Queanbeyan Quarry	50 Royalla Road, Queanbeyan	Gravel and Sand Quarrying	2018/2019	1700	West

7.2.6 Licencing under the POEO Act 1997

A search of the NSW EPA record of licensed activities under the *Protection of the Environment Operations Act 1997* indicate no licence, approval and notices has been identified for the site and 500 m buffer.

7.2.7 Delicensed Premises Still Regulated by EPA, Licences Surrendered, Clean Up and Penalty Notices

No clean-up and penalty notice was identified for the site and a 1 km buffer based on a search of the NSW EPA record of licensed activities under the *Protection of the Environment Operations Act 1997*.

7.2.8 Defence / UXO Sites

A search of Department of Defence databases for Defence or UXO impacted sites within the Site or surrounding 2000 m buffer area identified the following:

Table 9: Summary of Department of Defence Records relating to potential Unexploded Ordnance (UXO)

Site Name	Type	Details	Distance (m)	Direction
■ Canberra; HMAS Harman and Bonshaw receiver	■ RCIP*	<ul style="list-style-type: none"> ■ The property covers approximately 250 hectares and comprises office buildings, training facilities, accommodation blocks, workshop, recreational facilities and a former pistol range. ■ Activities for potential sources of contamination include bulk storage and distribution of petrol and diesel in underground storage tanks (USTs). Fill material from unknown origins was used for building. This fill may contain polychlorinated biphenyls (PCBs) due to historical use as a receiving station. ■ The former Pistol firing range was decommissioned in 2009, and also a landfill. The landfill area was investigated and remediated at the base for redevelopment in 2010. Hydrocarbon was identified in groundwater in the vicinity of former USTs, however, concentration were below the adapted investigation level. 	■ 820	■ North

* RCIP (Regional Contamination Investigation Program), UXO (Unexploded Ordnance Areas)

7.2.9 Historical Landfills

No historical landfills have been identified for the site and 500 m buffer area.

7.2.10 Search of Potentially Contaminating Activities

A search of other current potentially contaminating activities undertaken for the site and 500 m buffer area identified the following sites:

Table 10: Summary of Potentially Contaminating Activities from Public Searches

Site Name	Category	Location	Status	Distance (m)	Direction
7-Eleven Jerrabomberra	Petrol station	2 Ferdinand Lane, Jerrabomberra, 2619, NSW	Operational	0	Onsite
Woolworths Caltex Jerrabomberra	Petrol station	2 Limestone Drive, Jerrabomberra	Operational	160	East
Suez Services Centre	Waste management facility	11 Alderson Place, Hume	Operational	250	West
Tralee (TRAL)	Telephone Exchange	24 Rosewood Glen, Jerrabomberra	Operational	495	East

7.2.11 Other Current Potentially Contaminating Activities

A search for potentially contaminating activities undertaken for the site and 200 m buffer area identified the following sites, as described in Appendix A:

Table 11: Summary of Other Potentially Contaminating Activities

Site Name	Category	Location	Status	Distance (m)	Direction
HDM Metal	Manufacturer	16 Arnott St, Hume ACT 2620	Current	89	West
Acrow Formwork & Scaffolding Pty Ltd	Scaffolding Hire Service	15A Sleigh pl, Hume ACT, 2620	Current	100	West
Irwin & Hartshorn	Demolition contractor	12 Alderson pl, Hume ACT, 2620	Current	110	West
Cummins Canberra	Manufacturer	15 Arnott St, Hume ACT 2620	Current	111	West
Lo Pilato Bros	Landscaping Supply store	13 Arnott St, Hume ACT 2620	Current	113	West
InfraBuild Steel Centre-Canberra	Steel distributor	Johns Pl, Hume ACT 2620	Current	119	West
Pacific Formwork	Industrial building	10 Johns Pl, Hume ACT 2620	Current	122	West
Sodablast Canberra	Sandblasting service	7/23 Raws Cres, Hume ACT 2620	Current	123	West
Revlon	Warehouse	31-45 Raws Cres, Hume ACT 2620	Current	126	West
ShelvMaster	Shelving store	Unit 2/21 Raws Cres, Hume ACT 2620	Current	128	West
HDM Metal	Steel fabricator	27 Raws Cres, Hume ACT 2620	Current	131	West
Adams Bikes	Bicycle Shop	4/21 Raws Cres, Hume ACT 2620	Current	134	West

Site Name	Category	Location	Status	Distance (m)	Direction
Coates Hire Hume (P)	Equipment rental agency	47 Alderson Pl, Hume ACT 2620	Current	136	West
Downer Hume Asphalt Plant	Asphalt Plant	36 Sawmill Cct, Hume ACT 2620	Current	139	West
Waco Kwik form Canberra	Scaffolding Hire Service	17 Sheppard St, Hume ACT 2620	Current	143	West
Toll Express	Logistics service	44-50 Sawmill ACT, Hume ACT 2620	Current	146	West
Statewide Frames & Trusses	License Plate frames supplier	5a/15 Sheppard St, Hume ACT 2620	Current	151	West
Grace Removals Canberra	Removalist	54 Sawmill Circuit, Hume ACT 2620	Current	158	West
Optus	Telecommunication	47 Raws Cresent, Hume ACT 2620	Current	165	West
Cloud Electrical Pty Ltd	Electrician	Unit 2/3 Sleigh Pl, Hume ACT 2620	Current	167	West
Alto Scaffolding	Scaffolding	15b Sleigh Pl, Hume ACT 2620	Current	173	West
National Storage Hume, Canberra	Self-storage facility	20 Alderson Pl, Hume ACT 2620	Current	188	West

7.2.12 Derelict Mines and Quarries

A search for potential derelict mines and quarries on site and within a 500m buffer area identified the following sites, as described in Appendix A:

Table 12: Summary of Potential Derelict Mines and Quarries

Site Name	Description	Distance (m)	Direction
Tralee Sand & Gravel Pit	Location of operation given as Tralee. Property named Tralee is located south of Jerrabomberra Creek near NSW ACT border. Material extracted is sand and river gravel. Exact location unknown, possibly on Jerrabomberra Creek but unlikely.	0	Onsite
Tralee	Previously in Yarrowlumla Shire S117, shire boundary changed in 1995. CSR informed NSW in March 1999 that they don't have any intention of developing a quarry on the site and are in the process of relinquishing their leases and caveats.	50	South
Jerrabomberra Prospect	GS1971/653-anomalous stream sediments with follow up rock chips to: 5ppm Ag, 80 ppm Cu, 1400ppm Pb, 5500ppm Zn, 358 ppm As, 3100 ppm Mn. Gossans are located in a picnic area of the municipality of Queanbeyan.	287	East

7.3 Summary of Desktop Review

The results of the investigation indicated the following:

- The site is located in an area comprising primarily agricultural and undeveloped land uses with the township of Jerrabomberra located adjacent to the north east of the Site.
- Desktop search results identified a number of potential significant flora / fauna species and ecological communities that may require further consideration during any potential future operational expansion planning.
- The site is underlain by Adaminaby, Alluvium and Douro Group geological formations from the lower Ordovician, Quaternary, and Upper Silurian period. Soil landscapes within the Site were described as including Williamsdale, Burra, Ginninderra Creek, Luxor Variant B, Campbell etc.
- Groundwater within the site and surrounding area was measured to be present within underlying aquifers at depths ranging from 7 – 40.2 mbgl. Groundwater bores within the Site and surrounding area were identified to be utilised for a range of uses including monitoring, exploration, irrigation of agriculture and domestic water supply.
- Several surface water dams were located throughout the Site. During periods of rainfall, it is the opinion of ERM that surface waters would infiltrate the site surface or flow via overland flow paths / ephemeral drainage lines to onsite dams and / or adjacent surface water receiving bodies located on the northern and western boundary of the Site.
- The site and surrounding area has been primarily agricultural land since the earliest aerial photography records (1961). ERM notes that some minor commercial / industrial land uses have been undertaken within the site and surrounding area however specific details on the nature of these operations is unknown.
- There are known contaminated sites located adjacent to the northern boundary of the RJP where contaminated groundwater is present. Whilst this is unlikely to represent a risk to ongoing use of the land within the RJP, there is potential for draw-down of contamination if groundwater is extracted for beneficial re-use within the RJP.

7.4 RJP Conceptual site model

The following summary of the CSM for the South Jerrabomberra RJP has been prepared based on the desktop assessment, site inspection and preliminary sampling as discussed in the above sections. The location of the potential sources of contamination area is illustrated in Figure 7.

7.4.1 Potential Sources of Contamination

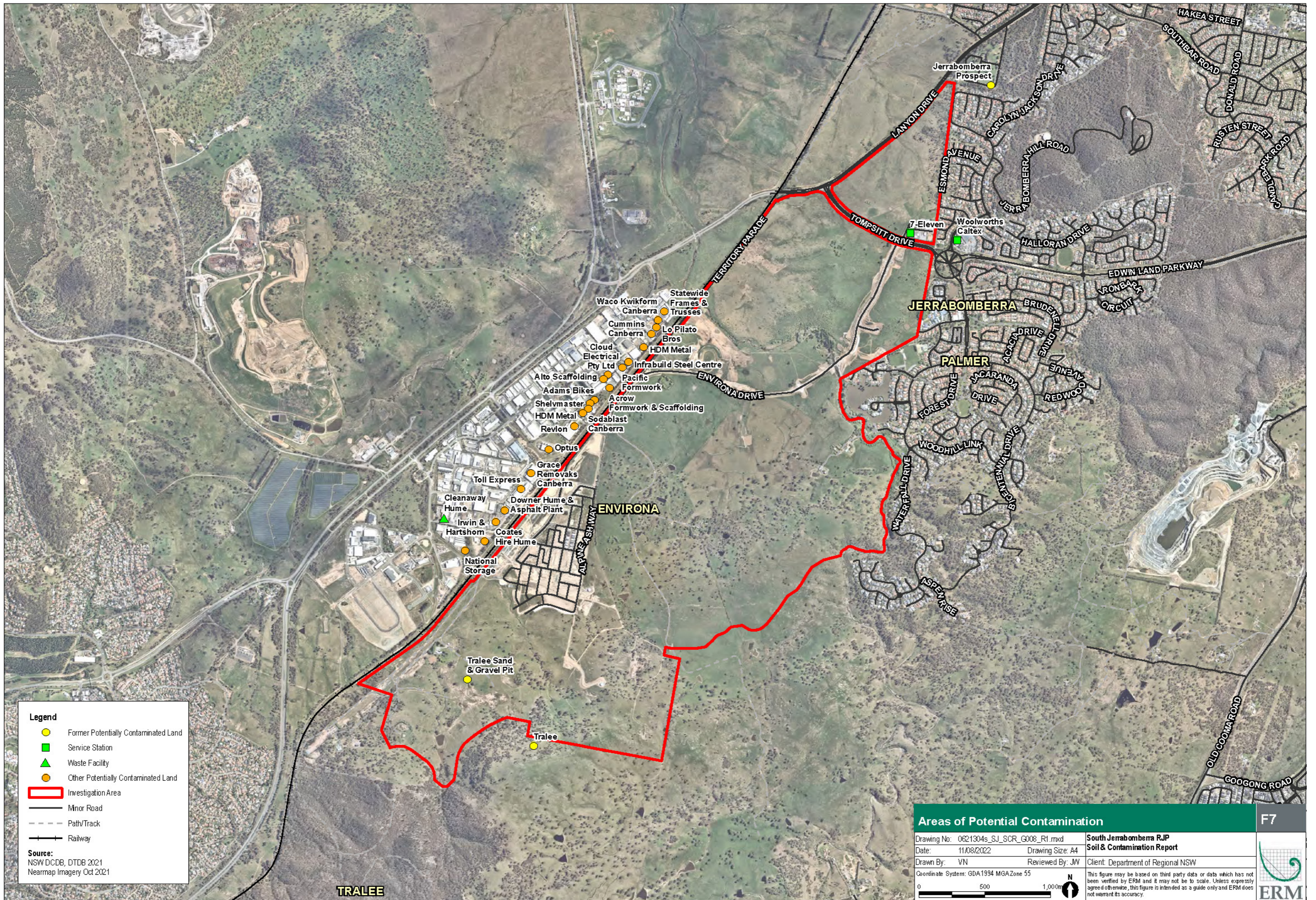
Based on the site history and background data reviewed and ERM's professional experience, the Contaminants of Potential Concern (CoPC) associated with current and historical land uses undertaken in the general area are considered to include the following:

Table 13: Potential Sources of Contamination

Potential Source	CoPC	Comment
AEC – 1 Tralee Sand & Gravel Pit	<ul style="list-style-type: none"> ■ Petroleum hydrocarbons ■ Polycyclic aromatic hydrocarbons (PAHs) (e.g., creosote, naphthalene) ■ Monocyclic aromatic hydrocarbons benzene, toluene, ethylbenzene and xylenes (BTEX) ■ Asbestos ■ Polychlorinated biphenyls (PCBs) ■ Metals (e.g., copper, lead) 	<ul style="list-style-type: none"> ■ Located on the Site ■ Gravel and sand quarrying ■ Potential leaks from waste disposal ■ Onsite fuel and chemical storage ■ Leaks and spills of fuels / chemicals associated with refuelling and maintenance ■ Hazardous materials associated with degrading building structures.
AEC – 2 7-Eleven Jerrabomberra	<ul style="list-style-type: none"> ■ Petroleum hydrocarbons ■ total recoverable hydrocarbons (TRH) ■ semi-volatile organic compounds (SVOCs) ■ Volatile Organic Compounds (VOCs) ■ Total Dissolved Solids (TDS) ■ Methyl tertiary-butyl ether and other oxygenates ■ Metals (e.g., barium, cadmium, copper, lead, nickel, zinc) ■ Solvents such as trichloroethene (TCE) ■ PAHs & BTEX ■ Heavy Metals ■ Oil and grease 	<ul style="list-style-type: none"> ■ Service station and fuel storage facilities located on the site, currently operational ■ Leaks and spills of fuels / chemicals associated with refuelling and maintenance ■ Hazardous materials associated with degrading building structures.

Potential Source	CoPC	Comment
AEC – 3 On-site Commercial / Industrial Land Uses	<ul style="list-style-type: none"> ■ TCE ■ PAH & BTEX ■ Metals ■ Ammonia ■ Asbestos ■ TRH ■ VOCs & SVOCs ■ phenols ■ Landfill gases ■ TDS; and ■ PFAS 	<ul style="list-style-type: none"> ■ Onsite fuel and chemical storage ■ Leaks and spills of fuels / chemicals associated with refuelling and maintenance ■ Hazardous materials associated with degrading building structures.
AEC – 4 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc.	<ul style="list-style-type: none"> ■ Asbestos, ■ heavy metals; and ■ PCBs 	<ul style="list-style-type: none"> ■ Potential building waste from demolition of former building structures located within the Site and adjacent area. ■ Potential redundant service lines / conduits
AEC – 5 Sewer / Septic Lines and Tanks	<ul style="list-style-type: none"> ■ Pathogens (E Coli and Enterococci) ■ Nutrients (Phosphorus, Nitrates, Nitrogen); and ■ Heavy Metals. 	<ul style="list-style-type: none"> ■ Potential leaks from current and former sewer lines / septic tanks within the site
AEC – 6 General Site Usage	<ul style="list-style-type: none"> ■ TRH, ■ PAHs & BTEX, ■ Solvents, ■ Chlorinated Hydrocarbons (CHC), ■ Heavy Metals, ■ PFAS, ■ PCBs, ■ OCP/OPP, ■ Herbicides, ■ Phosphates, ■ Nutrients; and ■ Asbestos. 	<ul style="list-style-type: none"> ■ Potential use of nutrients / fertilisers within irrigated portions of Site ■ Current and historical agricultural land uses ■ Area of excavation / clearing located within central portion of the Site ■ Current / former farm dams collecting potential contaminated surface water run off

Potential Source	CoPC	Comment
AEC – 7 Surrounding Agricultural and Commercial Industrial Land Uses	<ul style="list-style-type: none"> ■ Ammonia ■ Asbestos ■ Boron ■ Cresols ■ Landfill gases ■ Metals ■ Methyl tertiary-butyl ether and other oxygenates ■ Nutrients (Phosphorus, Nitrates, Nitrogen) ■ Oil and grease ■ Organochlorine pesticides (OCP) & Organophosphorus Pesticides (OPP) ■ PAHs & BTEX ■ Pathogens ■ Petroleum hydrocarbons ■ PFAS ■ phenols ■ SVOCs ■ TCE ■ TDS ■ TRH ■ VOCs & SVOCs 	<ul style="list-style-type: none"> ■ General use of the site prior to current operational uses and agricultural land uses undertaken within the surrounding area. ■ Hamas Harman (North), Queanbeyan Quarry (east), Koppers, Hume (west), Hume Asphalt Plant (west), Integrated Forest Products (West), Mugga Lane Landfill (west); all are located downstream to the Site ■ Electricity generation ■ Fill material from unknown origin ■ Gravel and sand quarrying ■ Hazardous materials associated with degrading building structures. ■ Leaks and spills of fuels / chemicals associated with refuelling and maintenance ■ Onsite fuel and chemical storage ■ Potential leaks from current and former sewer lines / septic tanks within the site ■ Potential leaks from PFAS and AFFF ■ Waste treatment and disposal



Legend

- Former Potentially Contaminated Land
- Service Station
- ▲ Waste Facility
- Other Potentially Contaminated Land
- Investigation Area
- Minor Road
- Path/Track
- Railway

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Areas of Potential Contamination		F7
Drawing No: 0621304s_SJ_SCR_G008_R1.mxd	South Jerrabomberra RJP	
Date: 11/08/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	
Coordinate System: GDA1994 MGAZone 55	Client: Department of Regional NSW	
0 500 1,000m N 		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

7.4.2 Potential Pathways

The primary potential exposure pathways of concern at the site are:

- Inhalation of vapour (from soil and/or groundwater) and contaminated dust (from soils).
- Dermal contact and / or incidental ingestion with contaminated surface water and soils / sediments.
- Transport of contamination through surface water flows.
- Transport of contamination to underlying groundwater aquifers.
- Transport of contaminants through mechanical transport (i.e., excavation, tracking during vehicle movement etc.).

7.4.3 Potential Receptors

Key receptors have been identified as:

- Current site users (agricultural, residential and commercial / industrial).
- Future site users (agricultural, residential and commercial / industrial).
- Potential future users of groundwater (identified use of groundwater for a range of purposes).
- Workers carrying out construction, installation or maintenance works within the site.
- Groundwater beneath the site.
- Adjacent sensitive receptors e.g., adjacent residents, cattle (or other grazing animals) and sensitive ecological receptors.

7.4.4 Preliminary Conceptual Site Model

Based on the results of the desktop assessment, site inspection and the potential sources, pathways and receptors identified above, ERM developed the below Conceptual Site Model (CSM). A preliminary assessment of the potentially complete pollutant linkages is provided in the table below based on the following risk-based parameters:

- Low – no known or suspected sources
- Low – known or suspected sources but actively being monitored or managed to reduce potential for complete pollutant linkage
- Moderate – potential or known sources of contamination with limited information available to assess and pollutant linkages unlikely to be complete under on-going land-use
- High – known source of contamination and actual or potential for exposure pathways to receptors and/or off-site migration

Table 14: Preliminary Conceptual Site Model

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage
AEC – 1 Tralee Sand & Gravel Pit	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
AEC – 2 7- Eleven Jerrabomberra	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Low
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Low
	<ul style="list-style-type: none"> ■ Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Low
AEC – 3 On- site Commercial /	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and 	<ul style="list-style-type: none"> ■ Moderate

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage
Industrial Land Uses		<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Moderate
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate
AEC – 4 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc.	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate - High
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate - High
AEC – 5 Sewer / Septic Lines and Tanks	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> moderate
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage
AEC – 6 General Site Usage	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
AEC – 7 Surrounding Agricultural and Commercial Industrial Land Uses	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Low
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate
	<ul style="list-style-type: none"> ■ Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> ■ Moderate – High

8. REVIEW OF MASTER PLAN MASTER PLAN

8.1 Review of Master Plan and Potential Constraints

The following section outlines the potential constraints identified in the review of the proposed Master Plan (August 2022) in light of the preliminary assessment of soil and contamination presented above in this report. The proposed Master Plan is presented in Figure 8.

8.2 Salinity

Based on regional soil mapping, no salinity hazard was identified for the soil landscapes within the investigation area. The salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan.

In addition to the above, it is noted that salinity conditions are dependent on several variables, which include surface water infiltration to soil and groundwater levels which may be modified by development in the area. The application of the principles of Water Sensitive Urban Design should be considered in the proposed development areas to mitigate potential changes to soil water levels and salinity conditions in the catchment. The impact of the extraction of groundwater for beneficial re-use on catchment level salinity conditions should also be considered, and groundwater monitoring for salinity should be considered as part of a hydrogeological assessment for beneficial re-use.

8.3 Acid Sulfate Soils Potential Constraints

No significant risk of acid sulfate soil was identified within the Site nor within a 200 m buffer zone based on the available Acid Sulfate Soil risk maps. The Atlas of Australian Acid Sulfate Soil indicates that there is an extremely low probability for acid sulfate soils occurring within the Site. The potential risk of acid sulfate soils is unlikely to represent a significant constraint on the proposed Master Plan.

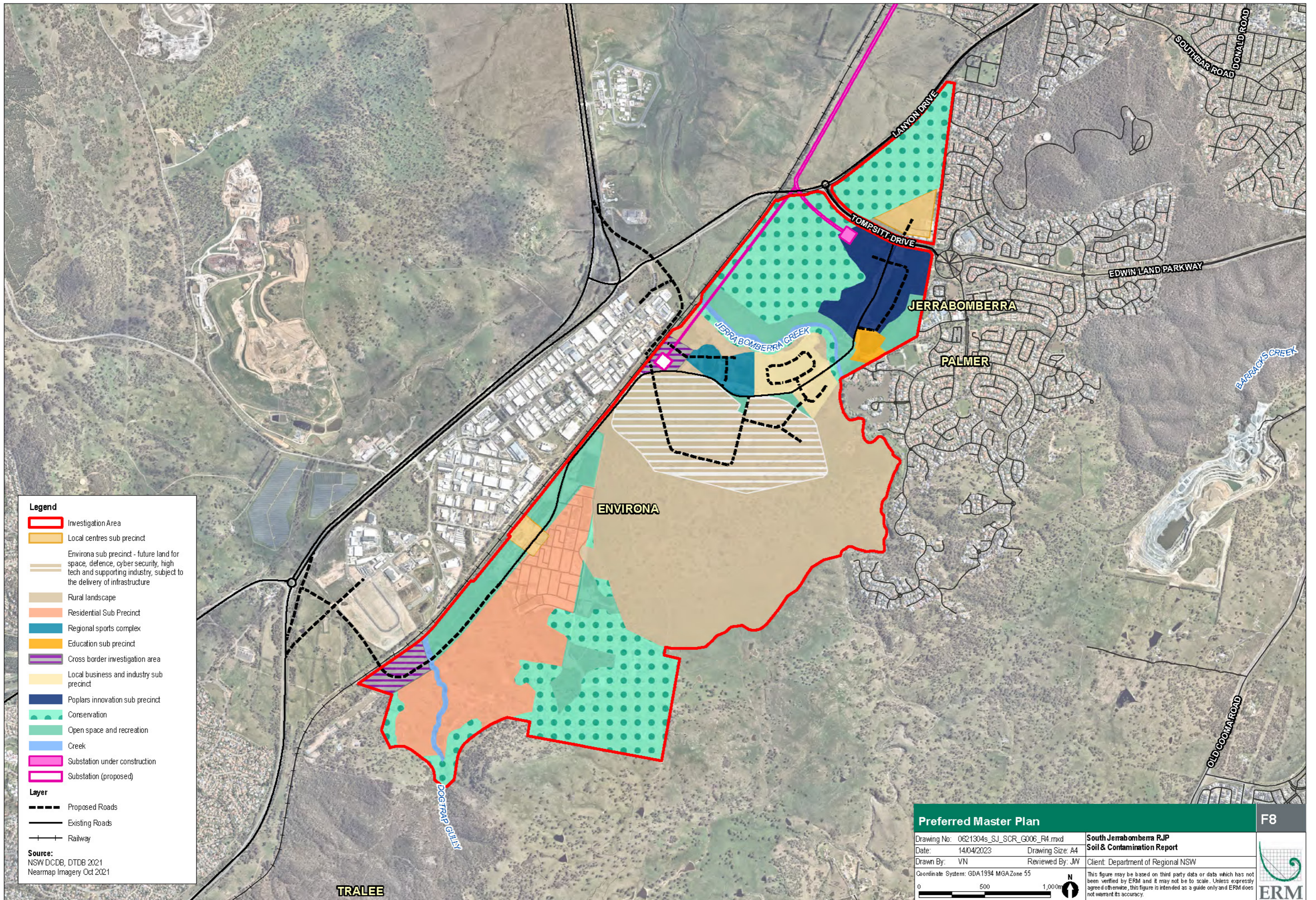
8.4 Contamination Potential Constraints

8.4.1 Potential for Contamination

Based on the findings of the desktop review, the following areas of potential contamination have been identified within the South Jerrabomberra RJP:

- Specific sites which are currently or formerly operated potentially contaminating industries and/or activities (as listed in Appendix 1 of the Land Contamination Planning Guidelines (Draft)), have the potential for contamination to be present:
 - Tralee Sand & Gravel Pit
 - 7-Eleven Jerrabomberra
 - On-site Commercial / Industrial Land Uses
- The remaining land has the broad potential for contamination associated with:
 - Built structures and/or infrastructure (current), which may include hazardous building materials (such as asbestos, lead paints, PCBs) that may pose a risk if demolished in an uncontrolled manner;
 - General rural use sites which may currently or formerly had chemical storage and use including but not limited to underground or above-ground chemical storage tanks;
 - Remains of built structures and/or infrastructure which have been demolished in an uncontrolled manner, which may include hazardous building materials (such as asbestos); and
 - Uncontrolled waste dumping.

- Contaminated groundwater associated with known contaminated sites to the north of the RJP. If beneficial re-use of groundwater within the RJP is proposed, further investigation would be required to assess potential for draw-down of existing contamination in groundwater associated with contaminated sites outside the RJP. Proposals for beneficial re-use of groundwater should avoid extraction of groundwater near known contaminated sites adjacent to the RJP.



Legend

- Investigation Area
- Local centres sub precinct
- Environa sub precinct - future land for space, defence, cyber security, high tech and supporting industry, subject to the delivery of infrastructure
- Rural landscape
- Residential Sub Precinct
- Regional sports complex
- Education sub precinct
- Cross border investigation area
- Local business and industry sub precinct
- Poplars innovation sub precinct
- Conservation
- Open space and recreation
- Creek
- Substation under construction
- Substation (proposed)

Layer

- Proposed Roads
- Existing Roads
- Railway

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Preferred Master Plan		F8
Drawing No: 0621304s_SJ_SCR_G006_R4.mxd	South Jenabomberra RJP	
Date: 14/04/2023	Soil & Contamination Report	
Drawn By: VN	Client: Department of Regional NSW	
Reviewed By: JW		
Coordinate System: GDA1994 MGAZone 55		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

8.4.2 Review of the Master Plan

The following section reviews the proposed changes to land-use under the Master Plan to inform the planning process. At this stage there is not a proposal to rezone land, however the following discussion is provided as it is relevant to the application of the Contaminated Land Planning Guidelines for proposed changes to land-uses at the strategic planning and rezoning stage.

The NSW Government (2018) Contaminated Land Planning Guidelines (Draft) provide further detail on the application of contamination assessments at the strategic planning and rezoning stage, including the general guidance on when a planning proposal to rezone land must be accompanied by a preliminary site investigation or detailed site investigation. The following table summarises the key aspects which the contaminated land planning guidelines (draft) recommends should be considered when preparing a planning proposal to rezone land:

Table 15 Strategic Planning and Rezoning Considerations

Contaminated Land Planning Guidelines	Applicability to RJP
land is significantly contaminated land within the meaning of the CLM Act	No site within the RJP has been identified as significantly contaminated within the meaning of the CLM Act.
an activity listed in the SEPP (as reproduced in Table 1 in Appendix 1 of Draft guidelines) is being carried out on the land and is potentially causing contamination	Some activities that may cause contamination include: <ul style="list-style-type: none"> ■ agricultural/horticultural activities ■ service stations
records show that a potentially contaminating activity has been carried out on the land	Potentially contaminating activities were identified as described in section 7.4.1 and summarised in Section 8.4.1.
there are incomplete records about the use of the land and during the periods not covered by those records, it would have been lawful to carry out a potentially contaminating activity	Available records have been reviewed.
the proposed rezoning, or proposed change to planning controls, would allow the land to be used for residential, educational, recreational or childcare purposes, or for the purposes of a hospital.	The Master Plan proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective. The exceptions to this are: <ul style="list-style-type: none"> ■ Areas proposed for recreational use which currently allow for industrial uses. The proposed changes to more sensitive land-uses are discussed further below and summarised in Table 8.3.

A high-level assessment of the potential for contamination and the proposed land-use changes in the RJP Master Plan has been undertaken to inform the planning process. As described in Section 8.4.1, there is potential for contamination to be present across the RJP associated with specific and non-specific activities and known contamination in groundwater outside the RJP which should be assessed further, as summarised in Figure 9 below.

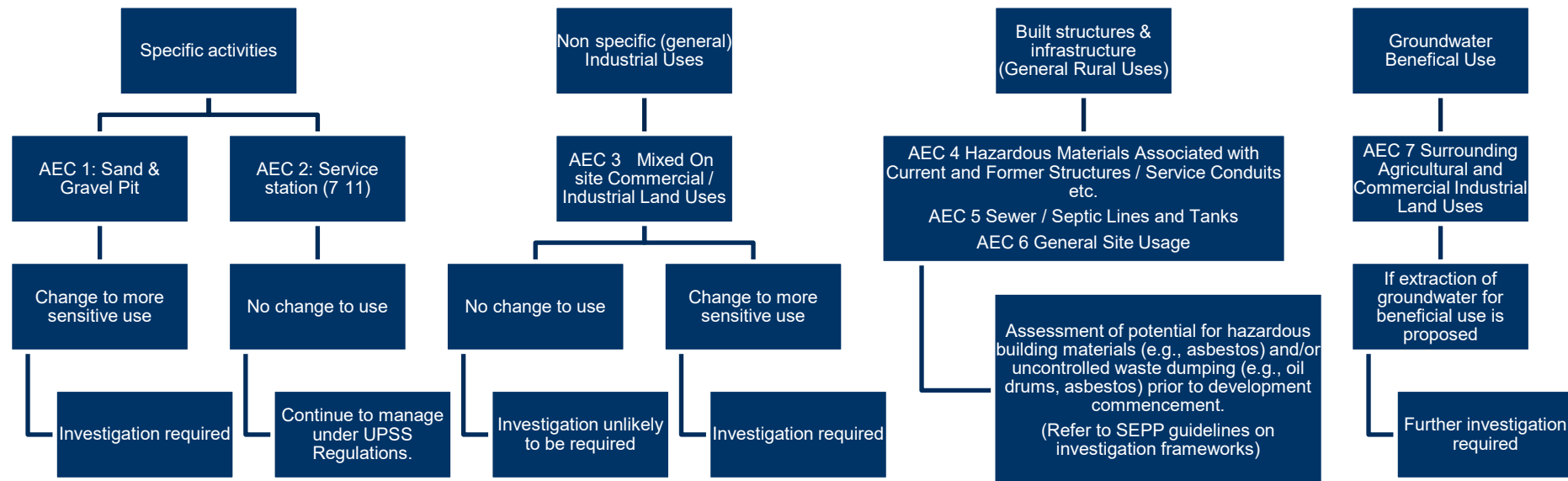


Figure 9: Summary of Likely Further Investigation Triggers

Note: Based on the available information at the time of this assessment on potential contamination and proposed land-use changes.

Based on the information in the preliminary site investigation, if further assessment is required, this can be undertaken by the proponent at the individual site level during the development application stage. Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required). The use of suitably qualified and experienced consultants (certified by a scheme currently recognised by NSW EPA) in conducting a third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent.

However, the draft Contaminated Land Planning Guidelines also advise the planning authority to consider whether appropriate provisions may be needed within the relevant environmental planning instrument or development control plan, where potentially contaminated land is suspected, to further investigate before land use changes occur.

The Master Plan (dated August 2022) proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective. The exceptions to this are areas proposed for recreational use which currently allow for industrial uses.

The triggers for further assessment of potential contamination are set out in Clause 4.6(4) of the SEPP. Generally, the triggers for further contamination assessment under Clause 4.6(4) of the SEPP would only be met where the proposed changes to land-use under the Master Plan for the RJP are (i) for residential, educational, recreational or child care purposes or for the purpose of a hospital; AND (ii) the land is currently or formerly used for potentially contaminating activities (as listed in Table 1 of Appendix 1 to the contaminated land planning guidelines).

In addition to the above it is important to note that there is broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping. This potential contamination should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Land Contamination Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) and/or uncontrolled waste dumping (e.g., oil drums, asbestos) prior to development commencement. A clear framework for management of these risks is needed for public safety and to mitigate the potential for substantial cost and time delays. Given the staging of the works (over a period of up to 20 years for different precincts), investigations would be best placed as the development/planning progresses to accommodate the likely changes to land that will occur over that time (i.e., ongoing activities may generate change in contamination potential).

As the planning process for the RJP is ongoing, the assessment of potential contamination should be considered at the relevant stages of the process with consideration of the guidance in the contaminated land planning guidelines, including the considerations for decision making in the planning proposal and rezoning process and the development assessment process (as summarised in Figure 10 and Figure 11 below, sourced from Figure 1 and Figure 2 of Contaminated Land Planning Guidelines (Draft)).

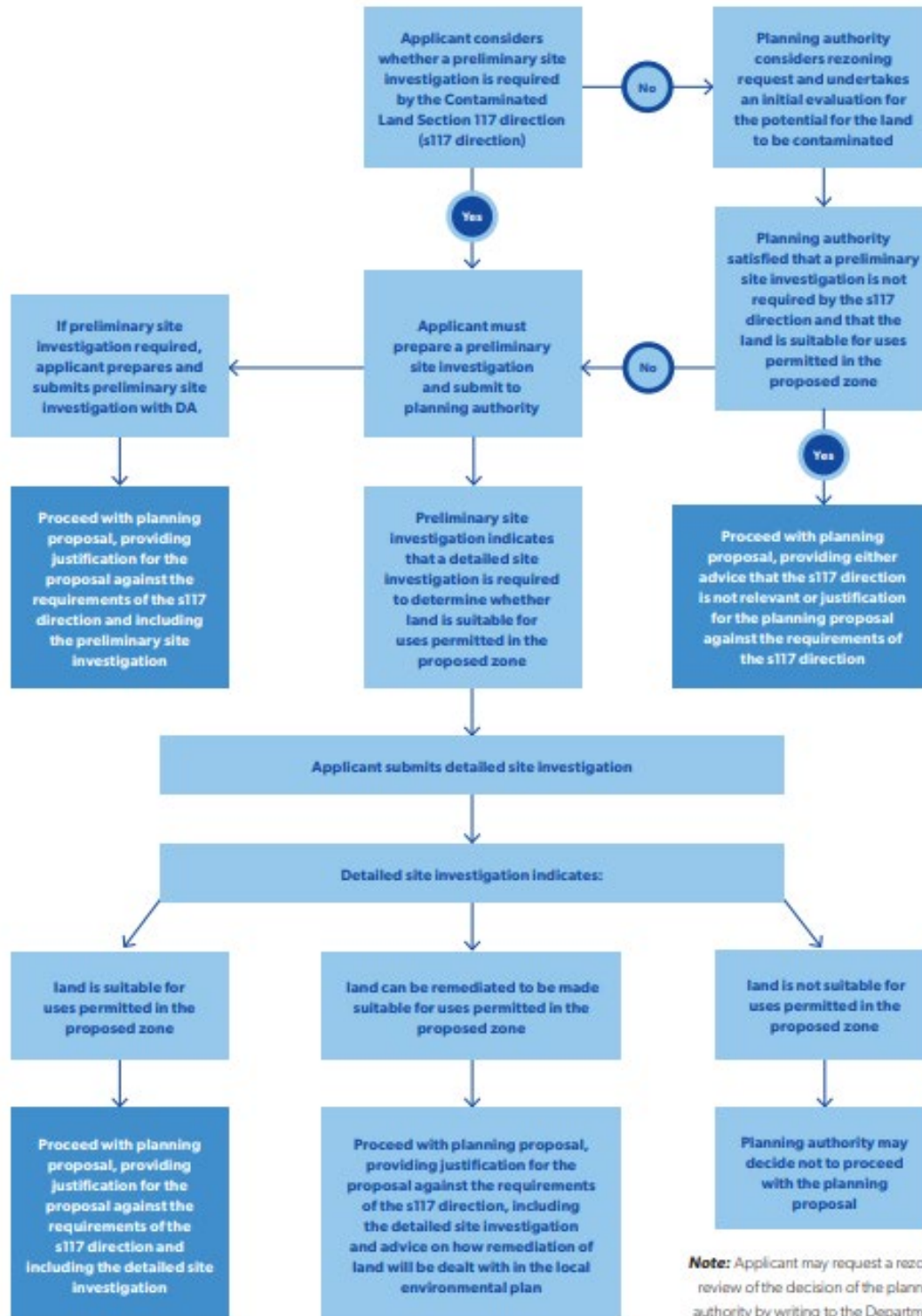


Figure 10: Considering contamination issues in the planning proposal and rezoning process. Source: Figure 1 of the NSW Government (2018) Contaminated Land Planning Guidelines (Draft).

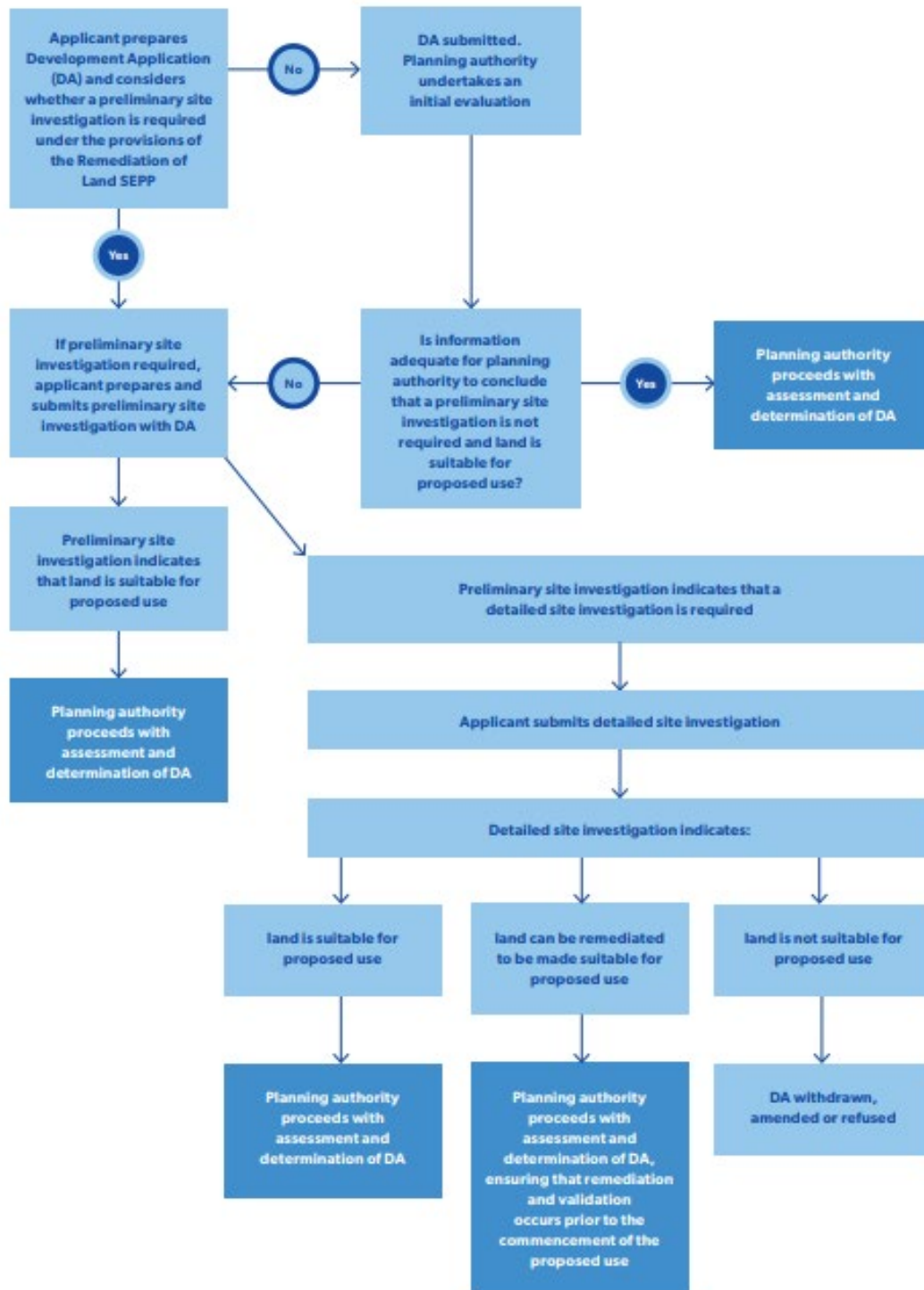


Figure 11: Considering contamination issues in the development assessment process. Source: Figure 2 of NSW Government (2018) Contaminated Land Planning Guidelines (Draft).

A high-level summary of the proposed land-use changes under the Master Plan and the triggers under the SEPP is detailed in Table 17. We note that the Master Plan describes the sub-precincts' proposed general activities, and that no changes to zoning are specified at this stage such that there is limited detail on permissible uses to inform the understanding of which areas may be used for more sensitive concurrent land-uses. For example, whilst the education precinct has been defined, there is potential that child-care centres may be concurrently located with commercial or residential uses within a sub-precinct at a later stage such as "Local Activity Centre".

The Master Plan proposes sub-precincts with further detail on the specific land-uses and/or permissible activities to be finalised at a later stage of the planning process. In order to support this review, the risk based land-use categories defined in the ASC NEPM for development of the health investigation levels (HILs) have been provisionally applied to assist in developing assumptions for this review. Based on the information in the Master Plan, Table 16 below summarises the current understanding of the potential land-uses in the proposed sub-precincts, as they relate to the land-use contexts applied in the risk assessment process of the ASC NEPM.

Table 16 Land-use Categories

Master Plan Land-use	ASC NEPM Land-use
Green Infrastructure Conservation	Environmental Conservation – no public access
Open space precinct	Open space–public access for recreational use (Recreational HIL-C)
Local activity Centres Sub Precinct Defence & Technology Sub Precinct Local Business & Industry Sub Precinct High Amenity Business Areas	Commercial/Industrial (HIL-D) If other more sensitive concurrent uses such as child-care centres may be present, residential with no accessible soils (Residential HIL-B) as applicable for educational uses.
Education Sub-Precinct	Residential with accessible soils (Residential HIL-A) or residential with no accessible soils (Residential HIL-B)
Residential Sub-precinct	Residential with accessible soils (HIL-A) or residential with no accessible soils (Residential HIL-B)
Rural Landscape Sub Precinct	Applies to the balance of unplanned lands not proposed for urban development. We assume this means no change to the existing land-use.

Table 17 Summary of Proposed Master Plan and Contamination Assessment Triggers in SEPP (Resilience and Hazards)

Potential Contamination	Potential Sources of Contamination from CSM	Current Zoning	Master Plan Proposed Changes to Land Use	Does the Master Plan Trigger Contamination Assessment in accordance with SEPP (Resilience and Hazards)?
Specific activities	Tralee Sand & Gravel Pit	R2 Low Density Residential	Residential Sub Precinct	The area is currently predominantly undeveloped, and the desktop assessment identified a former sand and gravel pit operation, and other areas appear to have been used for general rural industrial uses (truck and stockpile areas). Further assessment should be considered for sensitive land-use change (i.e., residential development). Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.
	7-Eleven Jerrabomberra	B1 Neighbourhood Centre	No change	No changes proposed under Master Plan
Non-specific (general) Industrial Uses	AEC 3 – Mixed On-site Commercial / Industrial Land Uses	B1 Neighbourhood Centre	Local Activity Centres Sub-Precinct	No change in zoning. Apply principles of SEPP (Resilience and Hazards) Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement. Consideration to be given to assessments for more sensitive land-use changes, such as construction of daycare centre, which are permissible within this zone.
		B4 Mixed Use	Defence & Technology Sub Precinct	
		B7 IN2 Light Industrial	High Amenity Business Areas Local Business & Industry Sub Precinct	
		IN2 Light Industrial	Open Space Sub Precinct	Yes Change to a more sensitive land-use (recreation), which may trigger assessment under SEPP (Resilience and Hazards). Further assessment may be required to assess potential contamination under public recreational uses. Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.
		RU2 Rural Landscape		

Potential Contamination	Potential Sources of Contamination from CSM	Current Zoning	Master Plan Proposed Changes to Land Use	Does the Master Plan Trigger Contamination Assessment in accordance with SEPP (Resilience and Hazards)?
Built structures & infrastructure (General Rural Uses)	AEC – 4 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc. AEC – 5 Sewer / Septic Lines and Tanks AEC – 6 General Site Usage	DM	Green Infrastructure Conservation Sub Precinct	Proposed for conservation (no development proposed under Master Plan). Investigation may be required if visual observations indicate potential for contamination (e.g., unauthorised waste dumping). Consideration to be given to potential contamination investigation if the area is intended for public recreational use.
			Defence & Technology Sub Precinct Local Business & Industry Sub Precinct	Proposed for predominantly commercial and industrial uses which are generally not more sensitive than the current land-use If the land is to be proposed for development of concurrent uses which are more sensitive such as child-care, school or health facility, this may trigger assessment under SEPP (Resilience and Hazards). Consider need for further assessment based on the intended use and potential exposure setting and apply principles of SEPP (Resilience and Hazards). Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) or uncontrolled waste dumping prior to development commencement.
			Rural Landscape Sub Precinct	Applies to the balance of unplanned lands not proposed for urban development. We assume this means no change to the existing land-use. Depending on the intended specific use, consider need for further assessment based on the intended use and potential exposure setting and apply principles of SEPP (Resilience and Hazards). Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) or uncontrolled waste dumping prior to development commencement.
		R2 Low Density Residential	Residential Sub-Precinct	Areas which are currently zoned R2 which are not proposed to change, but which are currently not developed. As this land is currently vacant, consideration should be given to the need for assessment of impacts from built infrastructure and potential uncontrolled waste dumping. Apply principles of SEPP (Resilience and Hazards) Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.

Potential Contamination	Potential Sources of Contamination from CSM	Current Zoning	Master Plan Proposed Changes to Land Use	Does the Master Plan Trigger Contamination Assessment in accordance with SEPP (Resilience and Hazards)?
		RE2 Private Recreation	Open Space	<p>Areas which are currently zoned RE2 which are not proposed to change, but which are currently not developed. As this land is currently vacant, consideration should be given to the need for assessment of impacts from built infrastructure and potential uncontrolled waste dumping, in particular the areas adjacent to the railway corridor.</p> <p>Apply principles of SEPP (Resilience and Hazards)</p> <p>Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.</p>
		C2 Environmental Conservation	Conservation	<p>Proposed for conservation (no development proposed under Master Plan).</p> <p>Investigation may be required if visual observations indicate potential for contamination (e.g., unauthorised waste dumping). Consideration to be given to potential contamination investigation if the area is intended for public recreational use.</p>
Regional Groundwater	AEC 7 – contaminated groundwater located to the north of the RJP			<p>If groundwater extraction for beneficial re-use is proposed, an assessment should be undertaken for draw-down of groundwater contamination associated with industrial land to the north of the RJP.</p>

In summary:

There is potential for contamination to be present across the RJP associated with specific and non-specific activities, and there is broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping.

Where a change to a more sensitive land-use is proposed, as summarised in Table 17, further assessment may be required. This can be undertaken by the proponent at the individual site level during the development application stage. However, it is noted that the draft Contaminated Land Planning Guidelines also advise the planning authority to consider whether appropriate provisions may be needed within the relevant environmental planning instrument or development control plan, where potentially contaminated land is suspected, to further investigate before land use changes occur.

Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required). The use of suitably qualified and experienced consultants (certified by a scheme currently recognised by NSW EPA) in conducting a third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent.

There is a broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping, which should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. Given the staging of the works (over a period of up to 20 years for different precincts), investigations would be best placed as the development/planning progresses to accommodate the likely changes to land that will occur over that time (i.e., ongoing activities may generate change in contamination potential). A clear framework for management of these risks is needed for public safety and to mitigate the potential for substantial cost and time delays and can be developed to fit within the planning process framework.

There is known contamination in groundwater outside the RJP which should be assessed further if groundwater extraction for beneficial re-use is proposed. An assessment should be undertaken for draw-down of groundwater contamination associated with industrial land to the north of the RJP. This can be undertaken concurrent with other groundwater investigations for the RJP.

9. CONCLUSIONS AND RECOMMENDATIONS

ERM was engaged by DRNSW to prepare a Technical Report focused on contamination, soils, and geology for the area identified as the South Jerrabomberra RJP (the Site).

This Technical Report provides an analysis of soils, contamination and geology issues at the Site to aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues with the South Jerrabomberra RJP. This technical report has been designed to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development of the master plan.

In summary, this report has identified the following constraints which should be considered as part of the development of the master plan:

- Based on regional soil mapping, no salinity hazard was identified for the soil landscapes within the investigation area. The salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan.
- Based on regional soil mapping, there is an extremely low to low probability for acid sulfate soils occurring. The potential risk of acid sulfate soils is unlikely to represent a significant constraint on the proposed Master Plan.
- Potential contamination was identified based on the desktop review (no sampling was undertaken) at specific sites which currently (or formerly) operate potentially contaminating industries and/or activities, including:
 - Tralee Sand & Gravel Pit
 - 7-Eleven Jerrabomberra
 - On-site Commercial / Industrial Land Uses
- The remaining land has the broad potential for contamination associated with hazardous building materials (such as asbestos) associated with built structures and/or infrastructure (current or former), chemical storage and use including but not limited to underground or above-ground chemical storage tanks, uncontrolled waste dumping.
- In addition to the above it is important to note that there is a broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping, which should be assessed further prior to approval of development to prevent potential exposure to contamination hazards.
- Contaminated groundwater associated with known contaminated sites to the north of the RJP. If beneficial re-use of groundwater within the RJP is proposed, further investigation would be required to assess potential for draw-down of existing contamination in groundwater associated with contaminated sites outside the RJP. Proposals for beneficial re-use of groundwater should avoid extraction of groundwater near known contaminated sites adjacent to the RJP.

The following recommendations should be considered during the appropriate phases of the planning process:

- The potential impact of existing contaminated groundwater outside the RJP (adjacent industrial sites north of the RJP) on the quality of extraction of groundwater for beneficial re-use should be further investigated concurrent with the hydrogeology assessment.
- The Master Plan proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective. The exceptions to this are:
 - Areas proposed for recreational use.

- The Master Plan proposes key changes to zoning which may trigger the following key decision points:
 - Where the land is proposed for sensitive land-uses such as recreation and zones which permit child-care centres or educational facilities, further assessment may be triggered under the SEPP; and
 - Where the land is currently used for potentially contaminating activities and change is proposed under the Master Plan to a similar or less sensitive land-use, further assessment may not be triggered under the SEPP, but we note that due diligence is advised and consideration should be given to the overarching principles of the SEPP.
- In addition to the above it is important to note that there is broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping. This potential contamination should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Land Contamination Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) and/or uncontrolled waste dumping (e.g., oil drums, asbestos) prior to development commencement. A clear framework for management of these risk is needed for public safety and to mitigate the potential for substantial costs and time delays.
- If further assessment is triggered under the SEPP, this can be undertaken by the proponent at the individual site level during the development application stage. Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required). The use of suitably qualified and experienced consultants (certified by a scheme currently recognised by NSW EPA) in conducting a third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent.

IMPORTANT LIMITATIONS AND CONTEXT

1. This report is based solely on the scope of work described in *RJP Package B – Environmental Assessment at Richmond Valley, Albury and South Jerrabomberra Procurement Registration Number P21-3009 dated 20th September 2021 (Scope of Work)* and performed by Environmental Resources Management Australia Pty Ltd (**ERM**) for The Crown in right of the State of New South Wales acting through Regional NSW (ABN 19 948 325 463) (the **Client**). The Scope of Work was governed by a contract between ERM and the Client (**Contract**).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information, beyond that required by the Scope of Work.
4. This report was prepared between 13 October 2021 and 14 April 2022 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. This report is based on one or more site inspections conducted by ERM personnel, the sampling and analyses described in the report, and information provided by the Client or third parties (including regulatory agencies). All conclusions and recommendations made in the report are the professional opinions of the ERM personnel involved. Whilst normal checking of data accuracy was undertaken, except to the extent expressly set out in this report ERM:
 - a) did not, nor was able to, make further enquiries to assess the reliability of the information or independently verify information provided by;
 - b) assumes no responsibility or liability for errors in data obtained from,
the Client, any third parties or external sources (including regulatory agencies).
7. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
8. Only the environmental conditions and or potential contaminants specifically referred to in this report have been considered. To the extent permitted by law and except as is specifically stated in this report, ERM makes no warranty or representation about:
 - a) the suitability of the site(s) for any purpose or the permissibility of any use;
 - b) the presence, absence or otherwise of any environmental conditions or contaminants at the site(s) or elsewhere; or

- c) the presence, absence or otherwise of asbestos, asbestos containing materials or any hazardous materials on the site(s).
9. Use of the site for any purpose may require planning and other approvals and, in some cases, environmental regulator and accredited site auditor approvals. ERM offers no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environment works.
10. The ongoing use of the site or use of the site for a different purpose may require the management of or remediation of site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
11. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity, the report is not to be copied, distributed or referred to in part only. No responsibility or liability is accepted by ERM for use of any part of this report in any other context.
12. Except to the extent that ERM has agreed otherwise with the Client in the Scope of Work or the Contract, this report:
- a) has been prepared and is intended only for the exclusive use of the Client;
 - b) must not to be relied upon or used by any other party;
 - c) has not been prepared nor is intended for the purpose of advertising, sales, promoting or endorsing any Client interests including raising investment capital, recommending investment decisions, or other publicity purposes;
 - d) does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in or in relation to the site(s); and
 - e) does not purport to provide, nor should be construed as, legal advice.

APPENDIX A DESKTOP REVIEW



Due Diligence Insight Report

South Jerrabomberra RJP Investigation Area
South Jerrabomberra, NSW

19 November 2021





Understanding your report

Your Report has been produced by Land Insight and Resources (Land Insight).

Your Report is based on information available from public databases and sources at the date of reporting. The information gathered relates to land that is within a 200 to 2000m radius (buffer zone) from the boundaries of the Property. A smaller or larger radius may be applied for certain records (as listed under records and as shown in report maps).

While every effort is made to ensure the details in your Report are correct, Land Insight cannot guarantee the accuracy or completeness of the information or data provided.

The report provided by Land Insight includes data listed on page 4 (table of contents). All sources of data and definitions are provided in the Product Guide (Attached). For a full list of references, metadata, publications or additional information not provided in this report, please contact info@liresources.com.au

The report does not include title searches; dangerous good searches or; property certificates (unless requested); or information derived from a physical inspection, such as hazardous building materials, areas of infilling or dumping/spilling of potentially contaminated materials. It is important to note that these documents and an inspection can contain information relevant to contamination that may not be identified by this Report.

Due to the ongoing nature of database development and frequency of updates provided by various state government regulators the data displayed within this report is only current from date of production.

This Report, and your use of it, is regulated by Land Insight's Terms and Conditions (See Land Insight's Product Guide).

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Land Insight Product Guide and Terms and Conditions

SUMMARY

 Section 1	PROPERTY SETTING	Identified
Sensitive Receptors Planning Control Heritage Soil and Land Information Geology and Topography		
 Section 2	HYDROGEOLOGY	Identified
Aquifer Groundwater Bores and Other Borehole investigations Groundwater Dependent Ecosystems (GDE) Hydrogeology Units Wetlands		
 Section 3	ENVIRONMENTAL REGISTERS LICENCES AND INCIDENTS	Identified
Contaminated Land Public Register Sites Regulate by Other Jurisdictional Body (Former Gaswork sites / PFAS sites) Licensing and Regulated Sites National Pollutant Inventory (NPI)		
 Section 4	POTENTIALLY CONTAMINATED AREAS	Identified
Former Potentially Contaminated Land Current and Historical Potentially Contaminating activities (PCA)		
 Section 5	NATURAL HAZARDS	Identified
Erosion risk Bushfire prone land Fire history Flood hazards		



Section 1 Property Setting



1.1 SENSITIVE RECEPTORS

Map 1.1 (200m Buffer)

Sensitive receptor	Category	Distance (m)	Direction
John Palmer Park	Parks	30	West
Madew Park Skate Park	Sports and Recreation Activities	30	West
Madew Regional Park	Sports and Recreation Activities	30	West
Park	Parks	40	West
Jerrabomberra Public School	School Education	50	West
Playground	Sports and Recreation Activities	60	West
Queanbeyan Lawn Cemetery	Places of Worship	70	North-west
Playground	Sports and Recreation Activities	120	West
Rutidosis Reserve	Parks	185	West
Goodstart Jerrabomberra	Child Care Services	188	West
Jerrabomberra Community Centre	Community Centres & Services	195	West

1.2 PLANNING CONTROLS

Map 1.2 (onsite)

Zoning

Code	Zoning	Details
B1	B1 Neighbourhood Centre	Queanbeyan Local Environmental Plan 2012
B4	Mixed Use	
B7	Business Park	
DM	Deferred Matter	

E2	Environmental Conservation	
IN2	Light Industrial	
R2	Low Density Residential	
RE1	Public Recreation	
RE2	Private Recreation	
RU2	Rural Landscape Zone	
SP2	Infrastructure	

Environmental Planning Instruments

Type	Category	Details
VAB	Visual and Acoustic Buffer Map	Queanbeyan Local Environmental Plan 2012
LOC	Local Clauses Map - Visual and Acoustic Buffer Clause 7.5 Applies	
LOC	Local Clauses Map - Arterial Road Area	
APU	Additional Permitted Uses Map	

Other Planning Information

Type	Category	Details
Not identified	-	-

1.3 HERITAGE

Map 1.3 (200m Buffer)

State and Local Heritage

Site ID	Site Name	Type	Details	Distance (m)	Direction
I1	Stone-faced Brick Building	Heritage conservation Area	Item - General significance= Local	0	Onsite

Australian Heritage Database

Site ID	Site Name	Type	Details	Distance (m)	Direction
105991	Natural Areas around and within Majura, Pialligo and Jerrabomberra	Commonwealth heritage List	Nominated place Natural	0	Onsite

Commonwealth Heritage List, National Heritage List and World Heritage Area.

1.4 SOIL AND LAND USE INFORMATION

Map 1.4a/1.4b (onsite)

Soil Landscape

Soil Landscape	YPI	Kurosols	Soil Group	Yellow Podzolic Soils - less fertile (granites and metasediment)
Description	GSG classification - Strongly differentiated duplex soils with light to medium textured A1 horizon over a pale A2 over a yellowish, firm to friable B horizon with generally polyhedral structure.			
Soil Landscape	SH	Kurosols, Natric	Soil Group	Soloths

Soil Landscape	YPI	Kurosols	Soil Group	Yellow Podzolic Soils - less fertile (granites and metasediment)
Description	GSG classification - Acid soils with strong texture contrast between pale topsoil and clay subsoil with coarse blocky or columnar structure. structure-- Describes with the arrangement of all soil particles and refers to the distinctness, size, shape and condition of the peds. The degree of structural distinctness is referred to as grade of pedality. Descriptive terms used are: single-grained-- soil occurs as a loose, incoherent mass of individual particles (as in sands); massive-- soil occurs as a coherent mass with no distinct arrangement of soil particles; weak pedality-- peds are barely observable in an undisturbed soil; moderate pedality-- peds are well formed and evident, although not distinct; strong pedality-- peds are quite distinct in an undisturbed soil.			
Soil Landscape	AI	Rudosols (Alluvial)	Soil Group	Alluvial Soils - Light Sandy Textured (Sands to Sandy Loams)
Description	GSG classification - Soils developed from recently deposited alluvium, normally characterised by little or no modification of the deposited material by soil forming processes, particularly with respect to soil horizon development.			
Soil Landscape	RPI	Kurosols	Soil Group	Red Podzolic Soils - less fertile (granites and metasediment)
Description	GSG classification - Strongly differentiated duplex soils with light to medium textured A1 horizon over a pale or bleached A2 over a reddish, firm to friable B horizon with generally polyhedral structure.			

Salinity

Salinity Hazard	Low	Yes
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Radon

Radon Level	Bq/m ³	16-19
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Typical radon levels in Australia are low and the values shown are the average values for each census district. For specific location, factors such as the local geology and house type could lead to different values. (ARPANSA).

Acid Sulfate Soil

ASS Risk Map (Table 1.4.1)	On the Property?	Within Buffer?
Class	Not identified	Not identified

National Acid Sulfate Soils Atlas

Atlas of Australian ASS (Table 1.4.2)		ASS in inland lakes, waterways, wetlands and riparian zones	Probability of Occurrence	Low Probability of occurrence
Bn(p4)		ASS in inland lakes, waterways, wetlands and riparian zones	Probability of Occurrence	Extremely low probability of occurrence
Cq(p4)		ASS in inland lakes, waterways, wetlands and riparian zones		

Table 1.4.1. Classification scheme in the ASS Planning Maps

Class of Land as shown on ASS Planning Maps	
1	Any works.
2a	Works below the natural ground surface. Works by which the watertable is likely to be lowered.
2b	Works other than ploughing below the natural ground surface. Works by which the watertable is likely to be lowered.

Table 1.4.1. Classification scheme in the ASS Planning Maps

3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.
5	Works within 500 metres of adjacent Class 1, 2a, 2b, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2a, 2b, 3 or 4 land.

For each class of land, the maps identify the type of works likely to present an environmental risk if undertaken in the particular class of land. If these types of works are proposed, further investigation is required to determine if ASS are actually present and whether they are present in such concentrations as to pose a risk to the environment.

Table 1.4.2. Atlas of Australian Acid Sulfate Soils¹ (ASRIS) (CSIRO/NatCASS)

Probability of Occurrence of ASS ¹	
A	High Probability of occurrence - (>70% chance of occurrence in mapping unit)
B	Low Probability of occurrence - (6-70% chance of occurrence in mapping unit)
C	Extremely low probability of occurrence - (1-5% chance of occurrence in mapping unit)
D	No probability of occurrence - (<1% chance of occurrence in mapping unit)
x	Disturbed ASS¹ terrain - (ASS ¹ material present below urban development).
u	Unclassified - (Insufficient information to classify map unit)
Zones	
a	Potential acid sulfate soil material and/or Monosulfidic Black Ooze (MBO).
b, c	Potential acid sulfate soil generally within upper 1 m.
c, d, e	ASS ¹ generally within upper 1 m.
f	ASS ¹ generally below 1 m from the surface
g	ASS ¹ , generally below 3 m from the surface.
h	ASS ¹ generally within 1 m of the surface.
i, j	ASS ¹ generally below 1 m of the surface.
k	ASS ¹ material and/or Monosulfidic Black Ooze (MBO).
l, m, n, o, p, q	ASS ¹ generally within upper 1 m in wet / riparian areas.
Subscripts to codes	
(a)	Actual acid sulfate soil (AASS) = sulfuric material.
(p)	Potential acid sulfate soil (PASS) = sulfidic material.
(q)	Monosulfidic Black Ooze (MBO) is organic ooze enriched by iron monosulfides.
Confidence levels	
(1)	All necessary analytical and morphological data are available
(2)	Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence
(3)	No necessary analytical data are available, but confidence is fair, based on a knowledge of similar soils in similar environments
(4)	No necessary analytical data are available, and classifier has little knowledge or experience with ASS, hence classification is provisional

¹Acid Sulfate Soils (ASS) are all those soils in which sulfuric acid may be produced, is being produced, or has been produced in amounts that have a lasting effect on main soil characteristics (Pons 1973). Acid sulfate soil (ASS) may include PASS or AASS + PASS. Potential acid sulfate soil (PASS) = sulfidic material. Actual acid sulfate soil (AASS) = sulfuric material.

1.5 GEOLOGY AND TOPOGRAPHY

Map 1.5 (onsite)

Geology

Map Sheet	Code	Formation	Age	Group	Dominant Lithology	Description
Canberra 1:100 000 Geological Map	Oada	Abercrombie Formation	Lower Ordovician	Adaminaby Group	Sandstone	Brown and buff to grey, thin- to thick-bedded, fine- to coarse-grained mica-quartz (+/- feldspar) sandstone, interbedded with laminated siltstone and mudstone. Sporadic chert-rich units.
	Q_a	<null>	Quaternary	Alluvium	Clastic sediment	Unconsolidated grey to brown to beige humic (±)micaceous silty clay, quartz(±)lithic silt, fine- to medium-grained quartz-rich to quartz-lithic sand, polymictic pebble to cobble gravel (as sporadic lenses); sporadic palaeosol horizons.
	Sdod	Deakin Volcanics	Upper Silurian	Douro Group	Pyroclastic rock	Rhyodacitic ignimbrite and minor volcanoclastic and argillaceous sedimentary rocks.
	Sdod_a	Deakin Volcanics	Upper Silurian	Douro Group	Ash tuff, lapillistone, and lapilli tuff	Unnamed tuff, sandstone, shale.
	Sdodm	Deakin Volcanics	Upper Silurian	Douro Group	Fine grained igneous rock	Blue and mauve-grey porphyritic rhyodacite, volcanoclastic and epiclastic tuff (as a waterlaid deposit), tuffaceous shale.
	Sdodm_s	Deakin Volcanics	Upper Silurian	Douro Group	Siltstone	Tuffaceous siltstone and shale.
	Suoc	Canberra Formation	Lower Silurian	Ungrouped Cowra-Yass Zone units	Mudstone	Mudstone, siltstone, minor sandstone, limestone, hornfels, dacitic ignimbrite volcanoclastics, minor agglomerate and lithic tuff.
	Suos	State Circle Shale	Lower Silurian	Ungrouped Cowra-Yass Zone units	Shale	Shale, mudstone, siltstone and minor sandstone.

Naturally Occurring Asbestos Potential (NOA)

Category	On the Property?	Within Buffer?
Not identified	-	-

Topography

Topography	580-860 mAHD
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Section 2 Hydrogeology



2.1 HYDROGEOLOGY AND GROUNDWATER BORES

Map 2.1 (2000m Buffer)

	On the Property?	Within Buffer?
Aquifer Type	Fractured or fissured, extensive aquifers of low to moderate productivity	Fractured or fissured, extensive aquifers of low to moderate productivity
Drinking Water Catchments	Not identified	Not identified
Protected Riparian Corridor	Jerrabomberra Creek	Jerrabomberra Creek
UPSS Environmentally Sensitive Zone	MURRUMBIDGEE RIVER	MURRUMBIDGEE RIVER
Wetlands	Not identified	Not identified

Groundwater Bores

Map ID	Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity (mg/l)	Yield (L/s)	Distance (m)	Direction
2	GW043847	Household	1/08/1969	37.8	37.7	12.1	Hard	0.075	0.0	Onsite
3	GW025629	Household	1/02/1965	23.2	23.2	13.1	<Null>	0.303	0.0	Onsite
4	GW025867	Household	1/02/1965	21.3	21.3	11	<Null>	0.303	0.0	Onsite
5	GW043846	Irrigated agriculture	1/10/1969	40.5	40.5	17.6	Hard	0.505	0.0	Onsite
12	410716	Unknown	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	0.0	Onsite
16	GW414716	Household	5/05/2011	<Null>	132.0	25	<Null>	1.05	0.0	Onsite
9	GW402607	Household	4/12/2003	90.0	90.0	7	<Null>	0.438	67.0	East
17	GW417521	Null	N/A	18.0	18.0	<Null>	<Null>	<Null>	159.0	East

Map ID	Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity (mg/l)	Yield (L/s)	Distance (m)	Direction
41	622	Unknown	<Null>	4.3	4.3	<Null>	<Null>	<Null>	244.5	North-west
29	617	Unknown	<Null>	6.8	6.8	<Null>	<Null>	<Null>	254.7	North-west
38	48	Unknown	14/08/1954	39.6	39.6	<Null>	<Null>	<Null>	291.7	North-west
34	623	Unknown	<Null>	5.4	5.4	<Null>	<Null>	<Null>	347.6	North-west
32	618	Unknown	<Null>	4.1	4.1	<Null>	<Null>	<Null>	372.9	North-west
1	GW032115	Unknown	1/12/1969	51.8	51.8	40.2	501-1000 ppm	0.51	386.4	North-east
37	621	Unknown	<Null>	0.0	0.0	<Null>	<Null>	<Null>	436.5	North-west
21	608	Unknown	17/06/1981	9.6	9.6	<Null>	<Null>	<Null>	491.2	North-west
22	609	Unknown	22/06/1981	15.6	15.6	<Null>	<Null>	<Null>	520.0	North-west
19	607	Unknown	16/06/1981	6.2	6.2	<Null>	<Null>	<Null>	524.2	North-west
27	624	Unknown	<Null>	5.7	5.7	<Null>	<Null>	<Null>	527.5	North-west
24	603	Unknown	11/06/1981	4.4	4.4	<Null>	<Null>	<Null>	530.6	North-west
39	619	Unknown	<Null>	6.8	6.8	<Null>	<Null>	<Null>	536.8	North-west
14	410712	Unknown	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	554.0	South-east
35	625	Unknown	<Null>	5.8	5.8	<Null>	<Null>	<Null>	625.4	North-west
43	630	Unknown	<Null>	5.2	5.2	<Null>	<Null>	<Null>	690.3	North-west
18	223	Unknown	13/05/1967	14.63	14.63	<Null>	<Null>	<Null>	708.3	North
33	629	Unknown	<Null>	4.5	4.5	<Null>	<Null>	<Null>	728.4	North-west
40	631	Unknown	<Null>	4.58	4.58	<Null>	<Null>	<Null>	771.4	North-west
20	47	Unknown	1/01/1952	24.69	24.69	<Null>	<Null>	<Null>	870.2	North-west
25	604	Unknown	11/06/1981	5.94	5.94	<Null>	<Null>	<Null>	871.9	North-west
44	626	Unknown	<Null>	5.87	5.87	<Null>	<Null>	<Null>	883.5	North-west
31	628	Unknown	<Null>	4.52	4.52	<Null>	<Null>	<Null>	888.4	North-west
11	GW403921	Household	5/05/2005	75	75	<Null>	<Null>	1.5	898.2	East
28	627	Unknown	<Null>	5.85	5.85	<Null>	<Null>	<Null>	911.5	North-west
42	620	Unknown	<Null>	5.67	5.67	<Null>	<Null>	<Null>	925.6	North-west
23	606	Unknown	16/06/1981	9.5	9.5	<Null>	<Null>	<Null>	934.4	North-west
26	605	Unknown	12/06/1981	9.2	9.2	<Null>	<Null>	<Null>	967.7	North-west
30	798	Water Supply	14/07/2010	60	60	<Null>	<Null>	<Null>	1003.5	North-west

Map ID	Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity (mg/l)	Yield (L/s)	Distance (m)	Direction
8	GW401765	Recreation	30/09/1997	100	100	22	Fair	1.25	1016.0	North-east
36	578	Water Supply	11/12/2007	90	90	<Null>	<Null>	<Null>	1216.4	North-west
6	GW038210	Exploration or research	1/02/1973	91.4	91.4	<Null>	Fresh	0.52	1252.7	North
10	GW403897	Household	25/05/2004	128	128	<Null>	<Null>	0.442	1402.7	South-east
13	410743	Unknown	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	1617.3	South-east
15	GW414721	Household	8/04/2003	<Null>	94	<Null>	<Null>	<Null>	1683.1	South-east
7	GW400651	Household	4/12/1998	40	40	18	Good	0.63	1837.5	East

Groundwater Bores Driller Lithology Details

Groundwater Bore ID	From Depth – To Depth (m)	Lithology	Distance (m)	Direction
GW043847	0m-1.22m 1.22m-25.3m 25.3m-37.8m 37.8m-37.81m	Soil subsoil Porphyry decomposed Porphyry hard Bedrock hard water supply	0.0	Onsite
GW025629	0m-3.05m 3.05m-18.29m 18.29m-23.16m	Clay Granite decomposed water supply Porphyry	0.0	Onsite
GW025867	0m-6.1m 6.1m-9.14m 9.14m-19.81m 19.81m-21.34m	Clay Porphyry Granite black red Porphyry	0.0	Onsite
GW043846	0m-1.83m 0m-1.83m 1.83m-17.98m 17.98m-30.78m 30.78m-40.54m	Clay Soil subsoil Porphyry decomposed Porphyry very hard Porphyry hard	0.0	Onsite
410716	#N/A		0.0	Onsite
GW414716	#N/A		0.0	Onsite
GW402607	0m-8m 8m-15m 15m-90m	Soil, weathered clays and shale Shale, fractured Dacite, hard blue	67.0	East
GW417521	#N/A		159.0	East
622	<Null>		244.5	North-west
617	<Null>		254.7	North-west
48	<Null>		291.7	North-west
623	<Null>		347.6	North-west
618	<Null>		372.9	North-west
GW032115	0m-10.36m 10.36m-39.62m 39.62m-51.82m	Clay Shale yellow Shale water supply	386.4	North-east
621	<Null>		436.5	North-west
608	0m-0.02m 0.02m-0.09m 0.09m-0.15m 0.15m-0.21m 0.21m-0.24m	Red brown poorly sort sand Light brown poorly sort gravelly silt Light brown (more gravelly) silt Yellow brown clay and feldspars Pale red brown gravelly clay	491.2	North-west
609	0m-0.12m 0.12m-0.16m	No core Coarse clayey gravel	520.0	North-west

Groundwater Bore ID	From Depth – To Depth (m)	Lithology	Distance (m)	Direction
	0.16m-0.18m	Pale grey heavy clay		
	0.18m-0.26m	Moderately weathered purple dacite		
	0.26m-0.39m	Slightly weathered purple dacite		
607	0m-0.04m	Light brown silt, some gravel	524.2	North-west
	0.04m-0.05m	Yellow brown clay with feldspars		
	0.05m-0.11m	Tan silty gravel, mottled at 4 m		
	0.11m-0.13m	Porous silty sandy fine gravel		
	0.13m-0.16m	Pink gravelly silt		
624	<Null>		527.5	North-west
603	0m-0.07m	Brown coarse sandy gravel	530.6	North-west
	0.07m-0.09m	Light brown coarse sandy silt		
	0.09m-0.11m	Light brown silty sand		
619	<Null>		536.8	North-west
410712	#N/A		554.0	South-east
625	<Null>		625.4	North-west
630	<Null>		690.3	North-west
223	0m-5.18m	Clay and sand	708.3	North
	5.18m-14.63m	Gravel and sand		
629	<Null>		728.4	North-west
631	<Null>		771.4	North-west
47	0m-13.41m	Clay or mud	870.2	North-west
	13.41m-16.149999999999999m	Sands on sandy clay		
	16.149999999999999m-16.46m	Bedrock		
604	0m-0.01m	Dark brown organic silt	871.9	North-west
	0.01m-0.06m	Bleached gravelly silt		
	0.06m-0.08m	Yellow-grey mottled clay and feldspars		
	0.08m-0.13m	Light brown gravelly silt		
	0.13m-0.13m	Red and grey mottled clay, some feldspars		
	0.13m-0.15m	Purple volcanic (dacite)		
626	<Null>		883.5	North-west
628	<Null>		888.4	North-west
GW403921	0m-0.2m	Topsoil	898.2	East
	0.2m-10m	Shale - yellow		
	10m-22m	Shale - grey		
	22m-75m	Shale - black		
627	<Null>		911.5	North-west
620	<Null>		925.6	North-west
606	0m-0.01m	Dark brown silt	934.4	North-west
	0.01m-0.03m	Light brown silty gravel		
	0.03m-0.08m	Grey-brown mottled clayey silty gravel		
	0.08m-0.18m	Light brown silt		
	0.18m-0.24m	Pinky tan gravelly silt, less gravel 8-9.5 m		
605	0m-0.01m	Dark brown organic silt	967.7	North-west
	0.01m-0.03m	Poorly sorted clayey gravel		
	0.03m-0.04m	Silty gravel, less clay		
	0.04m-0.08m	Bleached silty clayey gravel		
	0.08m-0.15m	Loose poorly sorted brown silty gravel		
	0.15m-0.18m	Loose poorly sorted brown silty gravel, more clayey		
	0.18m-0.22m	Grey-brown mottled gravelly clay		
	0.22m-0.23m	Bedrock - purple dacite		
798	<Null>		1003.5	North-west
GW401765	0m-0.6m	Soil	1016.0	North-east
	0.6m-6m	Clays		

Groundwater Bore ID	From Depth – To Depth (m)	Lithology	Distance (m)	Direction
	6m-36m Shales 36m-100m Shale, hard blue to black			
578	<Null>		1216.4	North-west
GW038210	0m-0.91m Topsoil 0.91m-5.48m Topsoil clay 5.48m-12.49m Shale decomposed slate 12.49m-85.95m Slate grey water supply quartz bands 85.95m-91.44m Granite black		1252.7	North
GW403897	0m-14m Granite - decomposed 14m-57m Granite - blue - fresh 57m-59m Granite - brown - fractured 59m-128m Granite - blue - fresh		1402.7	South-east
410743	#N/A		1617.3	South-east
GW414721	#N/A		1683.1	South-east
GW400651	0m-4m Red sandy clay 4m-7m Decomposed basalt 7m-40m Hard basalt		1837.5	East

2.2 HYDROGEOLOGY AND OTHER BOREHOLES

Map 2.2 (500m Buffer)

	On the Property?	Within Buffer?
Groundwater Vulnerability	Not identified	Not identified
Groundwater Exclusion Zones ^{1,2}	Not identified	Not identified
Hydrogeologic Unit	Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)	Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)

¹ - Botany Groundwater Management Zones (BGMZ): Zone 1 – the use of groundwater remains banned; Zones 2 to 4 – domestic groundwater use is banned, especially for drinking water, watering gardens, washing windows and cars, bathing, or to fill swimming pools.

² - Williamstown Groundwater Management Zones (WGMZ): Primary Management Zone – this area has significantly higher levels of PFAS detected and therefore, the strongest advice applies. Secondary Management Zone – this area has some detected levels of PFAS; Broader Management Zone – the topography and hydrology of the area means PFAS detections could occur now and into the future.

Groundwater Dependent Ecosystems (GDE)

	On the Property?	Within Buffer?
Aquatic	High - moderate	High - moderate
Terrestrial	Not identified	Low

Aquatic - Ecosystems that rely on the Surface expression of groundwater.

Terrestrial - Ecosystems that rely on the Subsurface expression of groundwater.

Other Known Borehole Investigations (Coal Seam Gas (CSG), Petroleum Wells and Other Boreholes)

Borehole ID	Purpose	Project	Client/ License	Date Drilled	Depth (m)	Distance (m)	Direction
100054_2019_RPT_OC_GEF_AUNSW_4_GT0001415	RPT	A collection of NSW geotechnical reports as part of the NSW Government Geotechnical	Drilling, Soil Sample Analysis located at Jerrabomberra Public School : geotechnical investigation	01/01/2000	0.0	125.2	East

Borehole ID	Purpose	Project	Client/ License	Date Drilled	Depth (m)	Distance (m)	Direction
		Report Database Project (GGRD).	/ Peter Shun, Geo				
ENSR_MW12	Borehole	Hume Timber Mill	<Null>	05/08/2008	7.0	182.7	North-west
100054_2019_RPT_OC_GEF_AUNSW_4_GT0001416	RPT	A collection of NSW geotechnical reports as part of the NSW Government Geotechnical Report Database Project (GGRD).	Soil Sample Analysis located at Jerrabomberra Public School : proposed carpark : additional geotechnical soil testing	01/01/2002	0.0	192.2	East
ENSR_MW04D	Borehole	Hume Timber Mill	<Null>	07/08/2008	16.5	225.9	North-west
ENSR_MW11	Borehole	Hume Timber Mill	<Null>	06/08/2008	16.5	236.7	North-west
ENSR_MW10	Borehole	Hume Timber Mill	<Null>	06/08/2008	17.0	454.4	North-west



Section 3 Environmental Registers, Licences and Incidents



3.1 CONTAMINATED LAND PUBLIC REGISTER

Map 3.1 (1000m Buffer)

Sites Notified as Contaminated to the EPA

Site Name	Address	Activity that caused Contamination	EPA Site Management Class (Table 3.1.1)	Distance (m)	Direction
Caltex Service Station	Lanyon Dr Cnr Mccrae St (1 Suraci Place) STREET QUEANBEYAN WEST	Service Station	Regulation under CLM Act not required	915	North-west

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Contaminated Land Record of Notices

Site Name	Area n°	Address	Notices	Distance (m)	Direction
Not identified	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Table 3.1.1. EPA Site Management Class Explanation

Table 3.1.1 EPA Site Management Class	
EPA Site Management Class	
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.
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.

Table 3.1.1 EPA Site Management Class

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.
Contamination currently regulated under the 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.
Contamination currently regulated under the 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 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 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 by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A 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.

The EPA maintains a record of sites that have been notified to the EPA by owners or occupiers as contaminated land. The sites notified to the EPA are recorded on the register at various stages of the assessment and/or remediation process.

3.2 SITES REGULATED BY OTHER JURISDICTIONAL BODY

Map 3.2 (2000m Buffer)

Defence, Military Sites and UXO Areas

Site name	Type*	Details	Distance (m)	Direction
Canberra; HMAS Harman and Bonshaw receiver	RCIP	The property covers approximately 250 hectares and comprises office buildings, training facilities, accommodation blocks, workshops, recreational facilities and a former pistol range. Activities for potential sources of contamination include bulk storage and distribution of petrol and diesel in underground storage tanks (USTs). Fill material from unknown origins was used for building. This fill may contain polychlorinated biphenyls (PCBs) due to historical use as a receiving station. The former pistol firing range was decommissioned in 2009, and also a landfill. The landfill area was investigated and remediated at the base for redevelopment in 2010. Hydrocarbons have been identified in groundwater in the vicinity of former USTs, however, concentrations were below the adopted investigation levels.	820	North

*RCIP (Regional Contamination Investigation Program). UXO (Unexploded Ordnance Areas)

Former Gasworks Sites

Site name	Description	Distance (m)	Direction
Not identified	-	-	-

PFAS Sites

Site name	Description	Source	Distance (m) *	Direction
Not identified	-	-	-	-

National Pollutant Inventory (NPI)

Facility name	Address	Primary ANZSIC Class	Latest report	Distance (m)	Direction
KOPPERS, HUME	TRALEE ST, Hume	Reconstituted Wood Product Manufacturing	2004/2005	90	West
Hume Asphalt Plant	36 Sawmill Circuit, Hume	Other Petroleum and Coal Product Manufacturing	2018/2019	95	West
INTEGRATED FOREST PRODUCTS (Receivers & Managers Appointed)	2 TRALEE ST, Hume	Log Sawmilling	2006/2007	550	West
HMAS Harman	Canberra Avenue, Harman	Defence	2015/2016	820	North
MUGGA LANE LANDFILL	MUGGA LANE, Canberra	Waste Treatment and Disposal Services	2018/2019	1400	West
Mugga Lane	MUGGA LA, Symonston	Other Electricity Generation	2018/2019	1400	West
Queanbeyan Quarry	50 Rayalla Road, Queanbeyan	Gravel and Sand Quarrying	2018/2019	1700	East

3.3 LICENCES, APPROVALS & NOTICES

Map 3.3 (500m Buffer)

Licences

Licence N°	Licence holder	Location Name	Premise Address	Fee Based Activity	Distance (m)*	Direction
Not identified	-	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Other Licences still Regulated by EPA

Licence N°	Licence holder	Location Name	Premise Address	Fee Based Activity	Status	Distance (m)*	Direction
Not identified	-	-	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Clean Up and Penalty Notices

Location ID	Notice Type	Notice N°	Licence holder	Location Name	Premise Address	Distance (m)*	Direction
Not identified	-	-	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.



Section 4 Potentially Contaminated Areas



4.1 FORMER POTENTIALLY CONTAMINATED LAND

Map 4.1 (500m Buffer)

Contaminated Legacy Areas / Historic Incident Sites

Site Name	Description	Distance (m)	Direction
Not identified	-	-	-

Includes known contaminated areas such as James Hardies Asbestos waste legacy areas, Pasmenco Smelter and Uranium processing site.

Derelict Mines and Quarries

Site name	Description	Distance (m)	Direction
Tralee Sand & Gravel Pit	Location of operation given as Tralee. Property named Tralee is located south of Jerrabomberra Creek near NSW ACT border. Material extracted is sand and river gravel. Exact location unknown, possibly on Jerrabomberra Creek but unlikely. Production possi	0	Onsite
Tralee	Previously in Yarrawlunla Shire S117, shire boundary changed in 1995. CSR informed us in March 1999 that they do not have any intension of developing a quarry on the site and are in the process of relinquishing their leases and caveats. Proposal for sub	50	South
Jerrabomberra Prospect	GS1971/653-anomalous stream sediments with follow up rock chips to: 5ppm Ag, 80ppm Cu, 1400ppm Pb, 5500ppm Zn, 358ppm As, 3100ppm Mn. Gossans are located in a picnic area of the Municipality of Queanbeyan.	287	East

Historical Landfills

Site name	Description	Distance (m)	Direction
Not identified	-	-	-

4.2 CURRENT POTENTIALLY CONTAMINATING ACTIVITIES (PCA)

Map 4.2 (500m Buffer)

Industries, businesses and activities that may cause contamination

Site name	Category	Location	Status*	Distance (m)	Direction
7-Eleven Jerrabomberra	Petrol Station	2 Ferdinand Lane, JERRABOMBERRA,2619,NSW	Operational	0	Onsite
Woolworths Caltex Jerrabomberra	Petrol Station	2 Limestone Drive, Jerrabomberra	Operational	160	East
Suez Service Centre	Waste Management Facility	11 Alderson Place, Hume	Operational	250	West
Tralee (TRAL)	Telephone Exchange	24 Rosewood Glen, Jerrabomberra	Operational	495	East

*Status:

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business is operating on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years prior from the day this report was issued. All former sites older than 2 years will be reported in the 'Historical Potentially Contaminating Activities' section 4.4 in this report.

Included in this search:

Type	Type	Type
Cattle Dip Sites	Liquid Fuel Depots	Substation/Switching Stations
Dry Cleaners	Operating Mines	Telephone Exchanges
Fire Rescue	Power Stations	Wastewater Treatment Plants
Gas Terminals	Petrol Stations	Waste Management Facilities

Includes industries or business activities associated with potentially contaminating activities. Records identified within section 4.2 are considered to have a higher likelihood of contamination risk associated with the type of business activity. The contamination risk associated with these records is based solely on the type of activity undertaken by the business, and in conjunction with business activities deemed to be of moderate to high risk of potential contamination identified in State Government regulatory body (EPA) published regulations or guidelines.

The records identified have not been risk ranked based on any current or previous site inspection. Please note that records not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.

4.3 OTHER POTENTIALLY CONTAMINATING ACTIVITIES

Map 4.3 (200m Buffer)

Industries, businesses and activities that may cause contamination considered of lesser risk

Site name	Category	Location	Status*	Distance (m)	Direction
HDM Metal	Manufacturer	16 Arnott St, Hume ACT 2620	Current	89	West
Acrow Formwork & Scaffolding Pty Ltd	Scaffolding Hire Service	15A Sleigh Pl, Hume ACT 2620	Current	100	West
Irwin & Hartshorn	Demolition contractor	12 Alderson Pl, Hume ACT 2620	Current	110	West

Site name	Category	Location	Status*	Distance (m)	Direction
Cummins Canberra	Manufacturer	15 Arnott St, Hume ACT 2620	Current	111	West
Lo Pilato Bros	Landscaping supply store	13 Arnott St, Hume ACT 2620	Current	113	West
InfraBuild Steel Centre - Canberra	Steel distributor	Johns Pl, Hume ACT 2620	Current	119	West
Pacific Formwork	Industrial building	10 Johns Pl, Hume ACT 2620	Current	122	West
Sodablast Canberra	Sandblasting service	7/23 Raws Cres, Hume ACT 2620	Current	123	West
Revlon	Warehouse	31-45 Raws Cres, Hume ACT 2620	Current	126	West
ShelvMaster	Shelving store	Unit 2/21 Raws Cres, Hume ACT 2620	Current	128	West
HDM Metal	Steel fabricator	27 Raws Cres, Hume ACT 2620	Current	131	West
Adams Bikes	Bicycle Shop	4/21 Raws Cres, Hume ACT 2620	Current	134	West
Coates Hire Hume (P)	Equipment rental agency	47 Alderson Pl, Hume ACT 2620	Current	136	West
Downer Hume & Asphalt Plant	Asphalt Plant	36 Sawmill Cct, Hume ACT 2620	Current	139	West
Waco Kwikform Canberra	Scaffolding Hire Service	17 Sheppard St, Hume ACT 2620	Current	143	West
Toll Express	Logistics service	44-50 Sawmill Cct, Hume ACT 2620	Current	146	West
Statewide Frames & Trusses	License plate frames supplier	5a/15 Sheppard St, Hume ACT 2620	Current	151	West
Grace Removals Canberra	Removalist	54 Sawmill Circuit Hume, Canberra ACT 2609	Current	158	West
Optus	Telecommunications	47 Raws Cres Hume ACT	Current	165	West
Cloud Electrical Pty Ltd	Electrician	Unit 2/13 Sleigh Pl, Hume ACT 2620	Current	167	West
Alto Scaffolding	Scaffolding	15b Sleigh Pl, Hume ACT 2620	Current	173	West
National Storage Hume, Canberra	Self-storage facility	20 Alderson Pl, Hume ACT 2620	Current	188	West

***Status:**

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business is operating on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years prior from the day this report was issued. All former sites older than 2 years will be reported in the 'Historical Potentially Contaminating Activities' section 4.4 in this report.

Includes industries or business activities records associated with potentially contaminating activities that are not listed in section 4.2 of this report. Records identified within this section are considered to have a lesser likelihood of contamination risk associated with the type of business activity. The contamination risk associated with the records listed in this section are based solely on the type of activity undertaken and have not been risk ranked based on any current or previous site inspection, as such, some of the sites listed in section 4.3 can be potentially of high risk. Industries or business activities deemed of a negligible risk of contamination are not reported. Please note that any record not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.

4.4 HISTORICAL POTENTIALLY CONTAMINATING ACTIVITIES

(not mapped)

1930 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1940 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1950 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1965 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1970 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1980 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Carriers - Heavy Industrial Transportation	Canberra Freight Express Pty Ltd	13 Arnott Street, Hume,ACT	Address	165.9	North-west
Earth Moving &/Or Excavating Contractors	LG Pilato Bros	13 Arnott Street, Hume,ACT	Address	165.9	North-west
Sand Soil & Gravel - Retailers	Lo Pilato Bros	13 Arnott Street, Hume,ACT	Address	165.9	North-west
Earth Moving &/Or Excavating Contractors	Casper Constructions	Arnott Street, Hume,ACT	Street		North-west
Furniture - Exterior/Outdoor	Hume Landscape Supplies & Services	Arnott Street,Hume,ACT	Street		North-west
Graziers	Lincoln T	Tralee Street, Tallawang,NSW	Street		Onsite
Ice Cream Vendors	Actice Supplies	Arnott Street,Hume,ACT	Street		North-west
Landscape Gardening Services & Supplies	Hume Landscape Supplies & Services	Arnott Street,Hume,ACT	Street		North-west
Primary Metal Products	O'Kane K L	Tralee Street, Brewer,NSW	Street		Onsite
Sand Soil & Gravel - Retailers	Hume Landscape Supplies & Services	Arnott Street,Hume,ACT	Street		North-west
Transport & Transportation Service	Canham B C	Tralee Street, Bugaldie,NSW	Street		Onsite

1990 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Steel Fabrication & M/Facrs	Metal Market The	16 Arnott Street, Hume,ACT	Address	90.4	North-west
Steel Merchant	Metal Market The	16 Arnott Street, Hume,ACT	Address	90.4	North-west
Welding	Metal Market The	16 Arnott Street, Hume,ACT	Address	90.4	North-west
Electrical W/Salers	Tuggeranong Electrical Wholesalers	15 Arnott Street, Hume,ACT	Address	105.4	North-west
Fuel Merchants & Buyers	O'Rourke's Solid Fuel Distributors	22 Alderson Place, Hume,ACT	Address	155.8	North-west
Petroleum and Coal Products n.e.c.	O'Rourke's Solid Fuel Distributors	22 Alderson Place, Hume,ACT	Address	155.8	North-west
Metal - Merchants	Tubemakers Metal Centre	11 Johns Place, Hume,NSW	Address	155.9	North-west
Landscape Gardening Services & Supplies	Hume Landscape Supplies	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Nurseries - Retail	Hume Landscape Supplies	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Packing & Filling Contractors	CNS Pty Ltd	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Playground Equipment Design & Installation	Hume Recreational Equipment	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Sand Soil & Gravel - Retailers	Hume Landscape Supplies	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Timber - Retailer/Trader	A.C.T. Mulch Supplies	14 Arnott Street, Hume,ACT	Address	163.6	North-west
Scaffolding Sale Or Hire	Waco International Sales Pty Ltd	13 Sleigh Place, Hume,ACT	Address	166.5	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Lo Pilato Bros (Marfel Transport Service)	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Earth Moving &/Or Excavating Contractors	Lo Pilato Bros	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Landscape Gardening Services & Supplies	Lo Pilato Bros	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Sand Soil & Gravel - Producers & W/Salers	Lo Pilato Bros (Marfel Transport Service)	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Sand Soil & Gravel - Retailers	LO Pilato Bros (Marfel Transport Service)	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Transport & Transportation Service	Marfil Transport	13 Arnott Street, Hume,ACT	Address	168.2	North-west
Nursery Supplies	Canberra Nursery Suppliers	12 Arnott Street, Hume,ACT	Address	178.2	North-west
Building Contractors - Renovations Alterations & Extensions	ACT Frames & Roof Trusses	15 Sheppard Street, Hume,ACT	Address	184.2	North-west
Cabinetry Makers	A.B.I.S. Joinery	15 Sheppard Street, Hume,ACT	Address	184.2	North-west
Door & Gate Fittings & Hardware	Abis Joinery	15 Sheppard Street, Hume,ACT	Address	184.2	North-west
Joinery Services	A.B.I.S. Joinery	15 Sheppard Street, Hume,ACT	Address	184.2	North-west
Roof Construction Specialists	ACT Frames & Roof Trusses	15 Sheppard Street, Hume,ACT	Address	184.2	North-west
Furniture Storage & Removals	A C T Holbrook Removals	10 Sleigh Place, Hume Act,NSW	Address	186.7	North-west

2005 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Fencing Contractors	Monaro Fencing	21 Esmond Ave ,JERRABOMBERRA,NSW,2619	Address	72.0	East
Kitchens Renovations & Equipment- New	A.C.T. Advanced Joinery	2/8 Arnott Pl,HUME,ACT,2620	Address	77.2	North-west
Shop & Office Fitting Design & Fit-Outs	National Fixing Pty Ltd	5&6/2 Arnott Pl,HUME,ACT,2620	Address	77.2	North-west
Wedding Services	Metal Market The	16 Arnott St,HUME,ACT,2620	Address	90.4	North-west
Piano Tuning & Repairs	Acoustic Piano Service	38 Firethorn Pl, JERRABOMBERRA,NSW,2619	Address	92.7	East
Concrete - Form Ties Formwork & Accessories	Pacific Formwork (Aust) Pty Ltd	10 Johns Pl,HUME,ACT,2620	Address	101.9	North-west
Transit Centre	Pacific Formwork Pty Ltd	10 Johns Pl,HUME,ACT,2620	Address	101.9	North-west
Envelope M/Factrs &/Or W/Salers	Australia Envelopes	Unit 2 15 Arnott St,HUME,ACT,2620	Address	105.4	North-west
Door & Gate Fittings & Hardware	Modernfold (Australia)	27 Raws St,HUME,ACT,2620	Address	116.9	North-west
Building Contractors - General	Apa Homes Pty Ltd	25 Firethorn Pl, JERRABOMBERRA,NSW,2619	Address	133.1	East
Earth Moving &/Or Excavating Contractors	B J Excavations	12 Darmody Pl, JERRABOMBERRA,NSW,2619	Address	137.4	East
Foundation Garments & Accessories - Retailers & Repairers	Garden World	14 Arnott St,HUME,ACT,2620	Address	163.6	North-west
Graphite Supplies	A.C.T. Mulch Supplies	14 Arnott St,HUME,ACT,2620	Address	163.6	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Lo Pilato Bros (Marfel Transport Service)	13 Arnott St,HUME,ACT,2620	Address	168.2	North-west
Postage Meters & Franking Machines Sales Service & Repairs	Lo Pilato Bros	13 Arnott St,HUME,ACT,2620	Address	168.2	North-west
Architect	Hunter Architects	3/ 13 Sleigh Pl,HUME,ACT,2620	Address	170.1	North-west
Office & Business Supplies	Unique Dimensions	2/ 13 Sleigh Pl,HUME,ACT,2620	Address	170.1	North-west
Sports Cards & Collectables	Unique Sports Memorabilia	2/ 13 Sleigh Pl,HUME,ACT,2620	Address	170.1	North-west
Wedding Services	Visy Recycling, Hume	11 Sleigh Pl,HUME,ACT,2620	Address	175.0	North-west
Building Contractors - General	Smart Housing Company Pty Ltd, Jerrabomberra	37 Waterfall Drv, JERRABOMBERRA,NSW,2619	Address	183.1	East
Building Contractors - Renovations Alterations & Extensions	Smart Housing Company Pty Ltd	37 Waterfall Drv, JERRABOMBERRA,NSW,2619	Address	183.1	East
Roof Construction Specialists	ACT Frames and Roof Trusses	15 Sheppard St,HUME,ACT,2620	Address	184.2	North-west
Roof Truss & Wall Frame Construction	ACT Frames & Roof Trusses	15 Sheppard St,HUME,ACT,2620	Address	184.2	North-west
Shop & Office Fitting Design & Fit-Outs	A.B.I.S. Joinery Pty Ltd	15 Sheppard St,HUME,ACT,2620	Address	184.2	North-west
Air Conditioning - Industrial & Commercial	Veetemp Heating & Air Conditioning	8 Johns Pl,HUME,ACT,2620	Address	193.3	North-west

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Air Conditioning - Installations/Repairs	A Balance Heating And Air Conditioning	8 Johns Pl,HUME,ACT,2620	Address	193.3	North-west
Electrical Power Line Construction & Fittings	Budget Bobcat	8 Johns Pl,HUME,ACT,2620	Address	193.3	North-west
Furniture Storage & Removals	AMG - Holbrook Removals	10 Sleigh Pl,HUME,ACT,2620	Address	194.7	North-west
Furniture Storage & Removals	Store Ezy	10 Sleigh Pl,HUME,ACT,2620	Address	194.7	North-west
Storage - General Facilities & Service	ACT Holbrook Removals	10 Sleigh Pl,HUME,ACT,2620	Address	194.7	North-west
Storage - General Facilities & Service	Store-Ezy Self Storage	10 Sleigh Pl,HUME,ACT,2620	Address	194.7	North-west
Building Design & Drafting Services	Designs By Mahony	26 Halloran Drv, JERRABOMBERRA,NSW,2619	Address	195.8	East
Train Services	Mahony Design & Drafting	26 Halloran Drv,JERRABOMBERRA,NSW,2619	Address	195.8	East
Fruit & Vegetable W/Salers	Alpha Quality Carton Meats	16-18 Raws Crs,HUME,ACT,2620	Address	196.3	North-west
Fruit & Vegetable W/Salers	John Iannelli Fresh Produce	16-18 Raws Crs,HUME,ACT,2620	Address	196.3	North-west
Hotel Restaurant & Club Supplies	Alpha Carton Meats (Canberra)	16-18 Raws Crs,HUME,ACT,2620	Address	196.3	North-west
Carriers - Heavy Industrial Transportation	Griffrez Refrigerated Transport Pty Ltd	11 Arnott St,HUME,ACT,2620	Address	198.8	North-west
Ice Supplies	ACT Pure Ice	11 Arnott St,HUME,ACT,2620	Address	198.8	North-west
Ice Supplies	Actice Supplies	11 Arnott St,HUME,ACT,2620	Address	198.8	North-west
Ice Supplies	Solo Ice Works	11 Arnott St,HUME,ACT,2620	Address	198.8	North-west
Building Contractors - General	T.G. Toth Constructions	53 Waterfall Drv, JERRABOMBERRA,NSW,2619	Address	199.1	East
Building Contractors - General	User Friendly Building, New Homes, Extensions & Bathrooms	53 Waterfall Drv, JERRABOMBERRA,NSW,2619	Address	199.1	East
Home Repairs & Maintenance	User Friendly Building & Maintenance Services	53 Waterfall Drv, JERRABOMBERRA,NSW,2619	Address	199.1	East
Building Contractors - General	Fgc Developments Pty Ltd	Firethorn Pl, JERRABOMBERRA,NSW,2619	Street		East
Graziers	Moses R L, Nullamanna	Tralee, NULLAMANNA,NSW,2360	Street		Onsite
Nurseries - Retail	Tay's Trees	Firethorn Pl, JERRABOMBERRA,NSW,2619	Street		East

2010 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Carpenters Joiners & Fitters	Dj Joinery	21 Mariners Crt CANBERRA 2600 ACT	Address	0.0	Onsite
Balustrades Timber & Metal	H D M Metal Pty Ltd	U1/ 16 Arnott St HUME 2620 ACT	Address	90.4	North-west
Crane & Travel Tower Hire Or Servicing	Pacific Formwork	10 Johns Pl HUME 2620 ACT	Address	101.9	North-west

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Paper & Plastic Container M/Facrs & Supplies	Australia Envelopes	Unit 2 15 Arnott St HUME 2620 ACT	Address	105.4	North-west
Transport & Transportation Service	Hills Transport Canberra	15 Arnott St HUME 2620 ACT	Address	105.4	North-west
Cleaning - Chemical Steam Pressure Contractors	Sodablast	Unit 7 23 Raws Cres HUME 2620 ACT	Address	106.5	North-west
Furniture Designers - Made To Order	Pyewood Pine	Unit 4/ 23 Raws Crs HUME 2620 ACT	Address	106.5	North-west
Garden & Gardening Supplies	Table Garden Pty Ltd	U6/ 23 Raws Crs HUME 2620 ACT	Address	106.5	North-west
Kitchens Renovations & Equipment- New	Re-Create Kitchens & Bathrooms	Unit 5 23 Raws Cres HUME 2620 ACT	Address	106.5	North-west
Door & Gate Equipment - Automatic	Modernfold (Australia)	27 Raws St HUME 2620 ACT	Address	116.9	North-west
Earth Moving &/Or Excavating Contractors	B J Excavations	12 Darmody Pl JERRABOMBERRA 2619 NSW	Address	137.4	East
Earth Moving &/Or Excavating Contractors	B J Excavations	12 Darmody Pl JERRABOMBERRA 2619 NSW	Address	137.4	East
Drainers & Drainage Services	Medi Drain Act	475 Firethorn Pl JERRABOMBERRA 2619 NSW	Address	164.3	East
Drainers & Drainage Services	Medi Drain Act	475 Firethorn Pl JERRABOMBERRA 2619 NSW	Address	164.3	East
Builder Handyman Contractor Equipment Sale/ Hire	Lo Pilato Bros (Marfel Transport Service)	13 Arnott St HUME 2620 ACT	Address	168.2	North-west
Earth Moving &/Or Excavating Contractors	Marfel Transport	13 Arnott St HUME 2620 ACT	Address	168.2	North-west
Recyclers	Visy Recycling	11 Sleigh Pl HUME 2620 ACT	Address	175.0	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Coates	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Force Access	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Bus & Truck Repairs	Capital Truck & Track	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Carriers - Heavy Industrial Transportation	Capital City Heavy Haulage	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Cold Storage - Refrigeration	Royal Wolf Refrigerated Containers	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Engineers - Motor & Repairers	Hume Mechanical Repairs Pty Ltd	47 Alderson Pl HUME 2620 ACT	Address	176.1	North-west
Landscape Gardening Services & Supplies	Garden World	12-14 Arnott St HUME 2620 ACT	Address	178.2	North-west
Swimming Pool - Construction & Installation	Anyday Hire Service	12-14 Arnott St HUME 2620 ACT	Address	178.2	North-west
Bus & Truck Repairs	Truck Art	Unit 4A- 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Door & Gate Equipment - Automatic	Capital Doorworks	Unit 2A/ 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Engineers - Motor & Repairers	Autotech Services (Act)	Unit 1A 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Glass Merchants & Installation Service Glaziers	Dominy & Fletcher	Unit 5A 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Kitchens Renovations & Equipment- New	Act Board Cutting Services Pty Ltd	Unit 1B/ 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Roof Construction Specialists	Act Frames And Roof Trusses	15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Roof Truss & Wall Frame Construction	Statewide Frames & Trusses	U5A/ 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Shop & Office Fitting Design & Fit-Outs	Abis Joinery Pty Ltd	Unit 1B 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Welding	Beeshaw Welding	Unit 3 15 Sheppard St HUME 2620 ACT	Address	184.2	North-west
Kitchens Renovations & Equipment- New	Leading Edge Benchtops	13B Sleigh Pl HUME 2620 ACT	Address	187.6	North-west
Kitchens Renovations & Equipment- New	About Kitchens	8A Johns Pl HUME 2620 ACT	Address	193.3	North-west
Transport & Transportation Service	John Iannelli Refrigerated & General Transport	16-18 Raws Crs HUME 2620 ACT	Address	196.3	North-west
Building - Supplies & Hardware	Onesteel Metalcentre Hume	Johns Pl HUME 2620 ACT	Street		North-west
Landscape Gardening Services & Supplies	Canberra Sand And Gravel	Johns Pl HUME 2620 ACT	Street		North-west
Nurseries - Retail	Sterling's Nursery	Firethorn Pl JERRABOMBERRA 2619 NSW	Street		East
Steel Merchant	Onesteel Metalcentre Canberra	Johns Pl HUME 2620 ACT	Street		North-west

2015 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Furniture Designers - Made To Order	Pyewood Pine	Unit 4/23 Raws Crs, Hume,ACT,2620	Address	53.0	North-west
Kitchens Renovations & Equipment- New	Re-create Kitchens & Bathrooms	5/23 Raws Crs, Hume,ACT,2620	Address	53.0	North-west
Garden & Gardening Supplies	Table Garden Pty Ltd	Unit 6/23 Raws Crs, Hume,ACT,2620	Address	54.8	North-west
Electrical Contractors & Consultants	MAK Electrics	4 Stella Pl, Jerrabomberra,NSW,2619	Address	57.6	East
Gates & Fences	Monaro Fencing	21 Esmond Ave, Jerrabomberra,NSW,2619	Address	71.9	East
Couriers	Dengate Delivery Services Pty Ltd	16 Arnott St,Hume,ACT,2620	Address	84.5	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Acrow Formwork & Scaffolding	15 Sleigh Pl,Hume,ACT,2620	Address	88.7	North-west
Wedding - Video & Dvd Services	SightProduction	2/15 Darmody Pl, Jerrabomberra,NSW,2619	Address	94.4	East
Envelope M/Factrs &/Or W/Salers	Australia Envelopes	Unit 2 15 Arnott St,Hume,ACT,2620	Address	101.2	North-west
Transport & Transportation Service	Hills Transport Canberra	15 Arnott St,Hume,ACT,2620	Address	101.2	North-west
Electrical Contractors & Consultants	Laser Electrical Hume	3/ 23 Raws Crs, Hume,ACT,2620	Address	102.3	North-west
Concrete - Form Ties Formwork & Accessories	Boral Formwork & Scaffolding	15 Sleigh Pl,Hume,ACT,2620	Address	108.0	North-west
Scaffolding Sale Or Hire	Cyclone Scaffolding Pty Ltd	15 Sleigh Pl,Hume,ACT,2620	Address	108.0	North-west
Windows - Aluminium & Metallic	System Windows	15 Sleigh Pl,Hume,ACT,2620	Address	108.0	North-west
Concrete - Form Ties Formwork & Accessories	Pacific Formwork Australia	10 Johns Pl,Hume,ACT,2620	Address	111.2	North-west

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Scaffolding Sale Or Hire	Pacific Formwork	10 Johns Pl,Hume,ACT,2620	Address	111.2	North-west
Door & Gate Fittings & Hardware	Modernfold (Australia)	27 Raws St,Hume,ACT,2620	Address	116.9	North-west
Carriers - Light Transportation	Hills ParcelDirect	15 Arnott St,Hume,ACT,2620	Address	126.4	North-west
Concrete - Contractors & Paving Specialists	Sapphire Concreting	10 Darmody Pl, Jerrabomberra,ACT,2619	Address	134.6	East
Earth Moving &/Or Excavating Contractors	B J Excavations	12 Darmody Pl, Jerrabomberra,ACT,2619	Address	136.9	East
Telecommunication Consultants	Canberra Communications Solutions Pty Ltd	12 Arnott St,Hume,ACT,2620	Address	144.8	North-west
Bus & Truck Repairs	Truck Art	Unit 4A- 15 Sheppard St, Hume,ACT,2620	Address	144.8	North-west
Joinery Services	Affinity Kitchens & Joinery	2/ 15 Sheppard St, Hume,ACT,2620	Address	144.8	North-west
Furniture Storage & Removals	Grace Removals Group	54 Sawmill Cct, Canberra,ACT,2600	Address	145.1	North-west
Car & Truck Body Trimmers	Hume Smash Repairs	4A 15 Sheppard St,Hume,ACT,2620	Address	146.5	North-west
Relocation Services & Consultants	Relocation Rules	Unit 4a 15 Sheppard St,Hume,ACT,2620	Address	146.5	North-west
Petrol Stations & Garages	Woolworths Petrol	10 Limestone Dr, Jerrabomberra,NSW,2619	Address	148.9	East
Engineers - Motor & Repairers	Autotech Services (ACT)	U 1A/ 15 Sheppard St,Hume,ACT,2620	Address	149.5	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Lo Pilato Bros (Marfel Transport Service)	13 Arnott St,Hume,ACT,2620	Address	157.1	North-west
Carriers - Heavy Industrial Transportation	Lo Pilato Bros.	13 Arnott St,Hume,ACT,2620	Address	157.1	North-west
Transport & Transportation Service	Marfel Transport	13 Arnott St,Hume,ACT,2620	Address	157.1	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Coates	47 Alderson Pl,Hume,ACT,2620	Address	161.2	North-west
Builder Handyman Contractor Equipment Sale/ Hire	Force Access	47 Alderson Pl,Hume,ACT,2620	Address	161.2	North-west
Buildings - Relocatable/Transportable -Commercial	Royal Wolf	47 Alderson Pl,Hume,ACT,2620	Address	161.2	North-west
Engineers - Diesel Repair Specialist	Capital Truck & Track	47 Alderson Pl,Hume,ACT,2620	Address	161.2	North-west
Recyclers	Visy Recycling	11 Sleigh Pl,Hume,ACT,2620	Address	175.0	North-west
Petrol Stations & Garages	Caltex Woolworths	10 Limestone Drv, Jerrabomberra,NSW,2619	Address	175.3	East
Concrete - Reinforcing Products	OneSteel Reinforcing	17 Sheppard St, Hume,ACT,2620	Address	177.9	North-west
Scrap Metal Merchants	All Types Of Scrap Metal	47 Alderson Pl, Canberra,ACT,2600	Address	191.7	North-west
Doctors & Medical Practitioners	Leung Jennifer	Unit 11/2 Limestone Drv, Jerrabomberra,ACT,2619	Address	192.6	East
Transport & Transportation Service	Griffreez Refrigerated Transport Pty Ltd	11 Arnott St,Hume,ACT,2620	Address	194.5	North-west
Airport Shuttle Transit Services	City Car Limousines	Jerrabomberra,ACT,2619	Suburb		East
Alternative Health Service Providers	Daws Stephen	Jerrabomberra,ACT,2619	Suburb		East

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Audio-Visual Equipment Sales Hire Or Service	Hillcrest Audio visual	Jerrabomberra,ACT,2619	Suburb		East
Batteries - Automotive & Marine	Battery World	Jerrabomberra,ACT,2619	Suburb		East
Brokers - Business Consultancy	destinyinyourhands.com	Jerrabomberra,NSW,2619	Suburb		East
Builder Handyman Contractor Equipment Sale/ Hire	Rent A Fence	Jerrabomberra,NSW,2619	Suburb		East
Builder Handyman Contractor Equipment Sale/ Hire	TFH Hire Services	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	Brumec Building Services	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	Exceptional Constructions Pty Ltd	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	Jarrad's Brick & Block Laying	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	JC Developments	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	Pichelmann Construction	Jerrabomberra,NSW,2619	Suburb		East
Building Contractors - General	Timbre Homes	Jerrabomberra,NSW,2619	Suburb		East
Carpenters Joiners & Fitters	Qualified Carpenters & Joiners	Jerrabomberra,NSW,2619	Suburb		East
Carpet Furniture & Upholstery Cleaning	Drymaster Carpet Cleaning	Jerrabomberra,NSW,2619	Suburb		East
Carpet Furniture & Upholstery Cleaning	Electrodry Carpet Dry Cleaning	Jerrabomberra,NSW,2619	Suburb		East
Cleaning - Industrial/Commercial Contractors	SKG Pty Ltd	Jerrabomberra,ACT,2619	Suburb		East
Cleaning Services - Domestic	Forward Cleaning Services	Jerrabomberra,NSW,2619	Suburb		East
Clothes Lines Portable & Rotary	Samuel Mahler	Jerrabomberra,ACT,2619	Suburb		East
Computer Equipment - Hardware Home Office	Alex Garnock	Jerrabomberra,ACT,2619	Suburb		East
Computer Equipment - Repairs Upgrades & Service	Geeks2U	Jerrabomberra,ACT,2619	Suburb		East
Concrete - Contractors & Paving Specialists	BM Concreting	Jerrabomberra,NSW,2619	Suburb		East
Concrete - Contractors & Paving Specialists	Capital Bobcat & Concreting	Jerrabomberra,ACT,2619	Suburb		East
Concrete - Contractors & Paving Specialists	Renew Concrete	Jerrabomberra,NSW,2619	Suburb		East
Concrete - Gutters & Kerbs	Bluey's Kwik Kerb	Jerrabomberra,ACT,2619	Suburb		East
Dishwashing Machines Servicing & Parts	Fisher & Paykel	Jerrabomberra,ACT,2619	Suburb		East
Dog & Cat Grooming	Aussie Pooch Mobile Dog Wash / Grooming	Jerrabomberra,NSW,2619	Suburb		East
Driving Schools	Canberra Region Truck & Bus School	Jerrabomberra,NSW,2619	Suburb		East
Earth Moving &/Or Excavating Contractors	Pyramid Drains Pty Ltd	Jerrabomberra,NSW,2619	Suburb		East
Earth Moving &/Or Excavating Contractors	Rubble Bobcat Services	Jerrabomberra,NSW,2619	Suburb		East

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Electrical Contractors & Consultants	ALLTYPE	Jerrabomberra,ACT,2619	Suburb		East
Engineers - Motor & Repairers	Lube Mobile - The Mobile Mechanics	Jerrabomberra,ACT,2619	Suburb		East
Entertainers Musicians & Agents	Melissa Gaye Entertainment	Jerrabomberra,NSW,2619	Suburb		East
Fashion Jewellery & Accessories - Importers & W/Salers	De Beads Online Bead Shop	Jerrabomberra,ACT,2619	Suburb		East
Fencing Contractors	Dunn & Farrugia Pty Ltd	Jerrabomberra,NSW,2619	Suburb		East
Fencing Contractors	Rent A Fence Canberra	Jerrabomberra,NSW,2619	Suburb		East
Gardening Services	High Country Landscapes	Jerrabomberra,NSW,2619	Suburb		East
Glass Merchants & Installation Service Glaziers	Aussie Emergency Glass	Jerrabomberra,NSW,2619	Suburb		East
Glass Merchants & Installation Service Glaziers	Axis Glass & Glazing	Jerrabomberra,ACT,2619	Suburb		East
Glass Merchants & Installation Service Glaziers	Greenleigh Contractors	Jerrabomberra,NSW,2619	Suburb		East
Glass Merchants & Installation Service Glaziers	O'Brien	Jerrabomberra,NSW,2619	Suburb		East
Glass Merchants & Installation Service Glaziers	TGA	Jerrabomberra,ACT,2619	Suburb		East
Hardware - Retailers	Erns Smith Mitre 10	Jerrabomberra,ACT,2619	Suburb		East
Home Improvement & Renovation Services	Danny's Handyman & Maintenance Service	Jerrabomberra,ACT,2619	Suburb		East
Home Repairs & Maintenance	Shee Property Maintenance & Fire Services	Jerrabomberra,NSW,2619	Suburb		East
Hot Water Systems Sales Installation & Repairs	Duncan's Plumbing Service	Jerrabomberra,NSW,2619	Suburb		East
Hot Water Systems Sales Installation & Repairs	Solahart	Jerrabomberra,ACT,2619	Suburb		East
Hot Water Systems Sales Installation & Repairs	The Hot Water Doctor	Jerrabomberra,ACT,2619	Suburb		East
Insurance - Fire Marine Casualty/Accident & General	Budget Direct Insurance	Jerrabomberra,NSW,2619	Suburb		East
Joinery Services	ACT Board Cutting Services Pty Ltd	Jerrabomberra,ACT,2619	Suburb		East
Landscape Design & Consultants	Capital Country Stonework	Jerrabomberra,ACT,2619	Suburb		East
Lawn Cutting & Garden Maintenance	Jim's Mowing	Jerrabomberra,NSW,2619	Suburb		East
Lawn Cutting & Garden Maintenance	Jim's Mowing (Jerrabomberra North)	Jerrabomberra,ACT,2619	Suburb		East
Legal Costing & Support Services	Authority Brief	Jerrabomberra,NSW,2619	Suburb		East
Martial Arts & Self Defence Schools & Supplies	Budoshinkai Karate Jitsu	Firethorn Pl,Jerrabomberra,NSW,2619	Street		East
Martial Arts & Self Defence Schools & Supplies	Impact Martial Arts	Jerrabomberra,ACT,2619	Suburb		East
Millinery Retailers	Viktoria Novak Design	Jerrabomberra,NSW,2619	Suburb		East
Musician Hire & Musicians' Agents	Sly Dogs	Jerrabomberra,NSW,2619	Suburb		East
Pest Control Services	Rentokil	Jerrabomberra,NSW,2619	Suburb		East

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Pet Shops & Accessories	2 Easy	Jerrabomberra,NSW,2619	Suburb		East
Plumbers & Gasfitters	Garry Blewitt Plumbing	Jerrabomberra,NSW,2619	Suburb		East
Plumbers & Gasfitters	National Plumbing Service Pty Ltd	Jerrabomberra,ACT,2619	Suburb		East
Plumbers & Gasfitters	Woden Valley Plumbing & Gasfitting	Jerrabomberra,ACT,2619	Suburb		East
Roof Repairs & Roof Cleaning & Maintenance	Look Up Roof Restorations	Jerrabomberra,NSW,2619	Suburb		East
Security & Alarm Systems & Consultants	Convac Services Ducted Vacuum Systems	Jerrabomberra,NSW,2619	Suburb		East
Signwriters	Aussie Printing Stickers & Signs	Jerrabomberra,NSW,2619	Suburb		East
Solar Energy Equipment & Machinery	Rheem	Jerrabomberra,NSW,2619	Suburb		East
Stone Masons Stonework & Masonry	Mals Rock Works	Jerrabomberra,NSW,2619	Suburb		East
Television Antennas Retail & Installation	Allsat	Jerrabomberra,NSW,2619	Suburb		East
Television Antennas Retail & Installation	JA & MA Cabling Pty Ltd	Jerrabomberra,NSW,2619	Suburb		East
Tilers - Wall & Floor	Jerry Maatouk Ceramic Tiler	Jerrabomberra,ACT,2619	Suburb		East
Washing Machines & Dryers - Service Parts & Repairs	ACT Majestic Services	Jerrabomberra,NSW,2619	Suburb		East
Windows - Aluminium & Metallic	ACT Window Installations	Jerrabomberra,NSW,2619	Suburb		East
Windscreens New & Repairs	O'Brien	Jerrabomberra,ACT,2619	Suburb		East

Land Insight uses a number of address geocoding techniques and characterised them according to the following criteria: completeness (match rates) and positional accuracy. When a historical street address does not contain complete details or a match is not found, a record identified as being in the surrounding area will be included for reference and the accuracy of the data is approximate only. The positional accuracy of the records is listed below:

Historical data positional accuracy and georeferencing results explanation		
Positional accuracy	Georeferenced	Description
Address	Located to the address level	<i>When street address and names fully match.</i>
Street	Located to the street centroid	<i>When street names match but no exact address was found. Location is approximate.</i>
Place	Located to the structure, building or complex	<i>When building, residential complex or structure name match but no exact address was found. Location is approximate.</i>
Suburb	Located to the suburb area	<i>When suburb name match but no exact address was found. Location is approximate.</i>

The data used in this section was extracted from range of historical commercial trade directories and historical business listing information. The business addresses were geocoded using historical information and cannot be relied upon as some of the addresses no longer exist. From 2005, the historical business records in this section are considered more accurate as information was extracted from digital directories with geographic coordinate location information available. For more information on how these records were geocoded and the methodology used by Land Insight, contact us at info@landinsight.co.

Historical Industries or business activities deemed to be of negligible or lesser risk are not reported. Please note that any record not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.



Section 5 Natural Hazards



5.1 Natural Hazards

Map 5.1 (500m Buffer)

Erosion Risk

Category	On the Property?	Within Buffer?
Minor to moderate	Yes	Yes

Fire Hazard

Category	On the Property?	Within Buffer?
Bush Fire Prone Land (BLP)	Buffer Category 1 Category 2	Buffer Category 1 Category 2
Fire History	Wildfire 1951-52 Burnt 1984-85	Wildfire 1951-52 Wildfire 1973-74 Wildfire 1984-85 Burnt 1984-85

Flood Hazard

Category	On the Property?	Within Buffer?
1 percent AEP Flood	-	Yes



Tower Three, Level 24
300 Barangaroo Avenue
Sydney NSW 2000 Australia
02 8067 8870
info@liresources.com.au
www.liresources.com.au

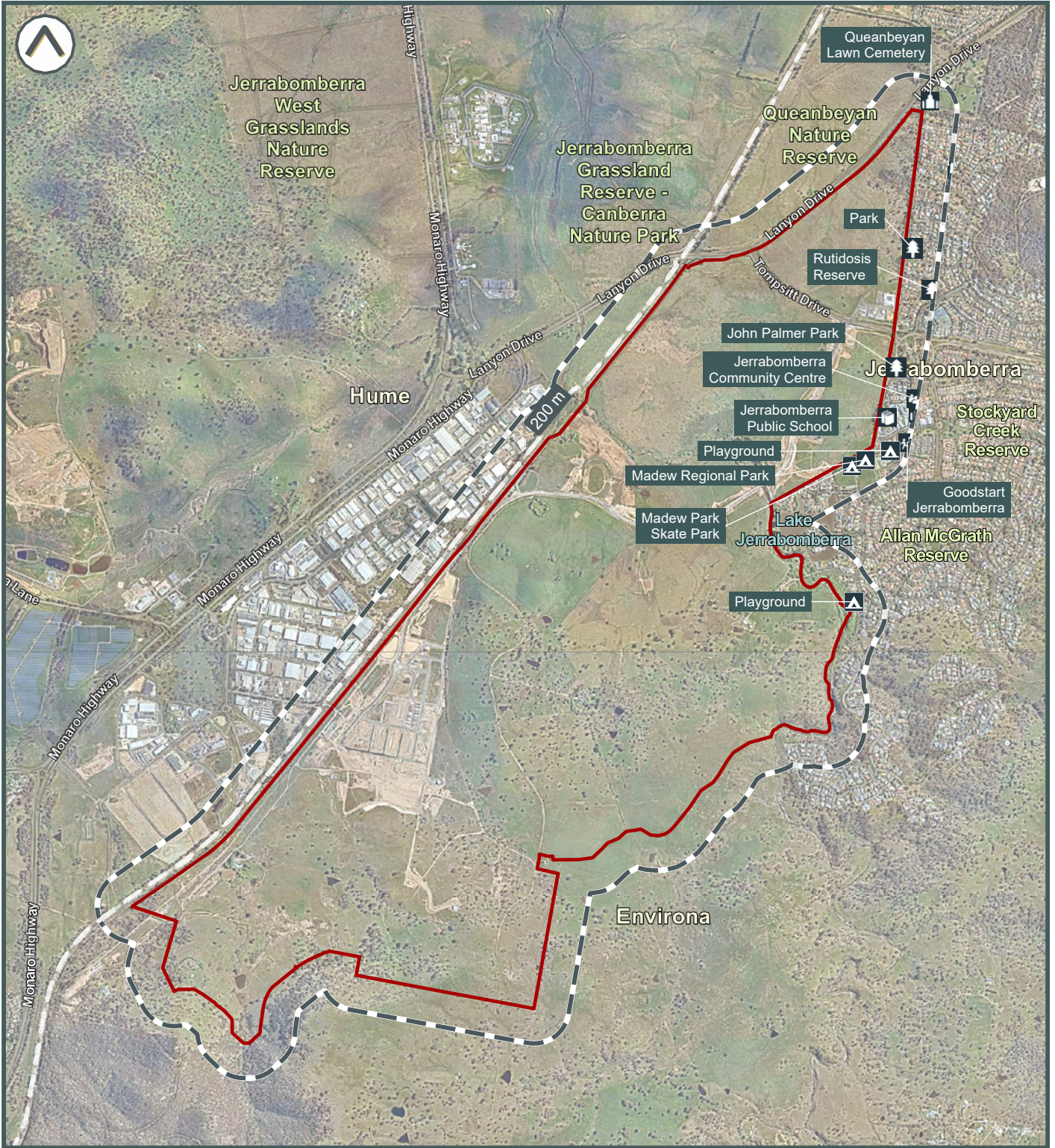


Appendix A

REPORT MAPS



Subject Area and Sensitive Receptors

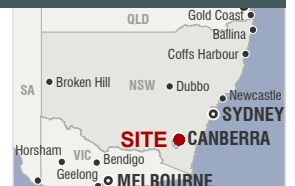


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- Subject area
- Sensitive Receptors**
- Child Care Services
- Community Centres & Services
- Education Facility
- Parks
- Places of Worship & Religious Organisations
- Sports and Recreation Activities

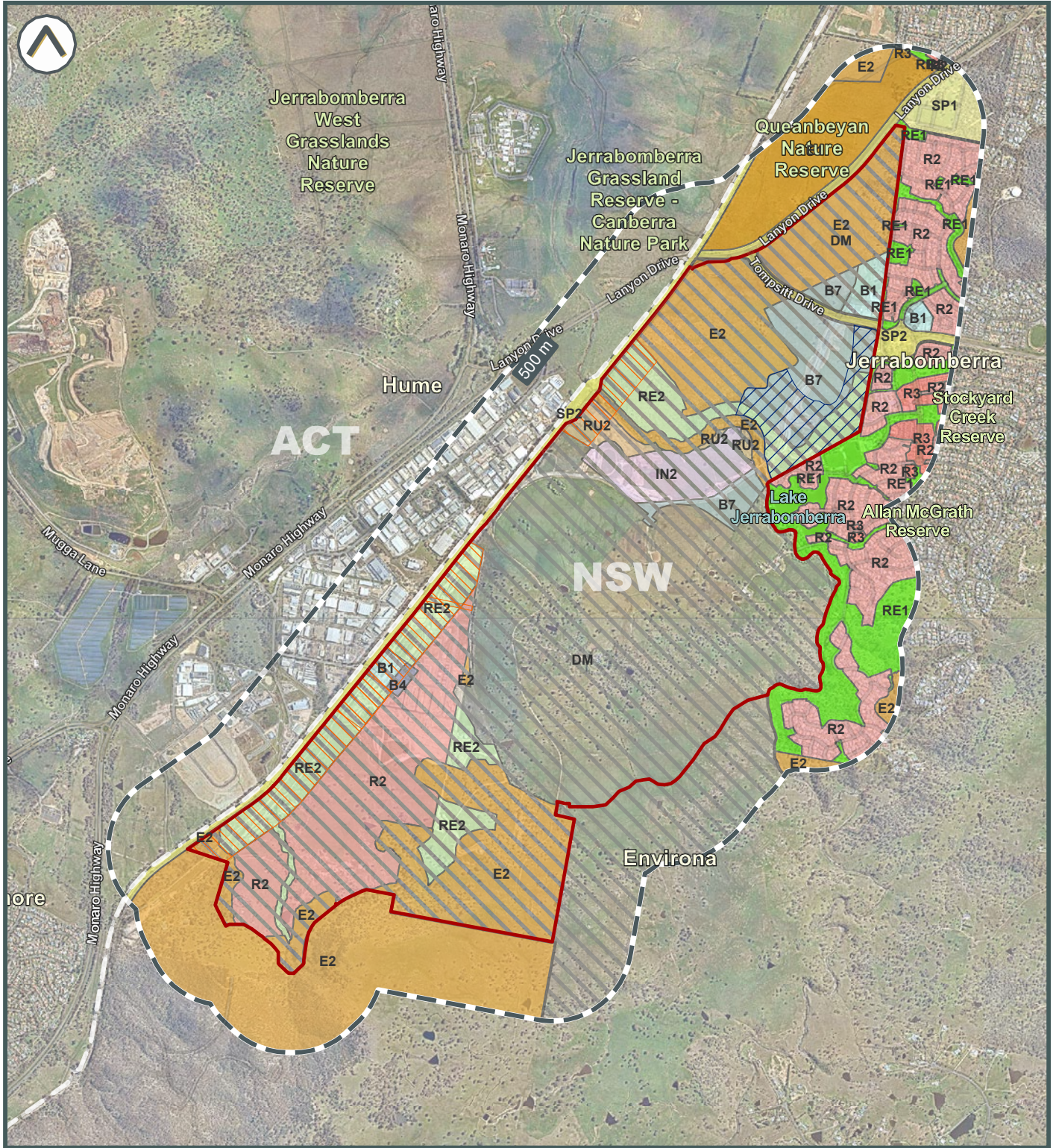


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Planning Controls

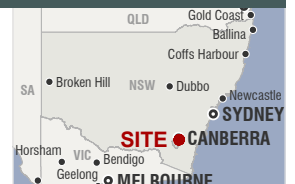


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- | | | | | | |
|--------------------|--------------------------------|--|---|--|--|
| | Subject area | | DM Deferred Matter | | RE1 Public Recreation |
| | Additional Permitted Land Uses | | E1 National Parks and Nature Reserves | | RE2 Private Recreation |
| | Local Provisions | | E2 Environmental Conservation | | RU2 Rural Landscape Zone |
| Land Zoning | | | E4 Environmental Living | | SP1 Special Activities |
| | B1 Neighbourhood Centre | | IN2 Light Industrial | | SP2 Special Purposes Zone - Infrastructure |
| | B4 Mixed Use | | R2 Low Density Residential | | |
| | B7 Business Park | | R3 Medium Density Residential | | |

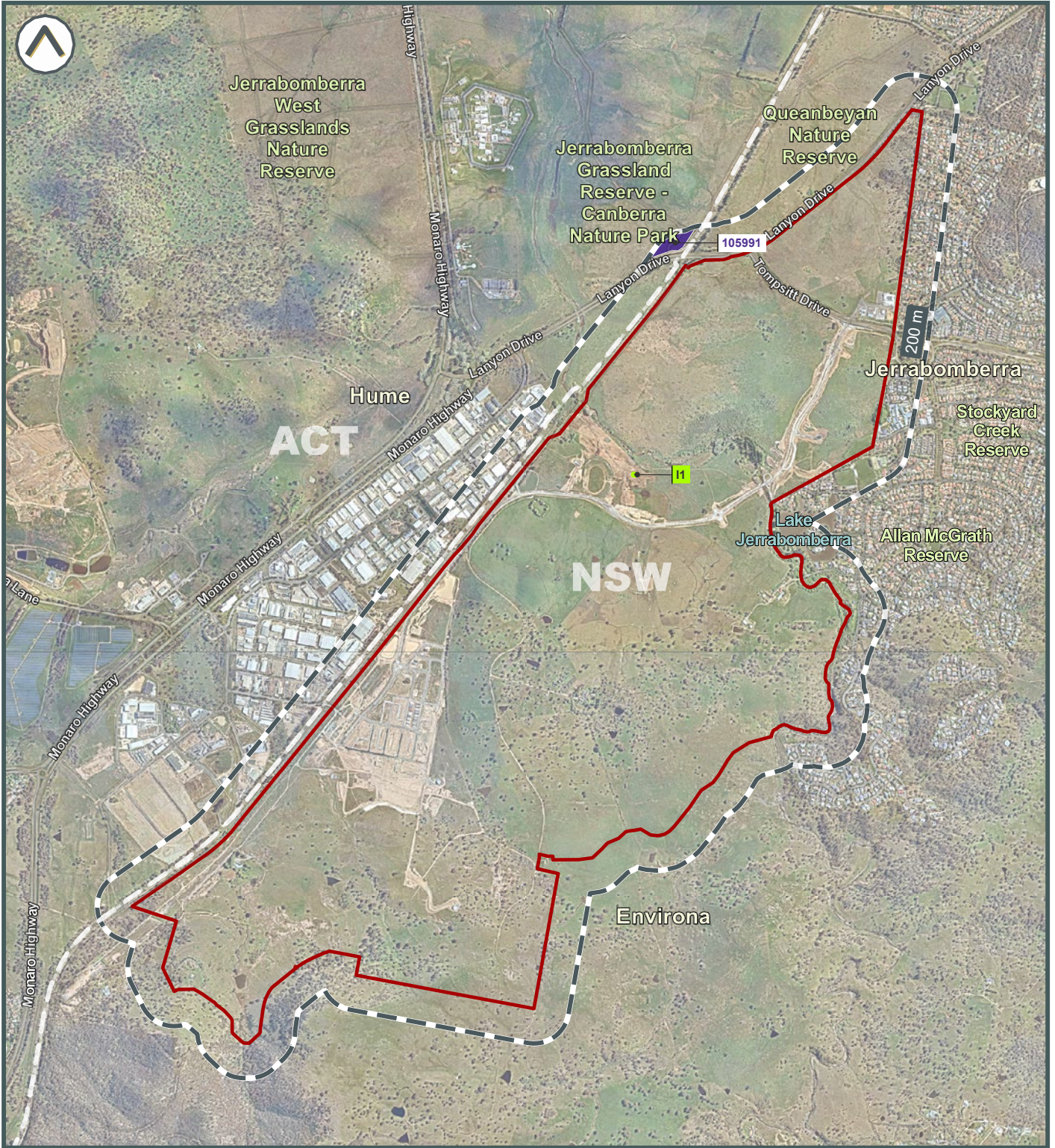


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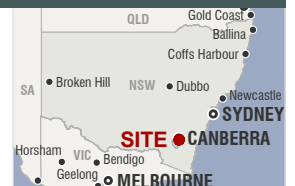


Heritage



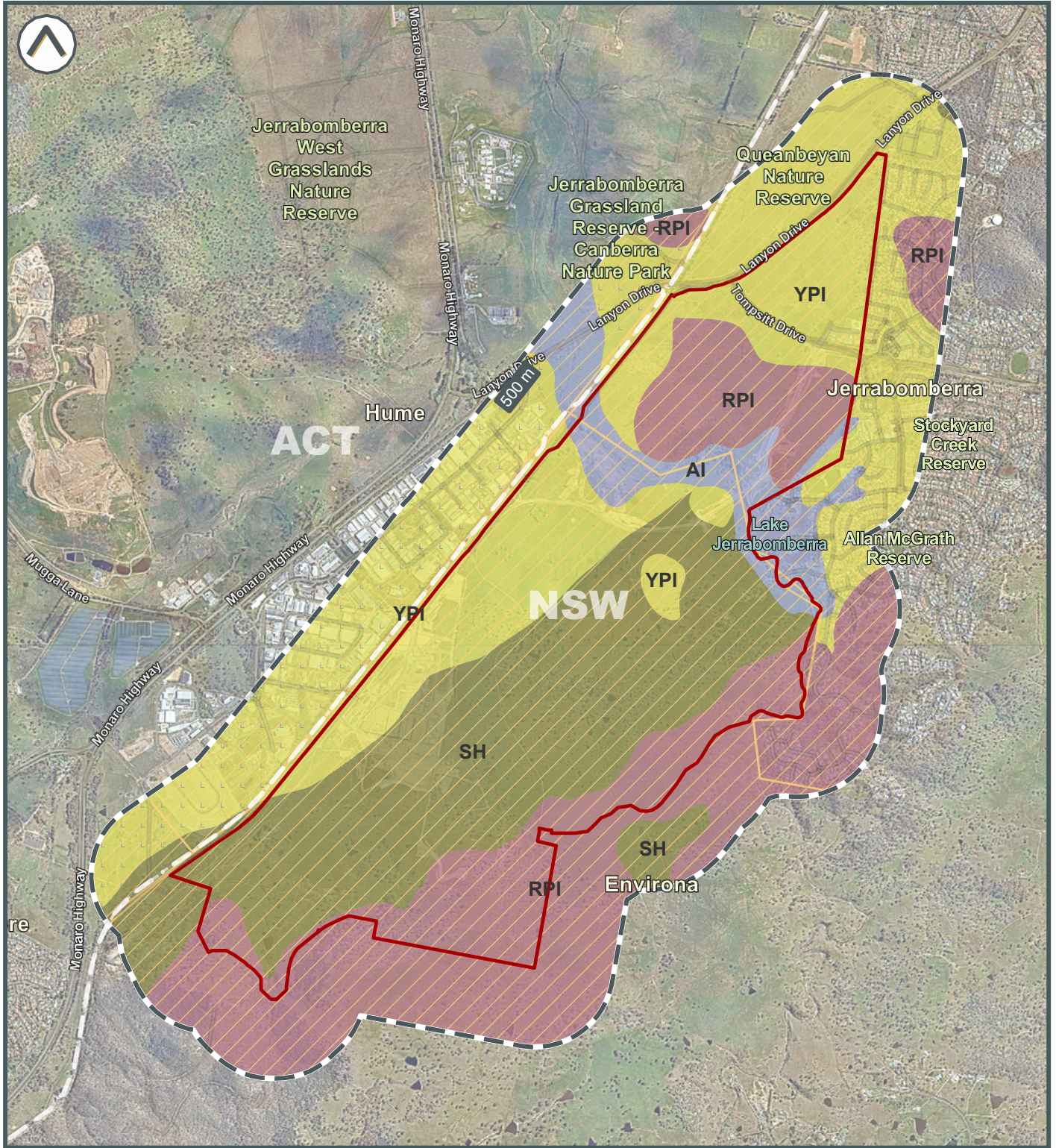
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- Subject area
- Heritage conservation Area (LEP)
- State Heritage Register
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- World Heritage Area (WHA)



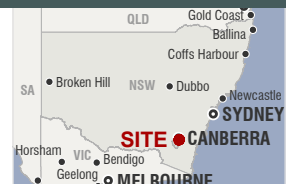


Soil Landscape and Salinity



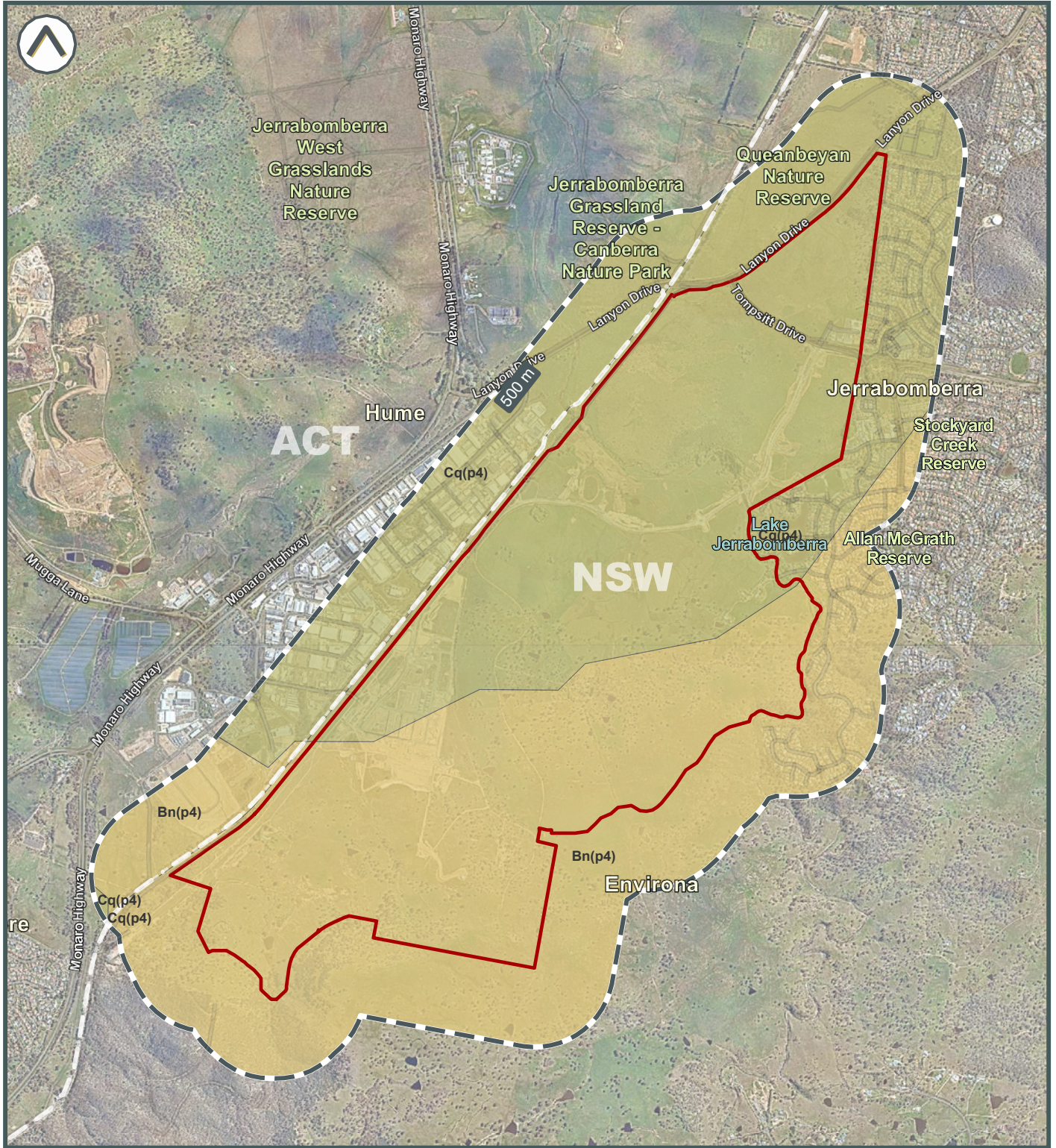
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- Subject area
- Salinity Hazard
- Low
- Radon Level (Bq/m³)
- 5-19
- Dominant Great Soil Group (GSG)
- Alluvial Soils - Light Sandy Textured (AI)
- Red Podzolic Soils - less fertile (granites and metasediment) (RPI)
- Soloths (SH)
- Yellow Podzolic Soils -less fertile (granites and metasediments) (YPI)





Acid Sulfate Soils

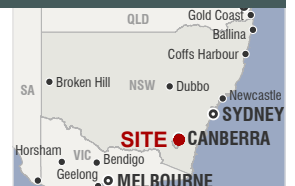


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- Subject area
- ASRIS Atlas of Australian Sulfate Soils
- Bn(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Cq(p4) | ASS in inland lakes, waterways, wetlands and riparian zones

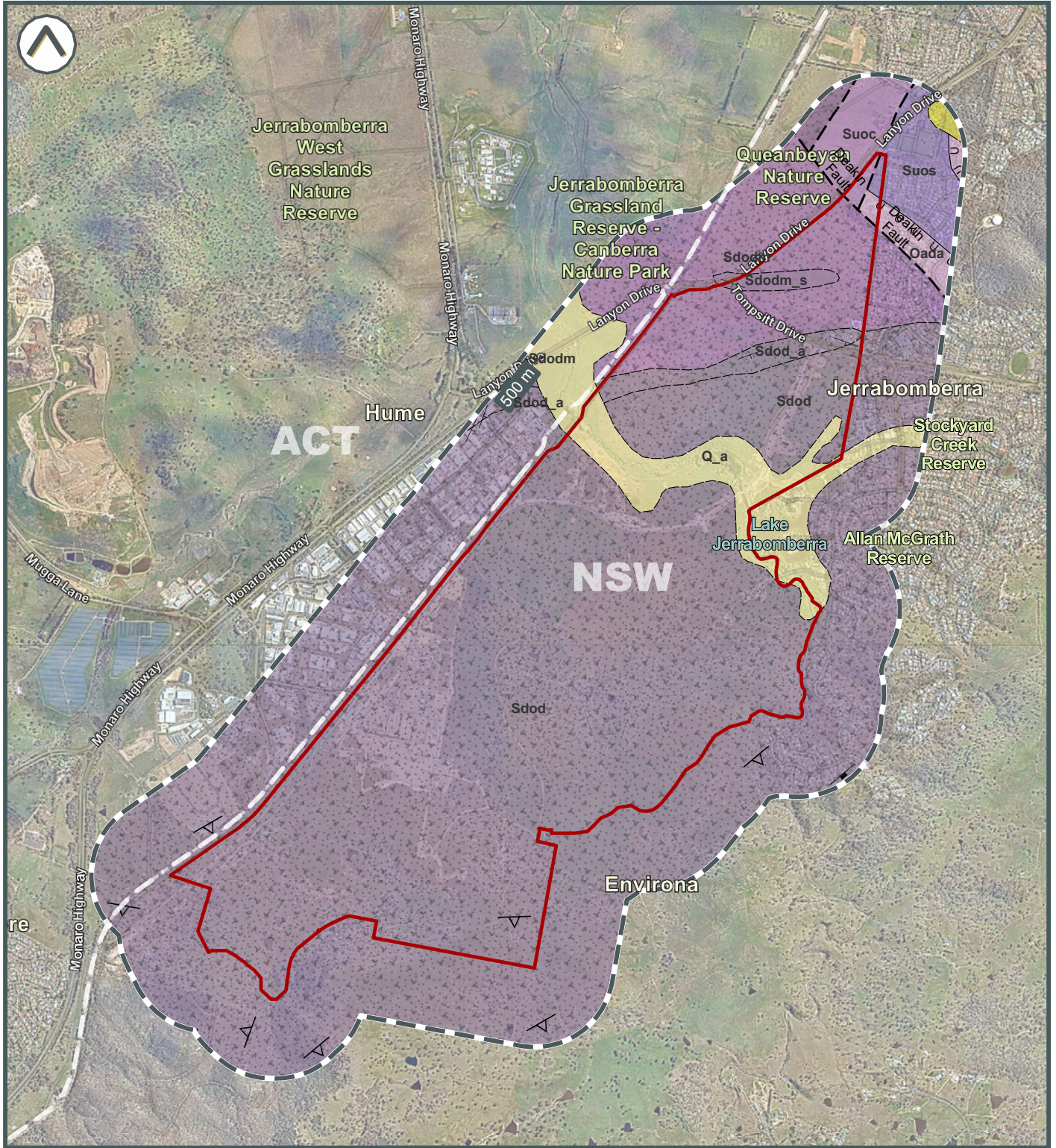


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Geology and Topography



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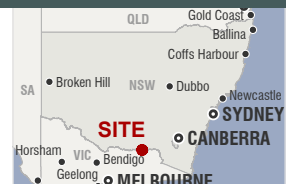
- Subject area
- Topographic contour (m)
- Strike and dip of bedding
- Strike and dip of strata, dip not estimated
- Strike and dip of joint
- Prevailing strike and dip of platy alignment/igneous banding.
- Fault, position approximate

- Dominant Lithology**
- Ash tuff, lapillistone, and lapilli tuff
 - Fine grained igneous rock
 - Pyroclastic rock
- Cenozoic Sedimentary Province**
- Q_a
 - Q_ctf

- LACHLAN OROGEN**
- Oada
 - Obew
 - Sdod
 - Sdod_a
 - Sdodm
 - Sdodm_s
- Sdom
 - Suob
 - Suoc
 - Suos

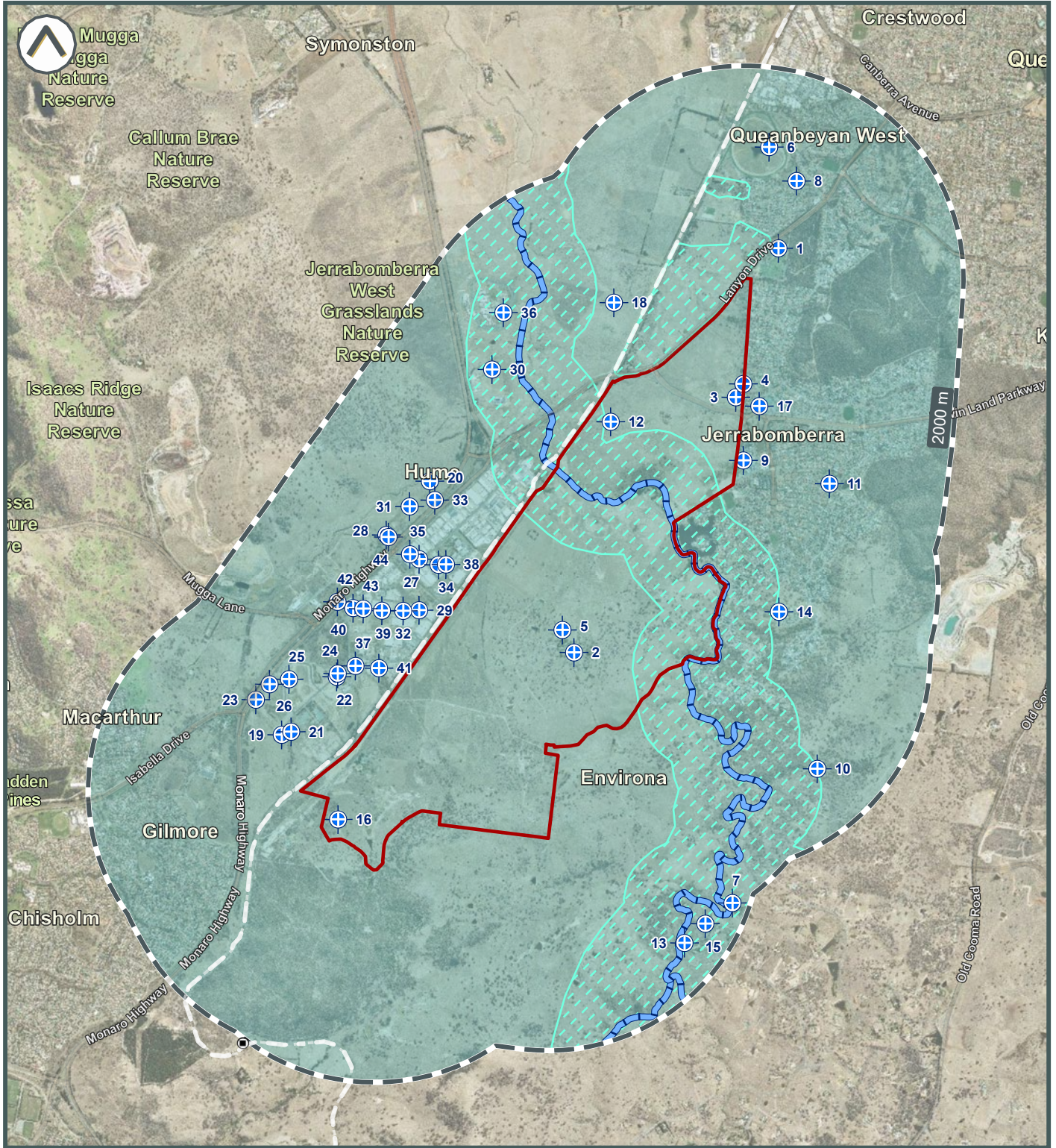


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Hydrogeology and Groundwater Boreholes



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- Subject area
- + Groundwater bores
- UPSS Environmentally Sensitive Zone
- Protected Riparian Corridor
- Fractured or fissured, extensive aquifers of low to moderate productivity

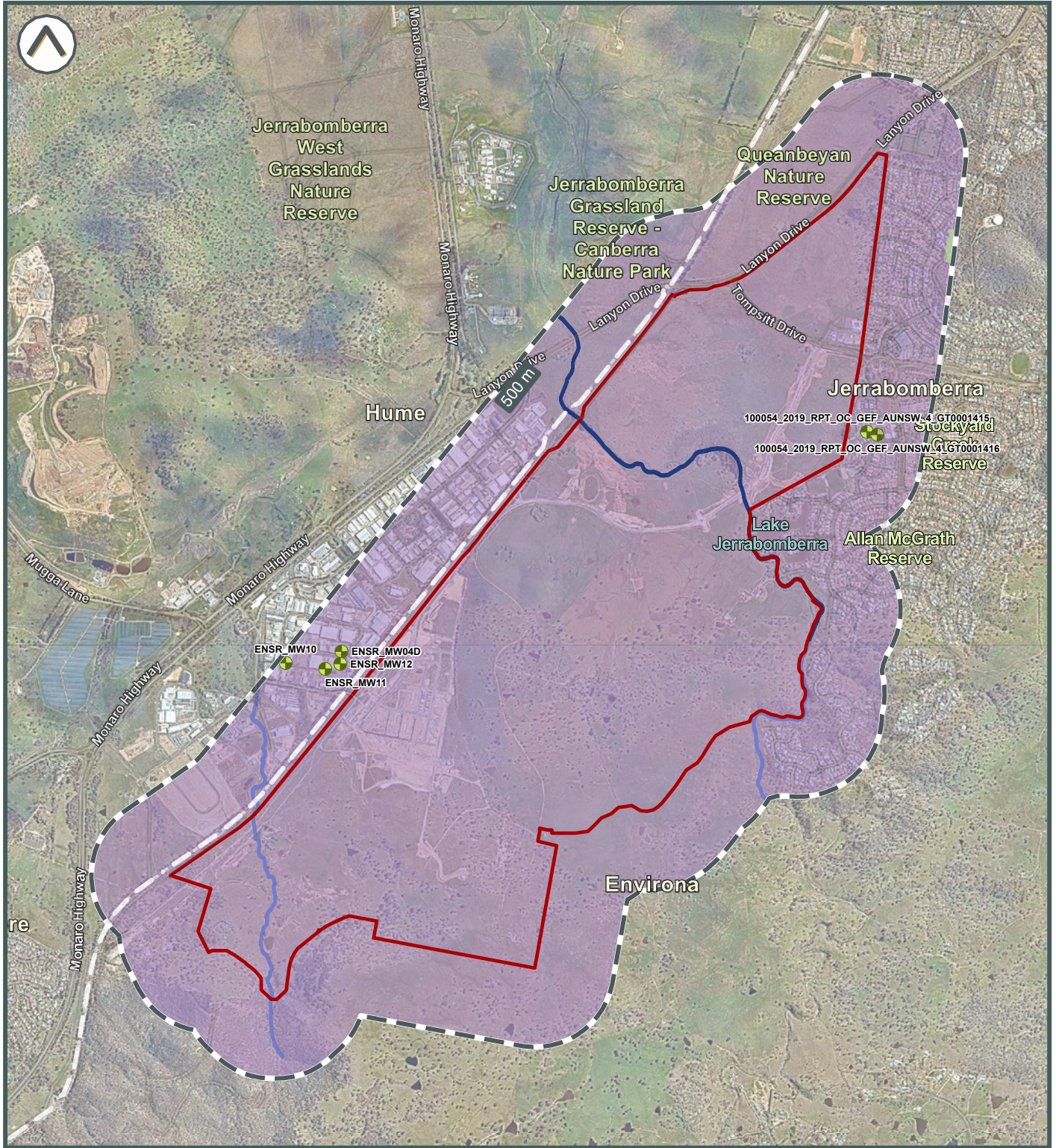


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Hydrogeology and Other Boreholes



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- Subject area
- Other borehole/monitoring well location
- Ecosystems that rely on the Surface expression of Groundwater
- High potential GDE - from national assessment
- Moderate potential GDE - from national assessment
- Ecosystems that rely on Subsurface presence of Groundwater
- Low potential GDE - from national assessment
- Hydrogeologic Unit
- Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)

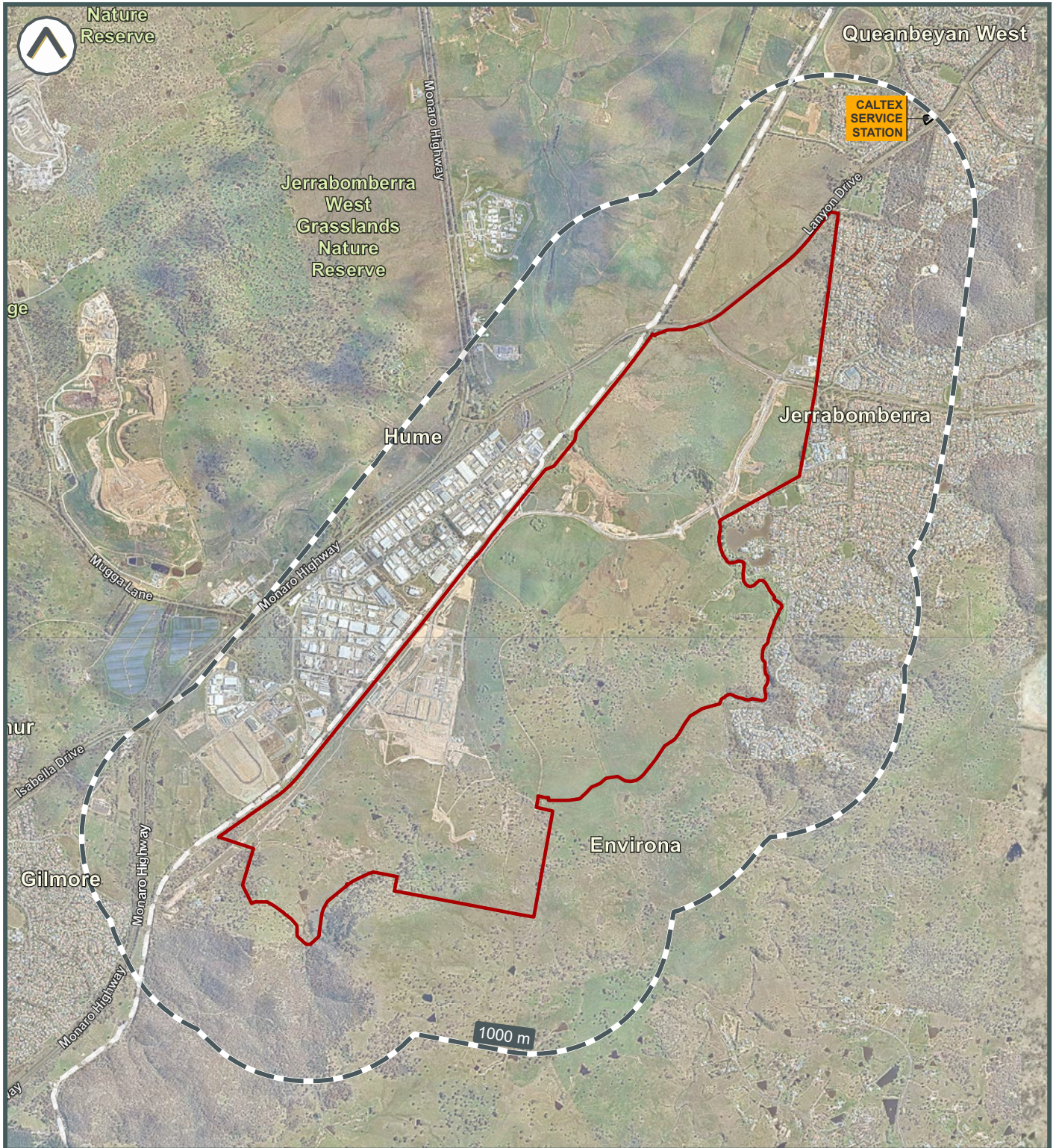


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Contaminated Land Public Register



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-  Subject area
-  Contaminated Land Register (EPA)
-  Contaminated Land Register (EPA)
-  Contaminated Land Record of Notices

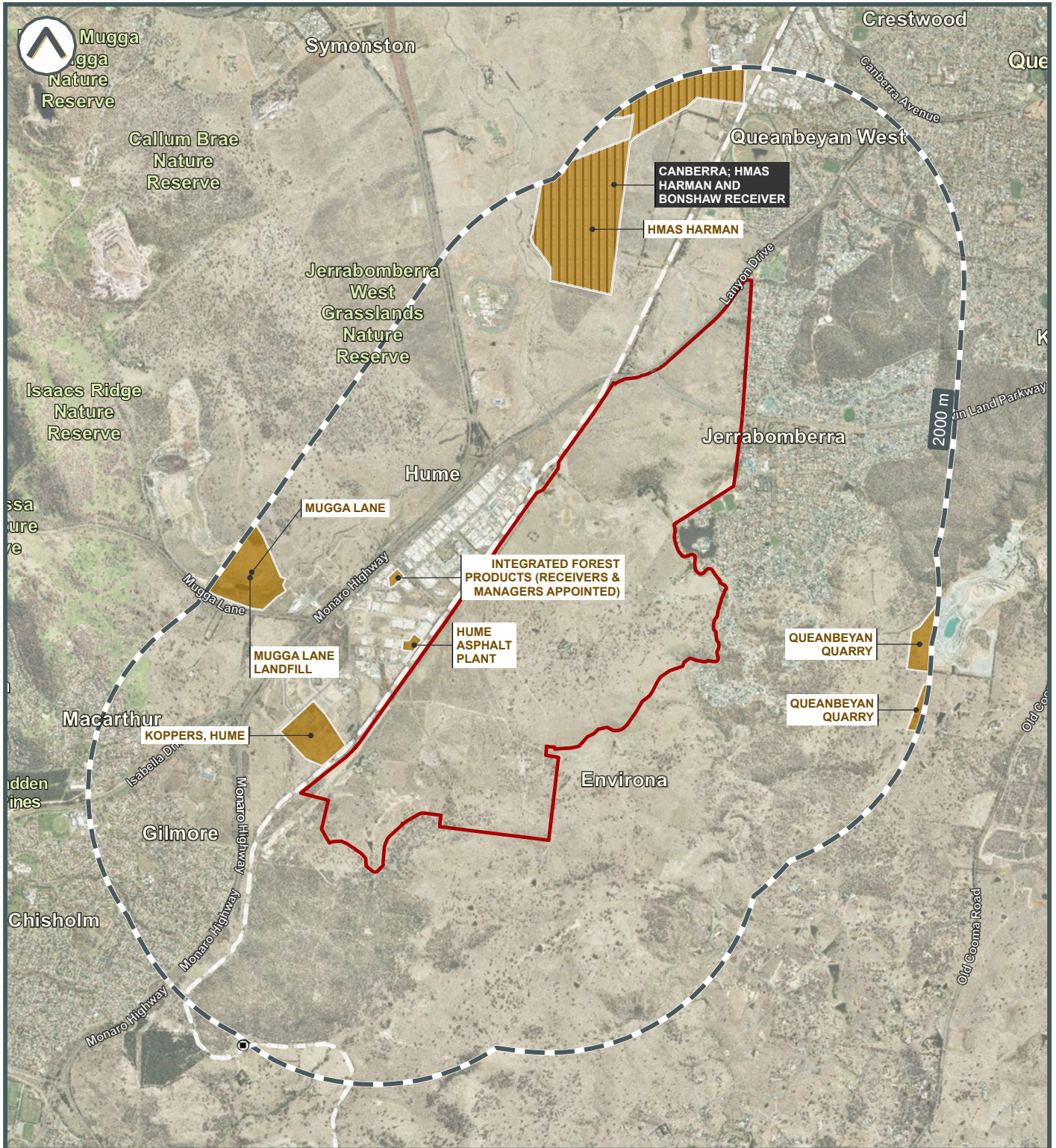


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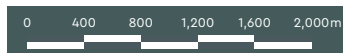


Sites Regulated by other Jurisdictional Body



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Subject area NPI Facilities Defence Area / Military Sites; Defence Area / Military Sites

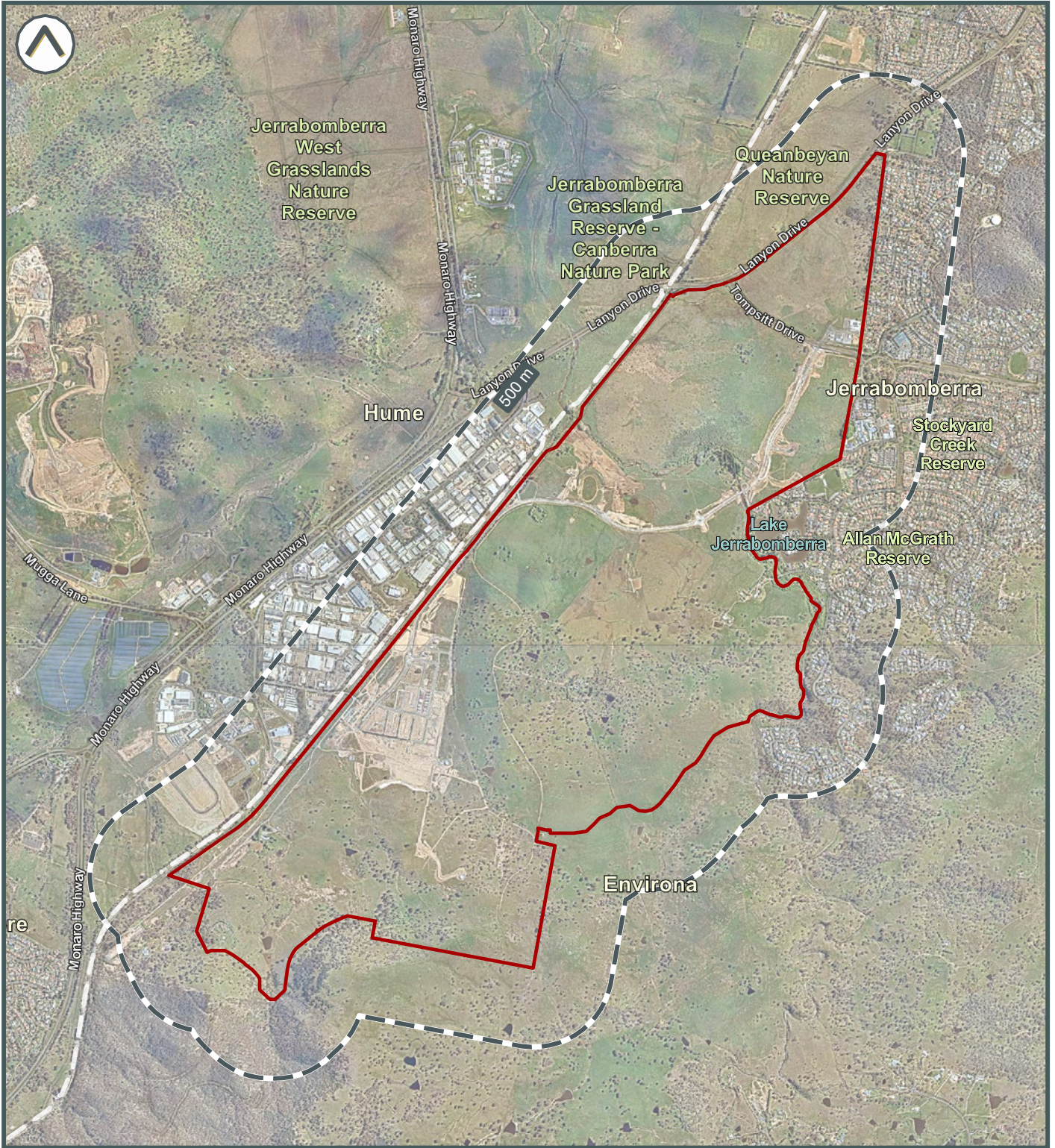


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Licensing Under the POEO Act



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- Subject area
- POEO Licences
- Issued
- Surrendered / Suspended / Revoked
- Delicensed / No longer in force
- Clean Up and Penalty Notices

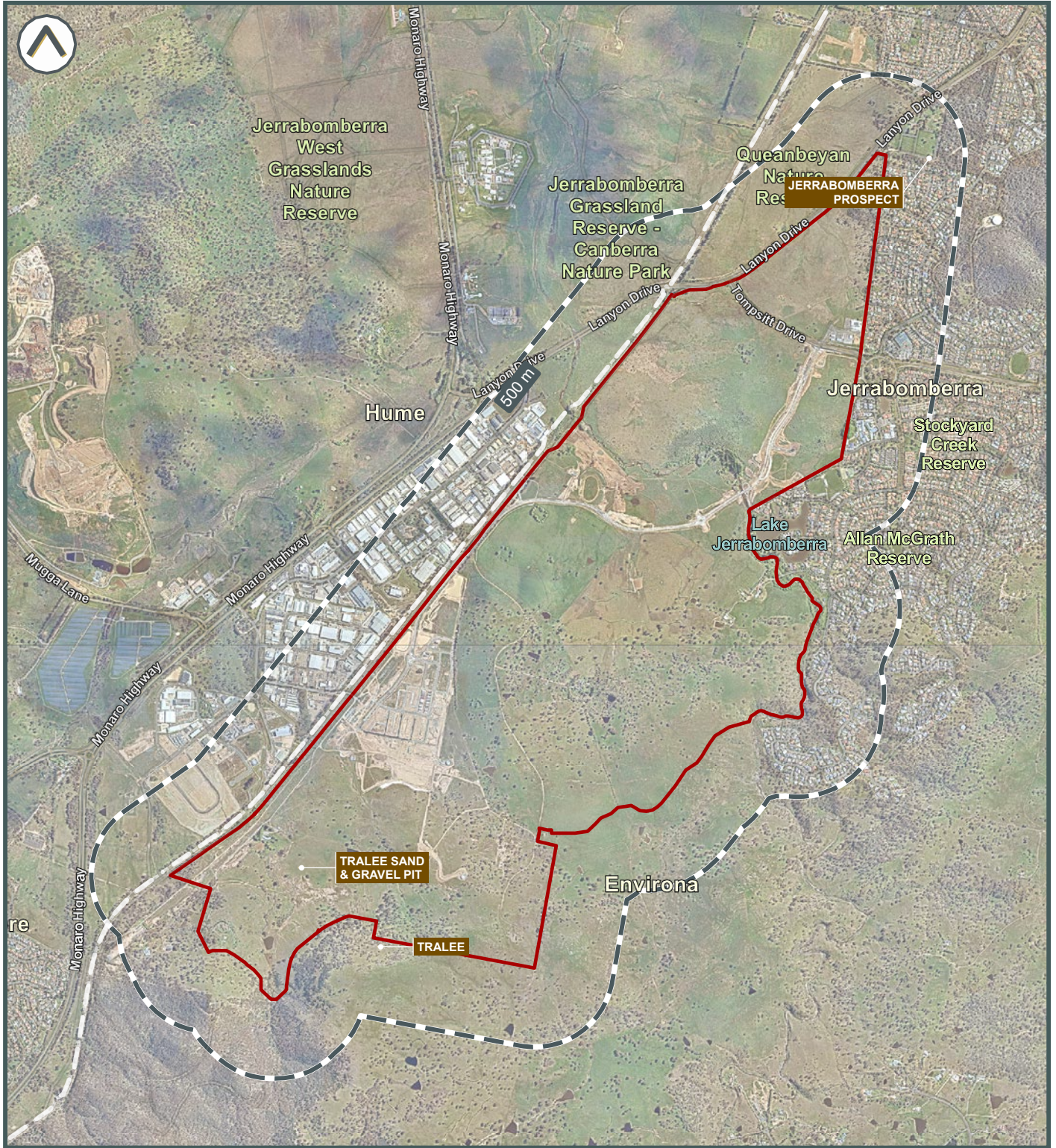


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Former Potentially Contaminated Land



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- Subject area
- Contaminated Legacy Areas
- James Hardie asbestos
- Derelict Mines and Quarries
- Historical (Legacy) Landfills

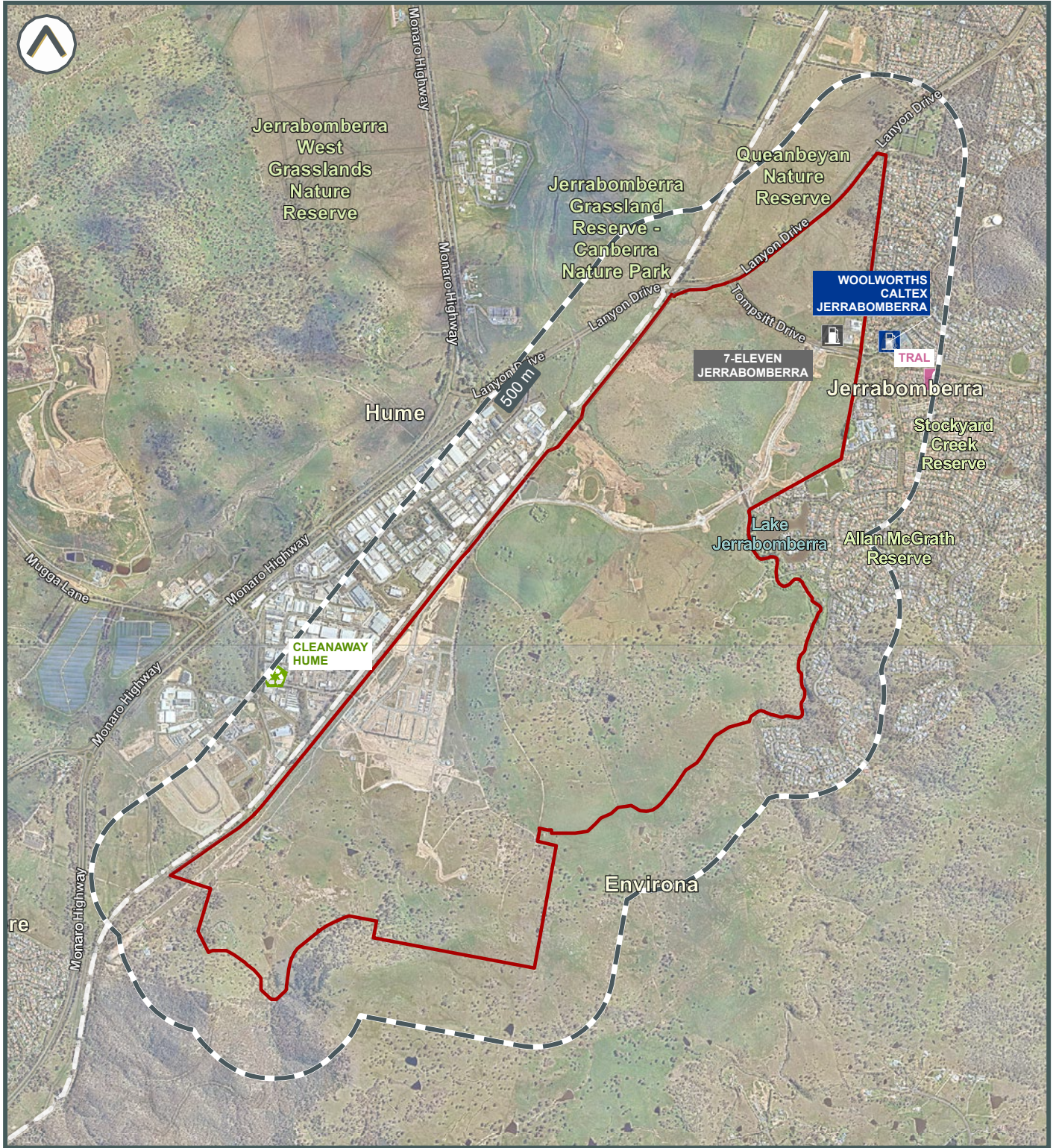


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Current Potentially Contaminating Activities (PCAs)



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- | | | | |
|--------------------------|--------------------|-----------------------------|------------------------------|
| Subject area | Fire Rescue | Operating Mines | Substation/switching station |
| Cattle Dip Sites | Gas Terminals | Power Stations | Telephone Exchanges |
| Operational Dry Cleaners | Liquid Fuel Depots | Operational Petrol Stations | Wastewater Treatment Plants |
| Former Dry Cleaners | Liquid Fuel Depots | Former Petrol Stations | Waste Management Facilities |

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

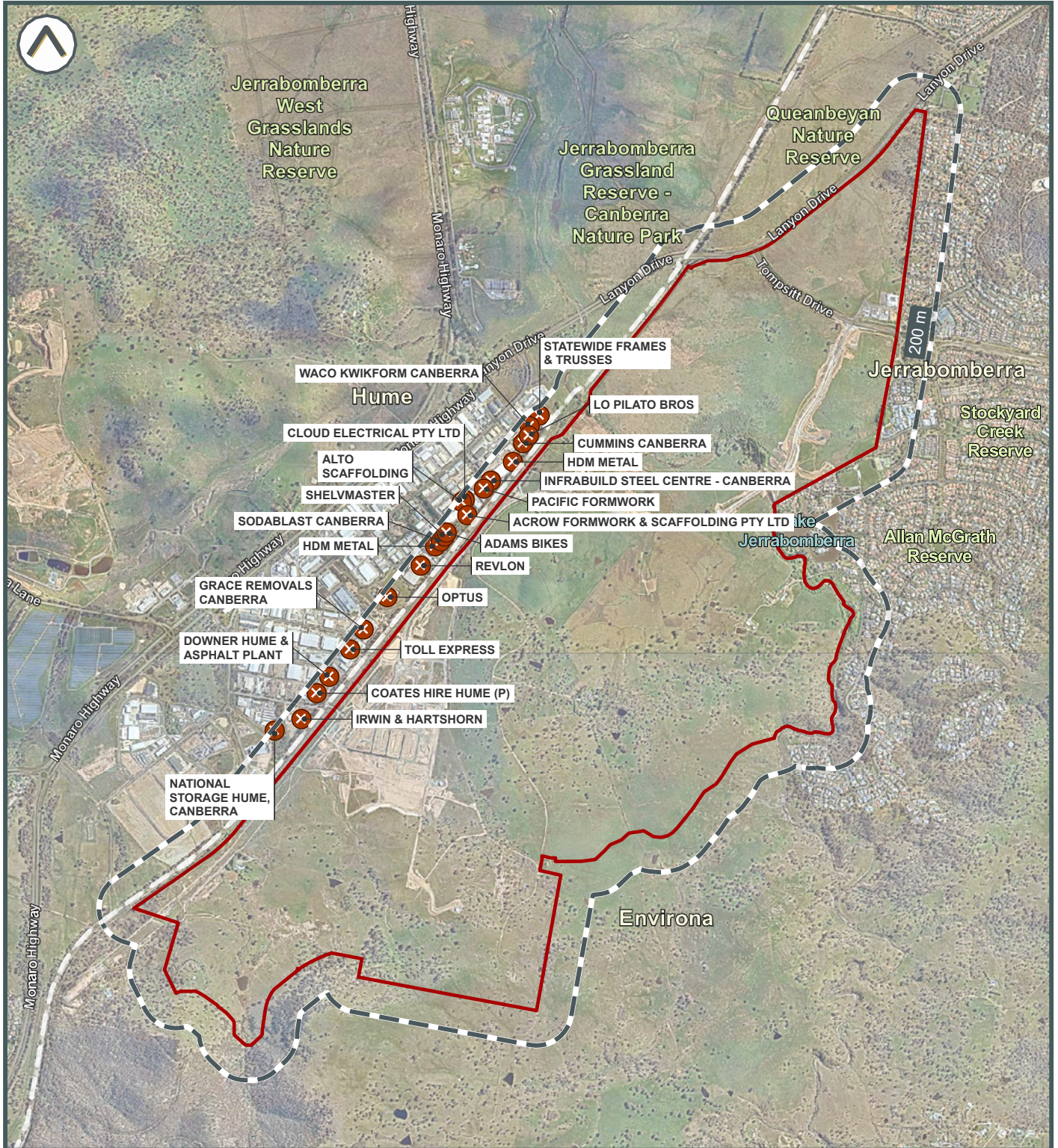


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Other Potentially Contaminating Activities



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- Subject area
- Commercial & Trade Directory
- + Other potentially contaminating activities
- x Former potentially contaminating activities

*This is not an exhaustive list of all tanks

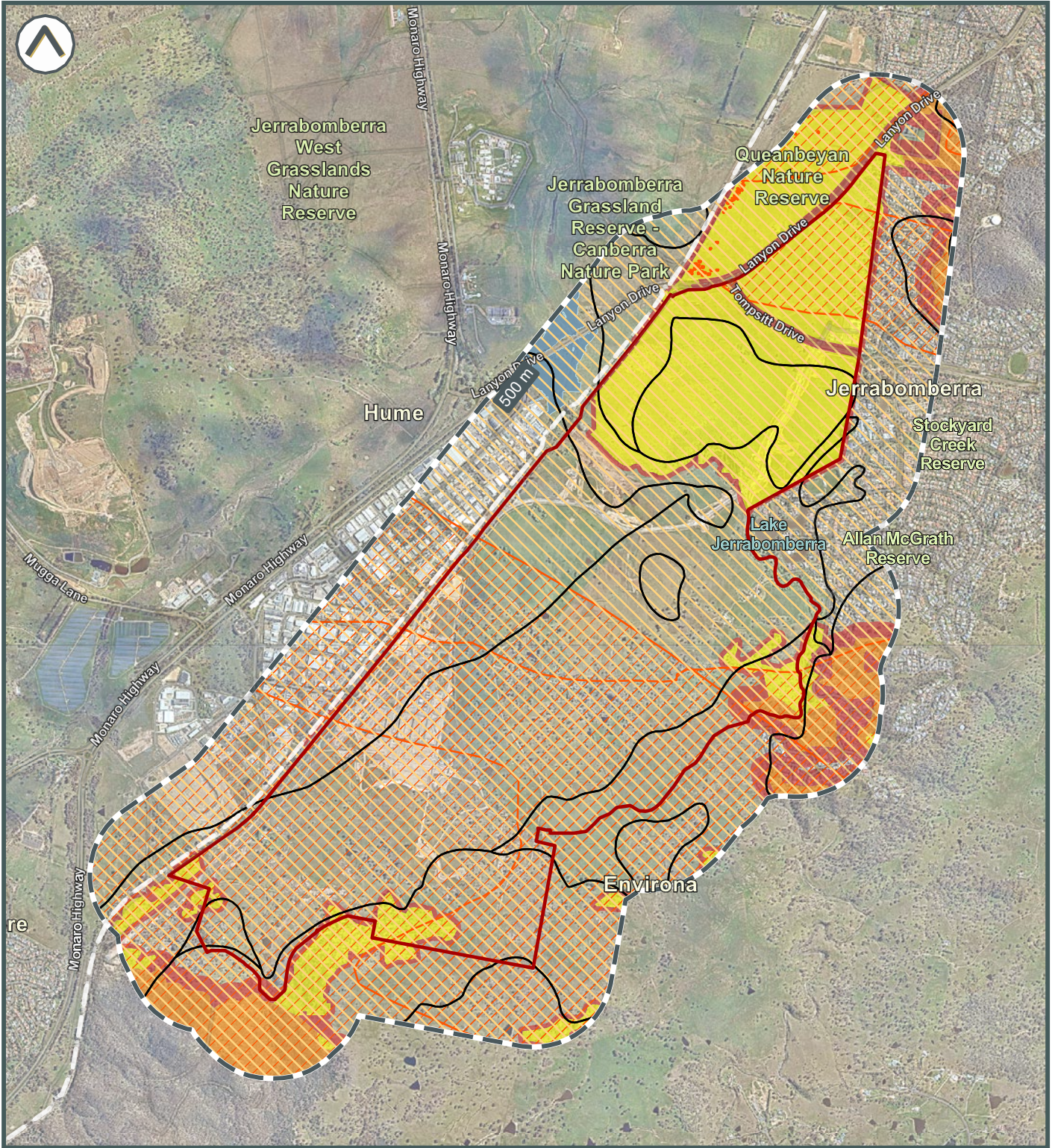


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Fire and Flood Hazards



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- Subject area
- Fire History
- Bush Fire Prone Land**
- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 2
- Erosion Hazard
- Minor to moderate
- Flood Hazard
- 1 percent AEP Flood



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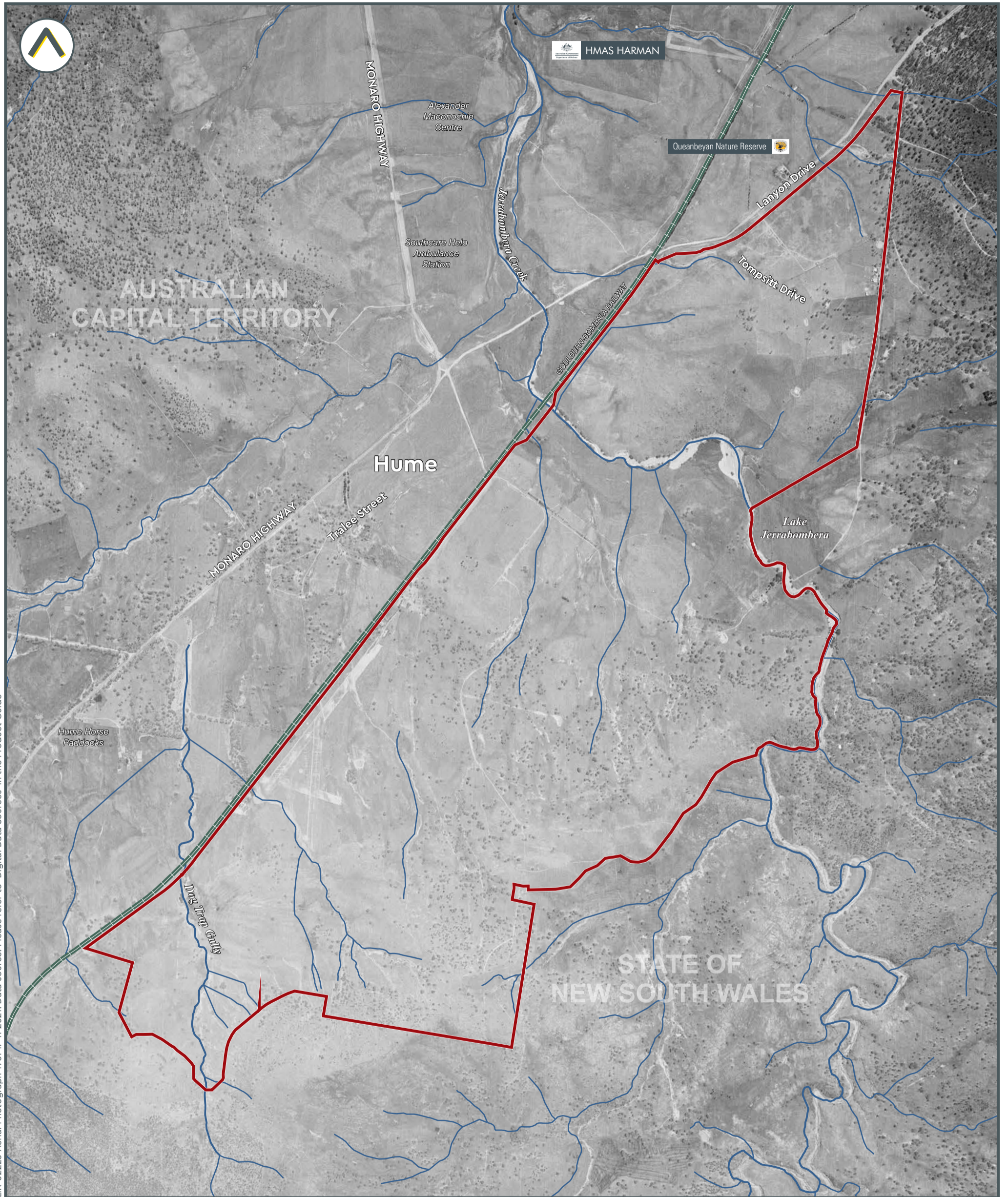


An aerial photograph of a vibrant turquoise river winding through a rugged, rocky landscape. The river is flanked by large, grey boulders and patches of dense, green and yellowish vegetation. The water's color is strikingly bright, contrasting with the natural tones of the surrounding environment. A yellow rectangular overlay is positioned in the center-right of the image, containing the text 'Appendix B' and 'HISTORIC IMAGERY'.

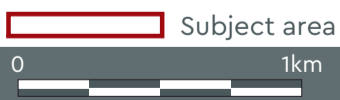
Appendix B

HISTORIC IMAGERY

Historic Aerial Photograph - 1961

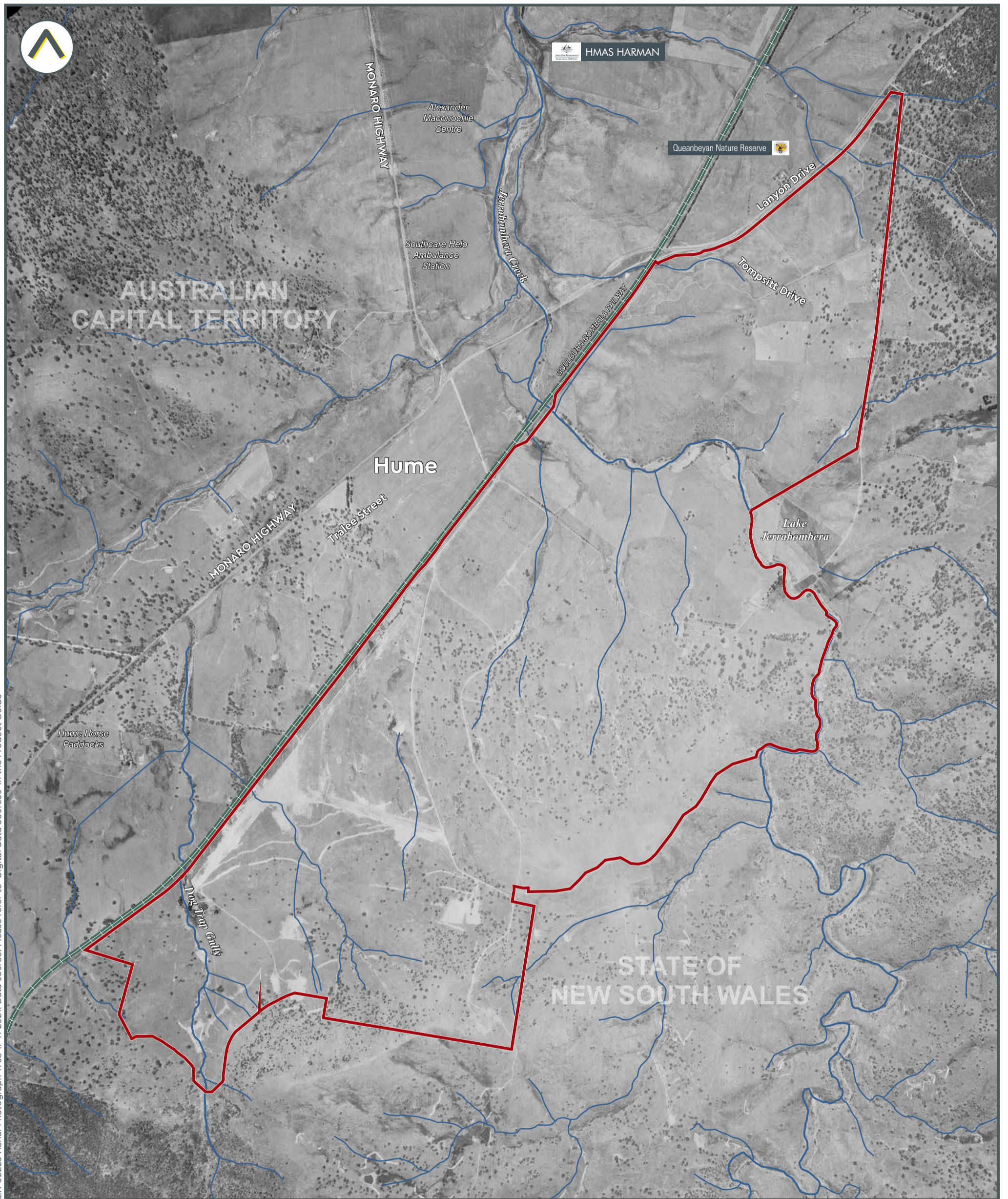


LIR-02226 Aerial Photograph 1961 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide

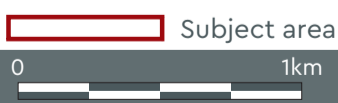


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Historic Aerial Photograph - 1968

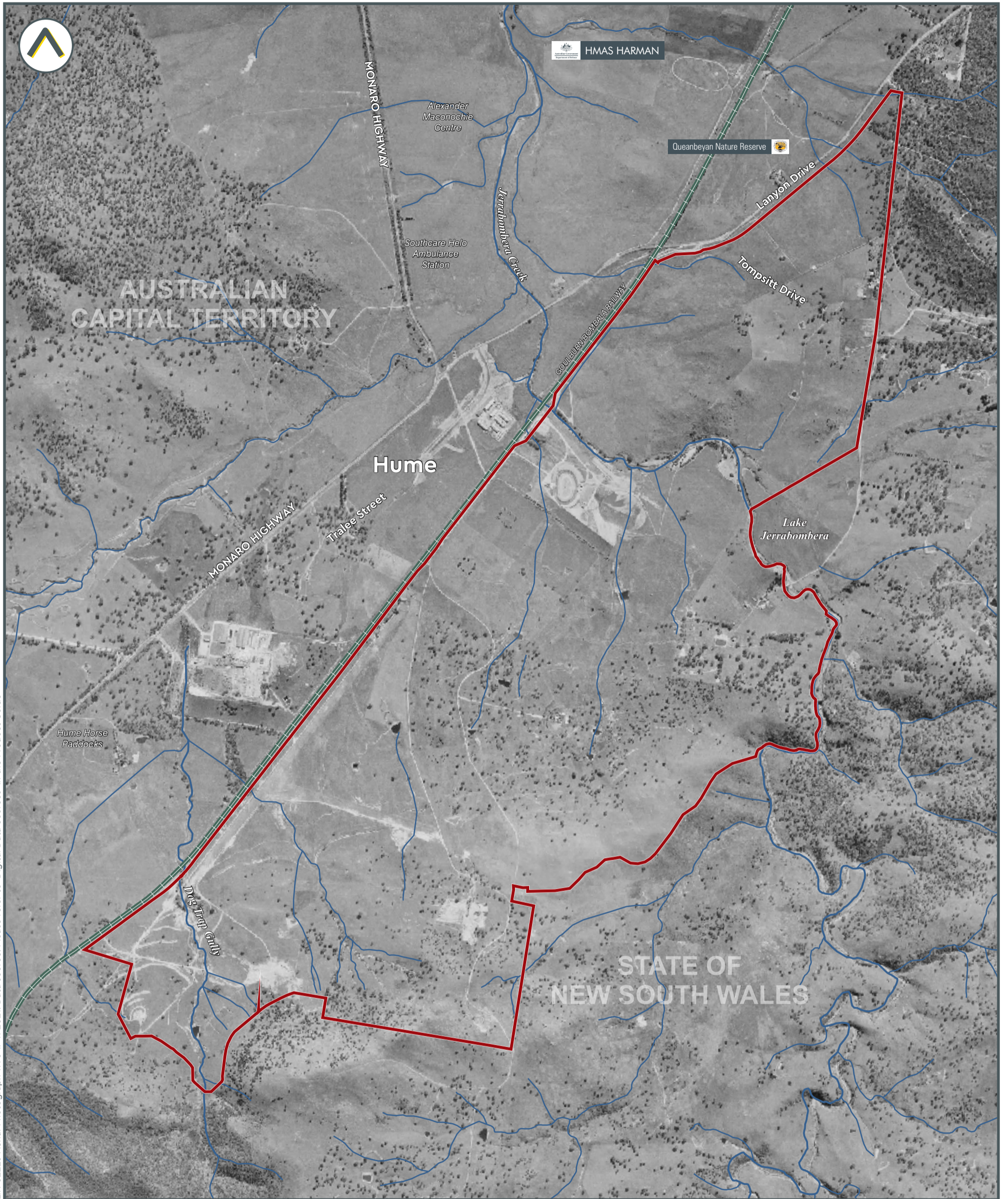


LIR-02226 Aerial Photograph 1968 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide

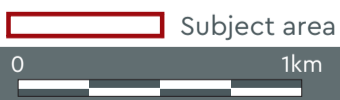


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Historic Aerial Photograph - 1976

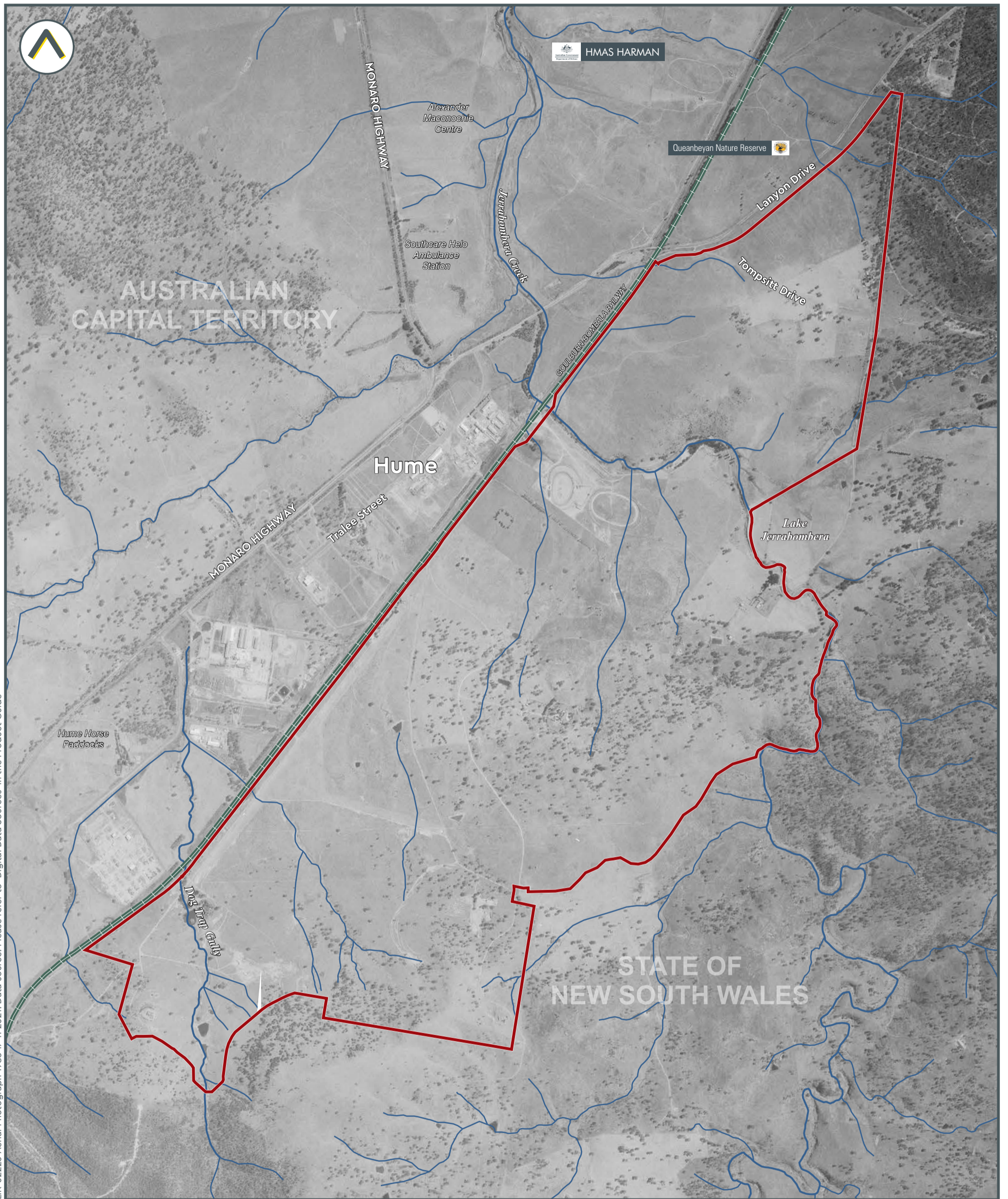


LIR-02226 Aerial Photograph 1976 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



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Historic Aerial Photograph - 1985



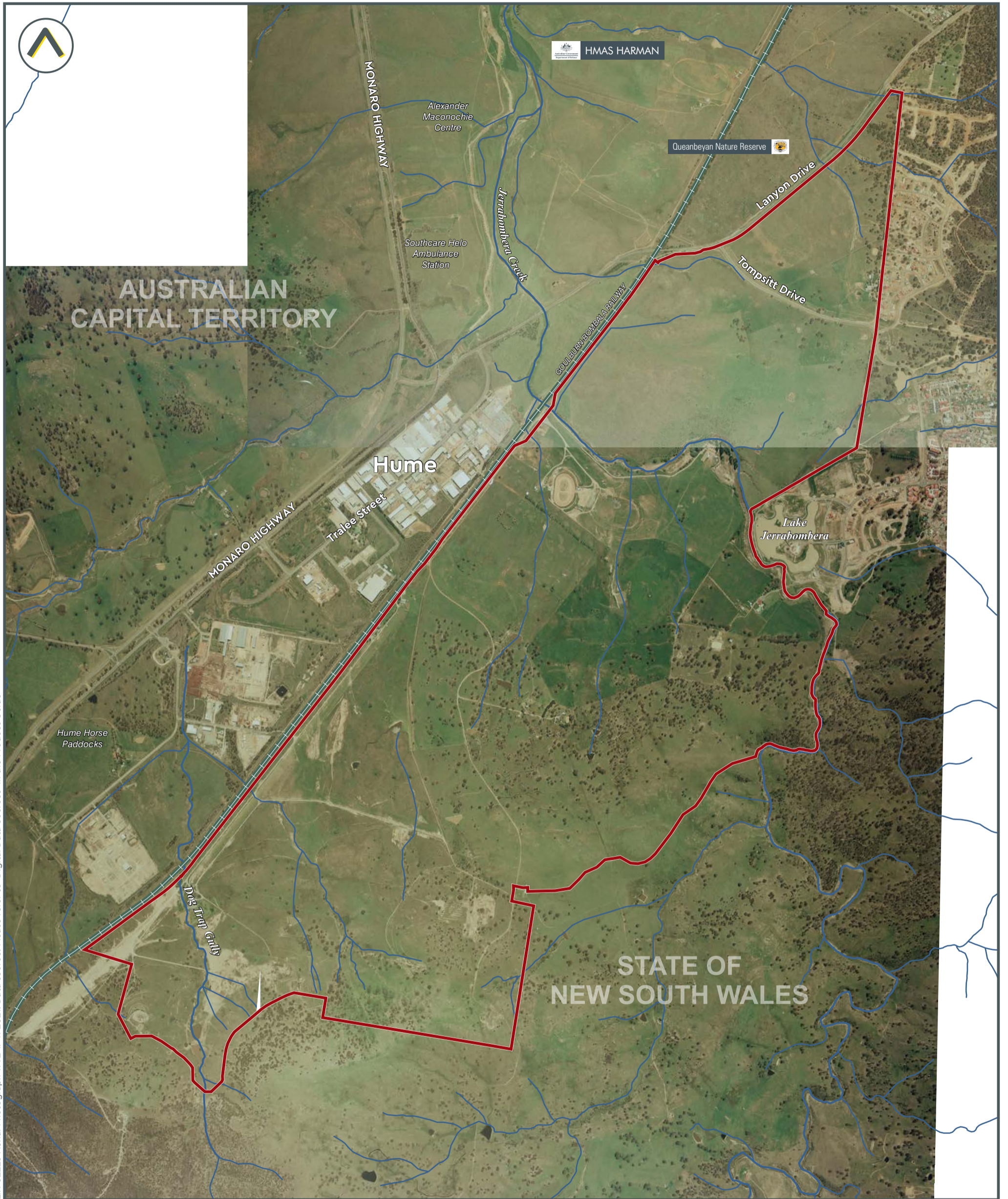
LIR-02226 Aerial Photograph 1985 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



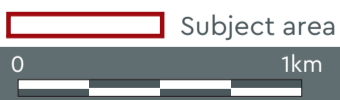
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Historic Aerial Photograph - 1985



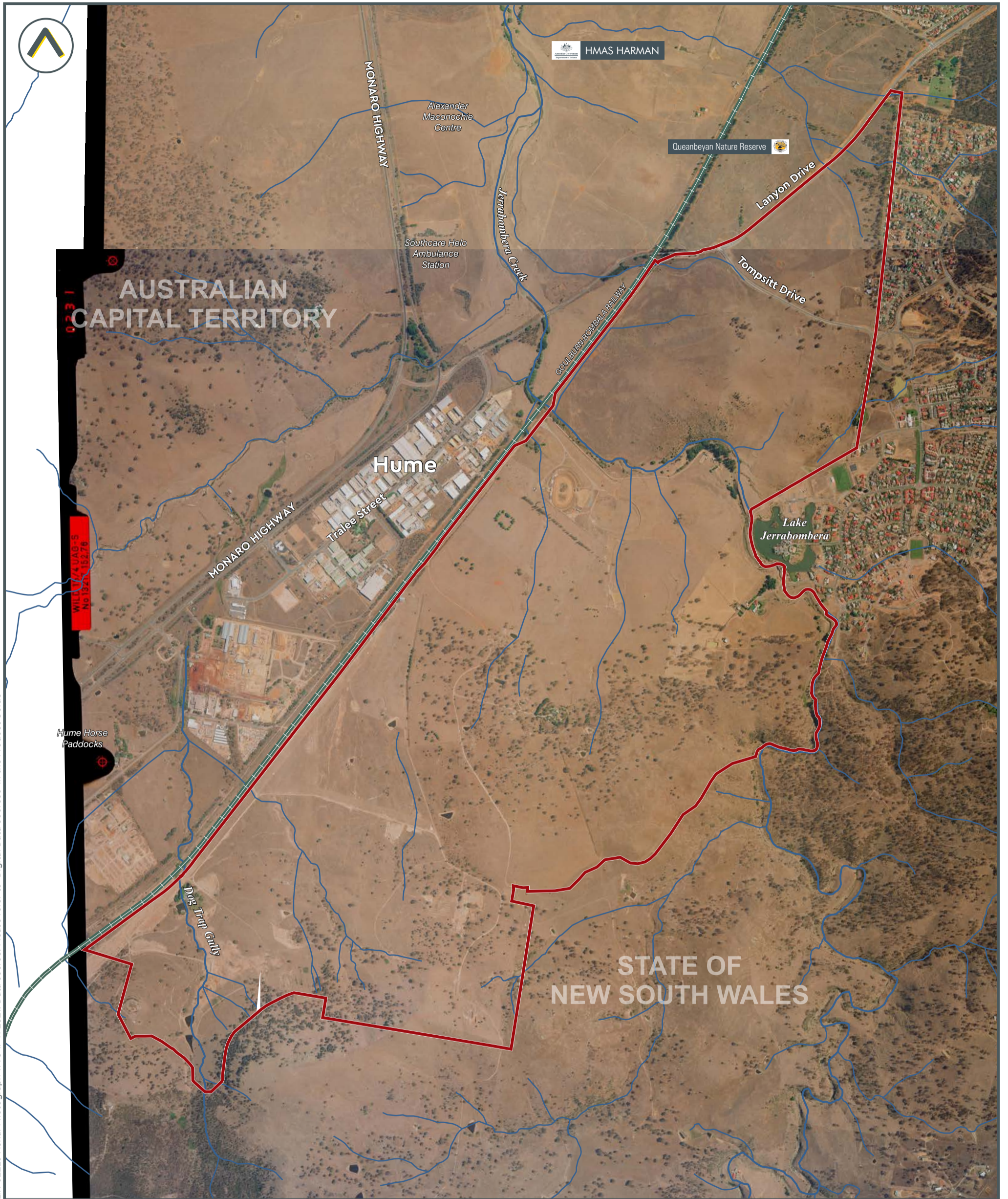
LIR-02226 Aerial Photograph 1992 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



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Historic Aerial Photograph - 1998



LIR-02226 Aerial Photograph 1998 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide

WILL 174 UAG-S
No 18271 15278

Subject area

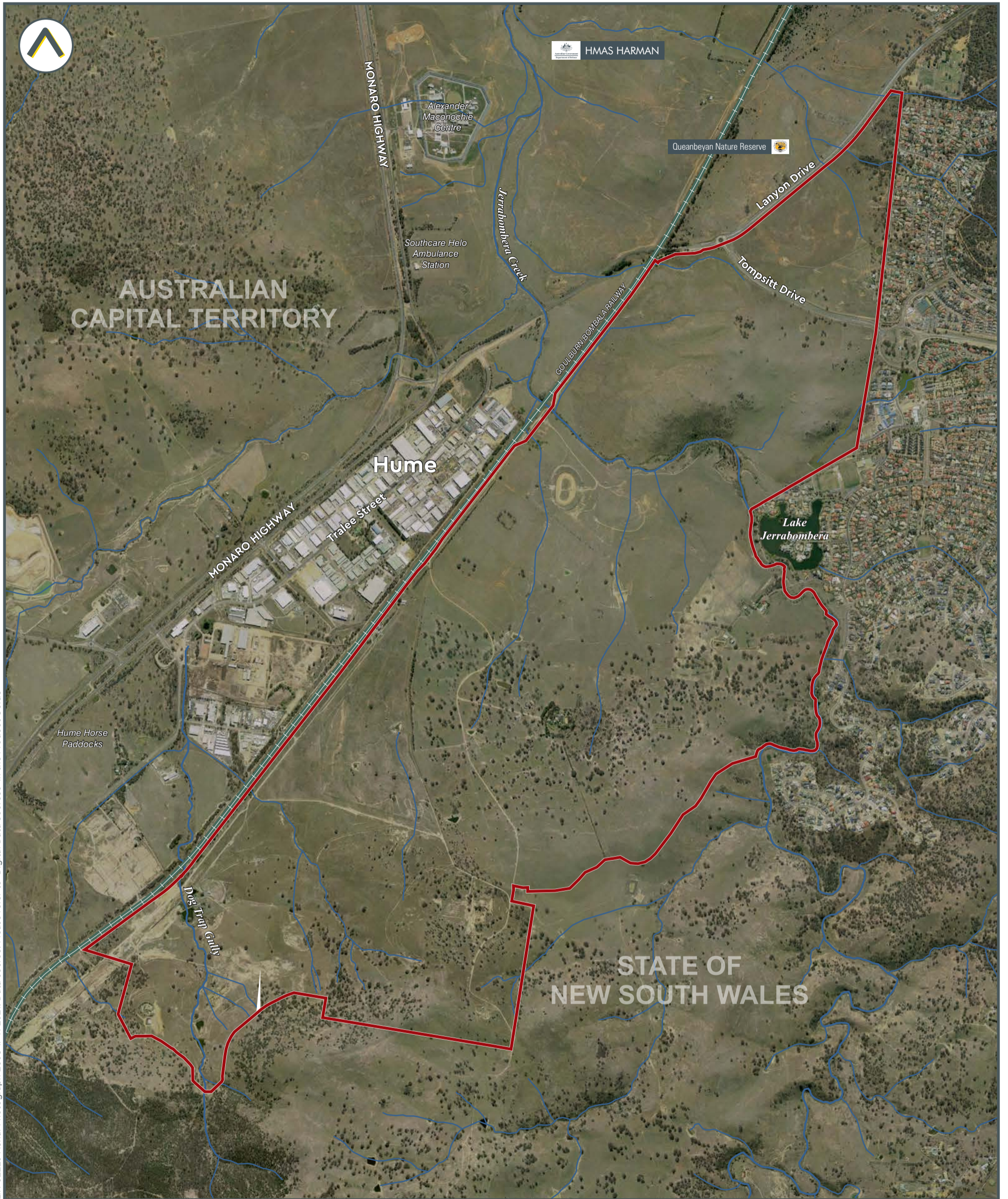
0 1km



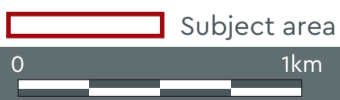
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Historic Aerial Photograph - 2008



LIR-02226 Aerial Photograph 2008 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



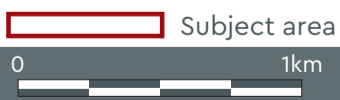
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Historic Aerial Photograph - 2010



LIR-02226 Aerial Photograph 1976 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



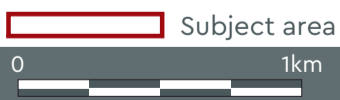
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Historic Aerial Photograph - 2012



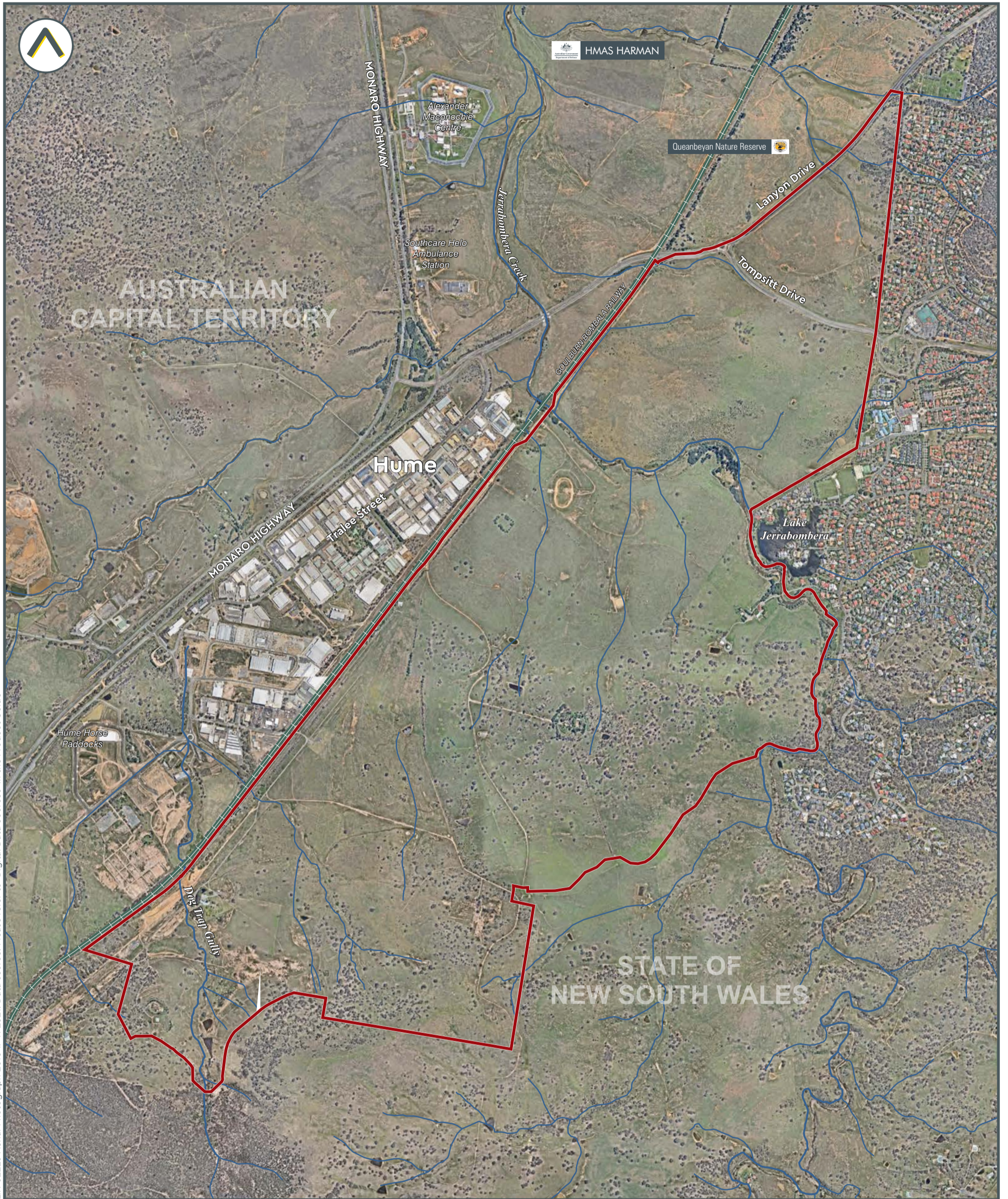
LIR-02226 Aerial Photograph 2012 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



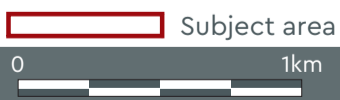
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Historic Aerial Photograph - 2015



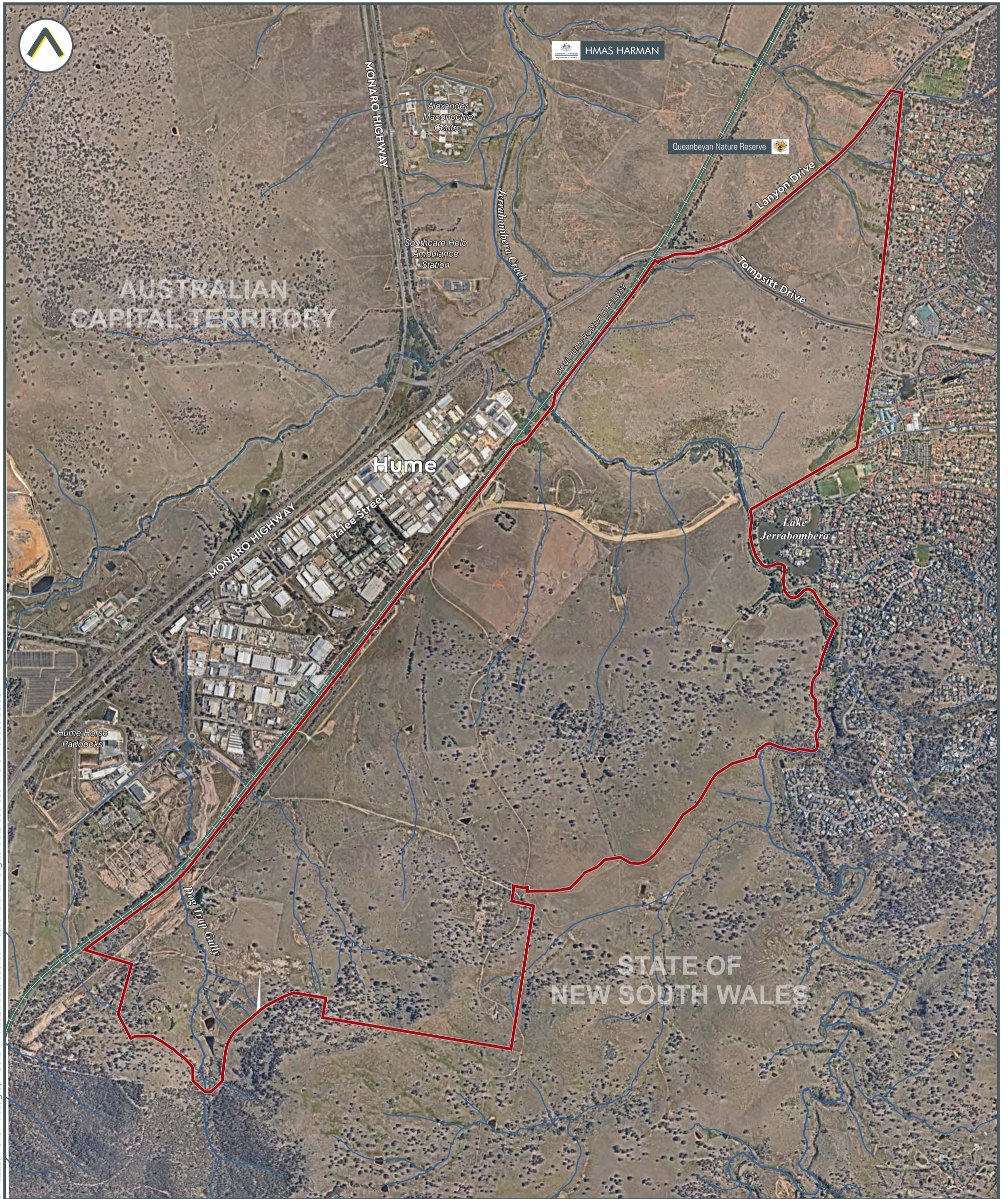
LIR-02226 Aerial Photograph 2015 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



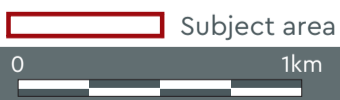
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Historic Aerial Photograph - 2018



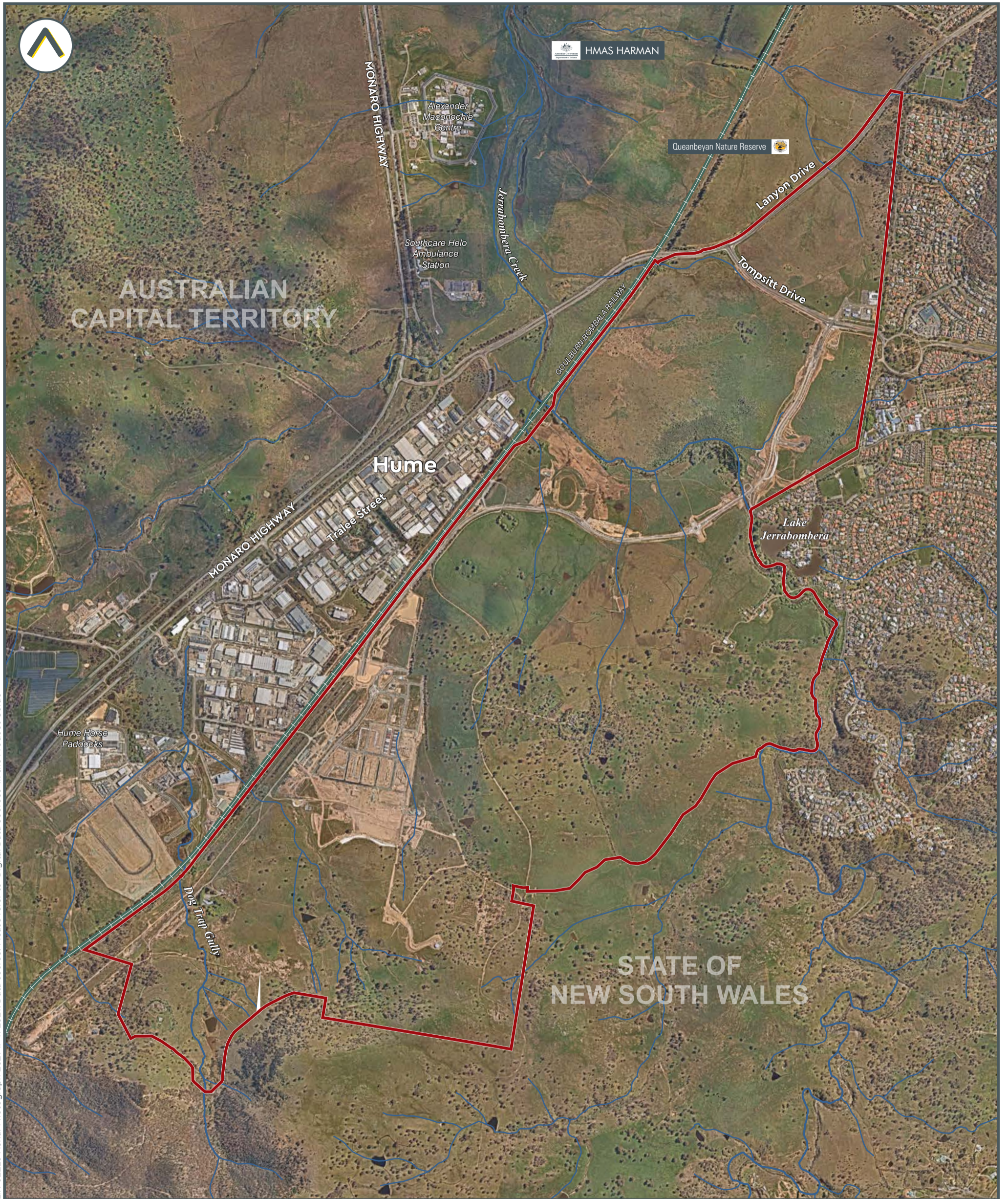
LIR-02226 Aerial Photograph 2018 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



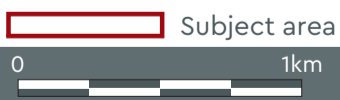
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Historic Aerial Photograph - 2021



LIR-02226 Aerial Photograph 2021 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



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APPENDIX B PHOTOGRAPHIC LOG



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 1	Date: 8 Dec. 2021	
Direction Photo Taken: North		
Description: Drum on Former Piggery Site		

Photo No. 2	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:35:30 AEST 2022 Position: 55 S 699228 6081807 Altitude: 610m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 203° S23W 3609mils (True) Zoom: 1X Glenloch MV3B3</p> 
Direction Photo Taken: Southwest		
Description: View to Southwest from Envirova Drive near future High School site.		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 3	Date: 7 April 2022
Direction Photo Taken: Southeast	
Description: View to Southeast from Environa Drive near future High School site.	



Photo No. 4	Date: 7 April 2022
Direction Photo Taken: East southeast	
Description: View to east southeast from Environa Drive near future High School site.	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------



Photo No. 5	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:37:54 AEST 2022 Position: 55 S 698702 6081402 Altitude: 599m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 160° S20E 2844mils (True) Zoom: 1X Glenloch MV3B3</p> 
Direction Photo Taken: South southeast		
Description: View to South southeast from roundabout to south of Jerrabomberra Creek.		

Photo No. 6	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:37:58 AEST 2022 Position: 55 S 698702 6081402 Altitude: 599m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 113° S67E 2009mils (True) Zoom: 1X Glenloch MV3B3</p> 
Direction Photo Taken: East Southeast		
Description: NC000161		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 7	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:38:46 AEST 2022 Position: 55 S 698699 6081377 Altitude: 598m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 189° S09W 3360mils (True) Zoom: 1X Glenloch MV3B3</p> 
Direction Photo Taken: Southwest		
Description: View to South from Environa Drive adjacent roundabout.		

Photo No. 8	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:38:49 AEST 2022 Position: 55 S 698699 6081377 Altitude: 598m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 189° S09W 3360mils (True) Zoom: 2X Glenloch MV3B3</p> 
Direction Photo Taken: South		
Description: View to South from Environa Drive adjacent roundabout note farm buildings to left of frame.		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 9	Date: 7 April 2022
Direction Photo Taken: South southeast	
Description: View to south southeast from Environa Dr.	



Photo No. 10	Date: 7 April 2022
Direction Photo Taken: East	
Description: View to east from Environa Drive	





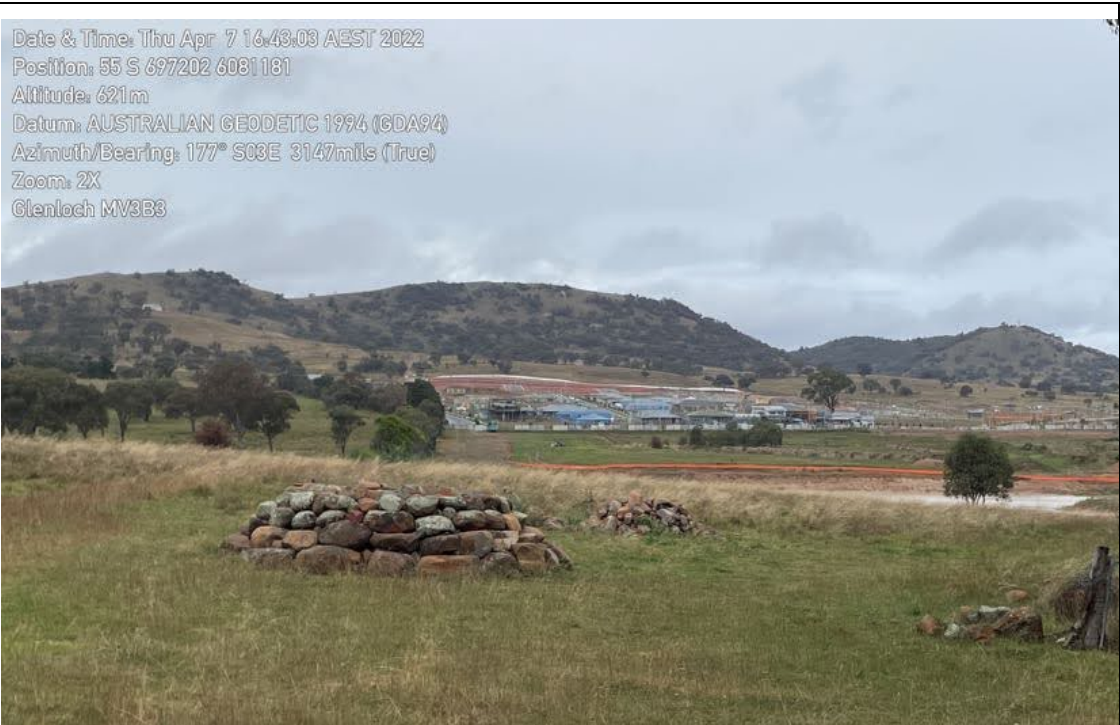
PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 11	Date: 7 April 2022
Direction Photo Taken: Southeast	
Description: View to Southeast from adjacent "Environa" Gates.	



Photo No. 12	Date: 7 April 2022
Direction Photo Taken: South	
Description: View to South from "Environa" gates South Tralee development in background.	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 13	Date: 7 April 2022
Direction Photo Taken: Southeast	
Description: View to Southeast from "Environa" gates South Tralee development in background.	

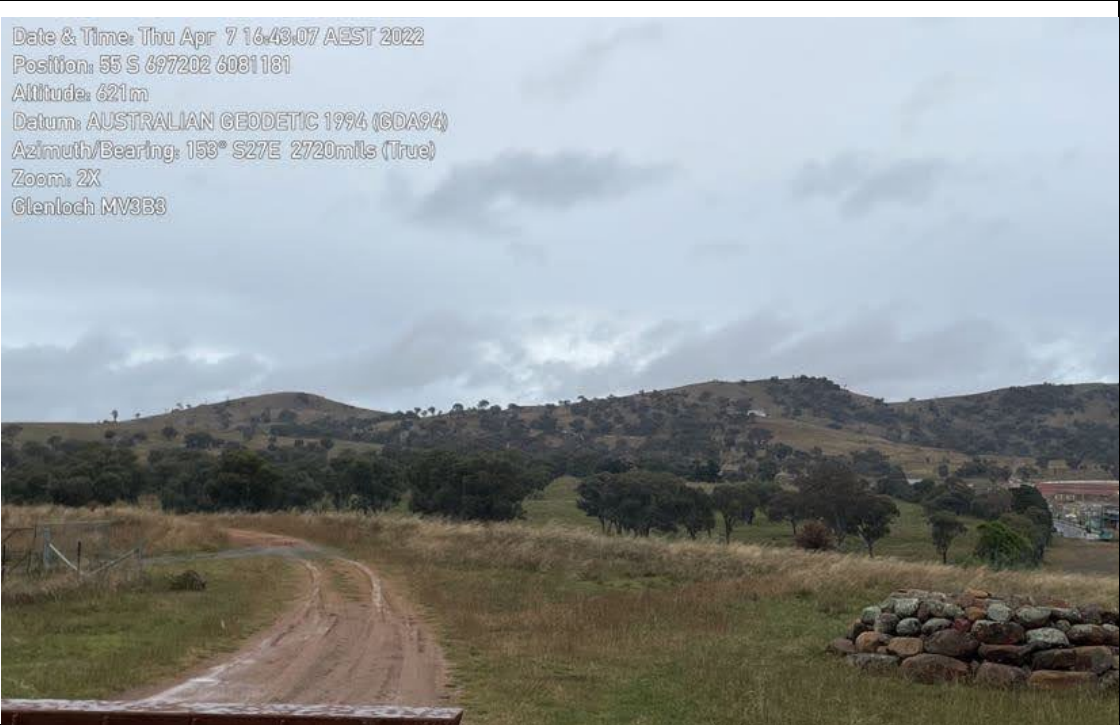


Photo No. 14	Date: 7 April 2022
Direction Photo Taken: Northeast	
Description: South Tralee Development	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 15	Date: 7 April 2022
Direction Photo Taken: Southeast	
Description: South Tralee Development	



Photo No. 16	Date: 7 April 2022
Direction Photo Taken: Southwest	
Description: South Tralee Development	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 17	Date: 7 April 2022
Direction Photo Taken: Southwest	
Description: Soil stockpiles on South Tralee Development	



Photo No. 18	Date: 7 April 2022
Direction Photo Taken: South southwest	
Description: Construction compound on South Tralee Development	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 19	Date: 7 April 2022
Direction Photo Taken: North northeast	
Description: Sports complex development site	



Date & Time: Thu Apr 7 16:52:19 AEST 2022
Position: 55 S 697805 6081496
Altitude: 592m
Datum: AUSTRALIAN GEODETIC 1994 (GDA94)
Azimuth/Bearing: 028° N28E 0498mils (True)
Zoom: 2X
Glenloch MV3B3

Photo No. 20	Date: 7 April 2022
Direction Photo Taken: Northeast	
Description: Sports complex development site	



Date & Time: Thu Apr 7 16:52:22 AEST 2022
Position: 55 S 697805 6081496
Altitude: 592m
Datum: AUSTRALIAN GEODETIC 1994 (GDA94)
Azimuth/Bearing: 056° N56E 0996mils (True)
Zoom: 2X
Glenloch MV3B3



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 21	Date: 7 April 2022
Direction Photo Taken: Southeast	
Description: Environa precinct	



Photo No. 22	Date: 7 April 2022
Direction Photo Taken: North northwest	
Description: View north northwest from Environa drive with path of Jerrabomberra Creek visipble at foot of slope.	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 23	Date: 7 April 2022
Direction Photo Taken: West northwest	
Description: Sport complex development	

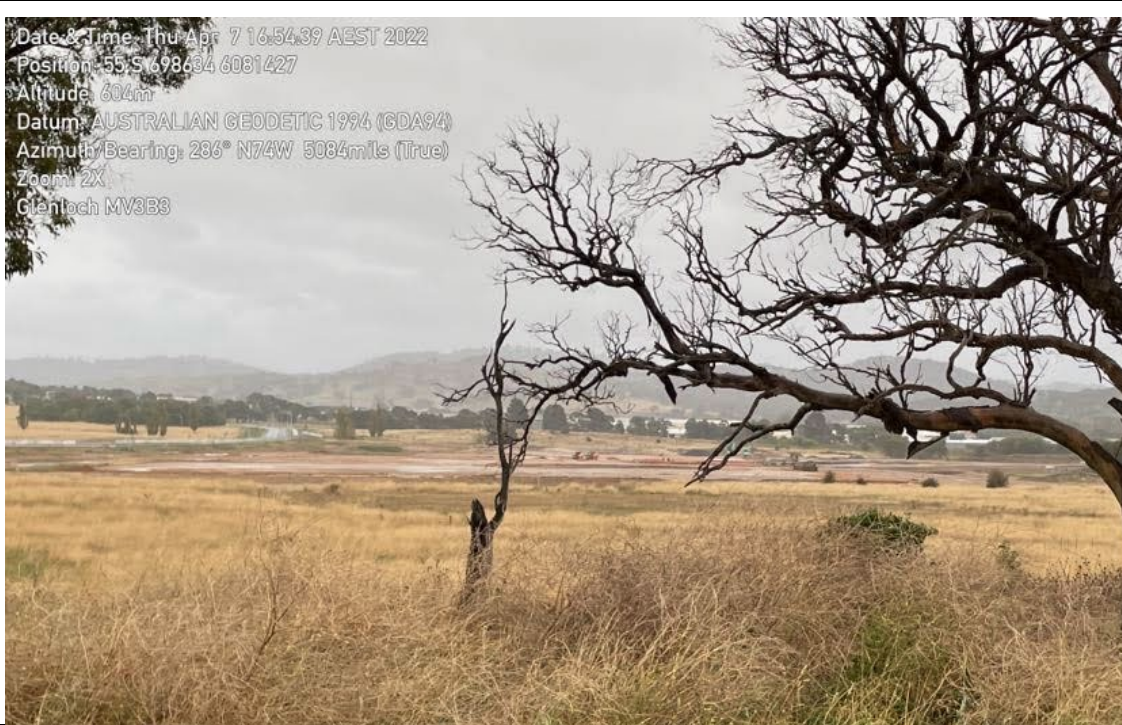


Photo No. 24	Date: 7 April 2022
Direction Photo Taken: North northeast	
Description: View to north northeast from Environa Drive	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: South Jerrabomberra	Project No.: 0621304
---	--	--------------------------------

Photo No. 25	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:56:23 AEST 2022 Position: 55 S 699068 6081854 Altitude: 596m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 217° S37W 3858mils (True) Zoom: 2X Glenloch MV3B3</p> 
Direction Photo Taken: Southwest		
Description: Surface water storage with bridge over Jerrabomberra Ck in background.		

Photo No. 26	Date: 7 April 2022	<p>Date & Time: Thu Apr 7 16:56:27 AEST 2022 Position: 55 S 699069 6081849 Altitude: 596m Datum: AUSTRALIAN GEODETIC 1994 (GDA94) Azimuth/Bearing: 275° N85W 4889mils (True) Zoom: 2X Glenloch MV3B3</p> 
Direction Photo Taken:		
Description: NC000181		

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Guyana	South Africa
Hong Kong	South Korea
India	Spain
Indonesia	Sweden
Ireland	Switzerland
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Kazakhstan	Thailand
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