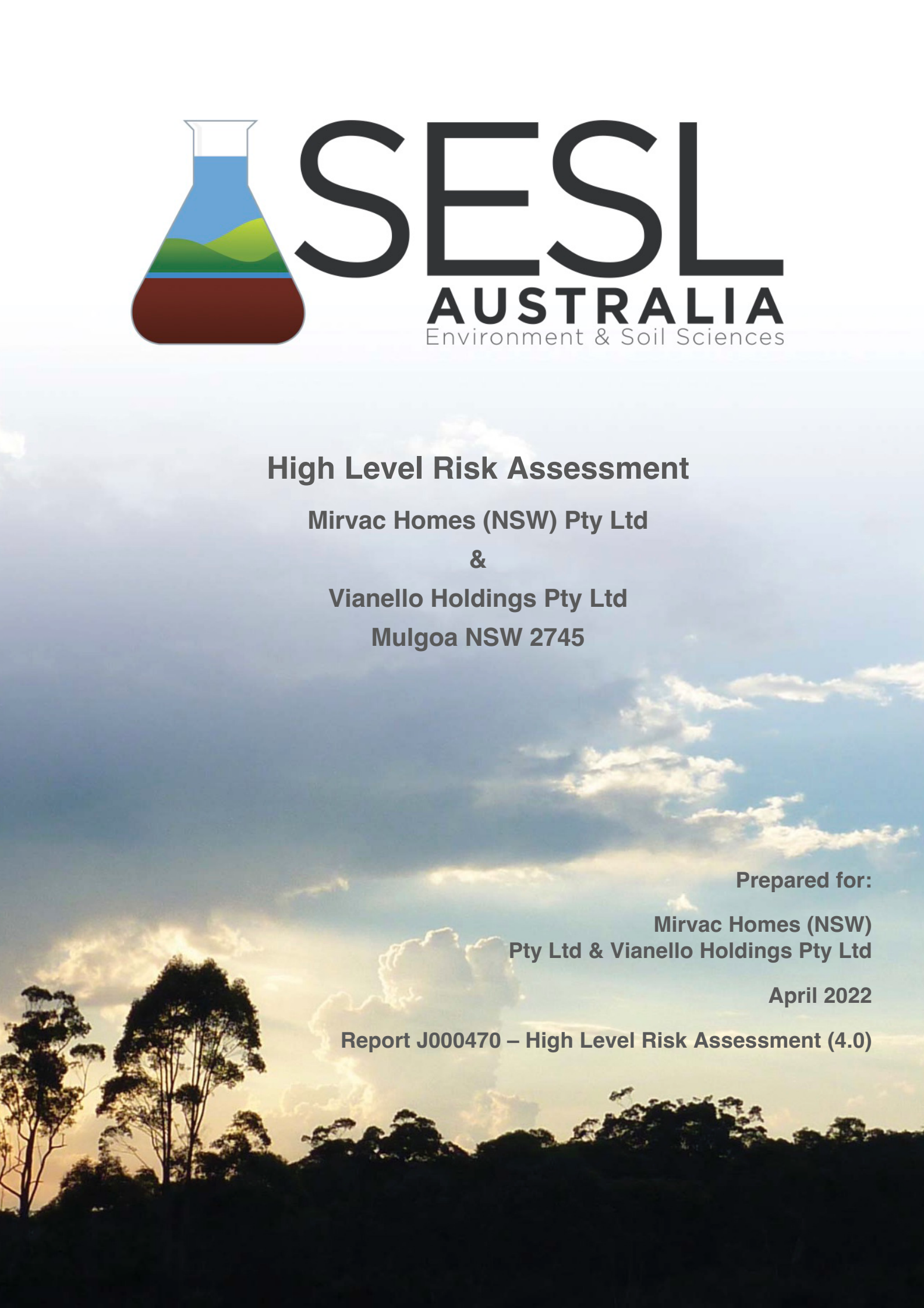

High Level Risk Assessment

Mirvac Homes (NSW) Pty Ltd

&

Vianello Holdings Pty Ltd

Mulgoa NSW 2745

Prepared for:

Mirvac Homes (NSW) Pty Ltd & Vianello Holdings Pty Ltd

April 2022

Report J000470 – High Level Risk Assessment (4.0)

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EXECUTIVE SUMMARY

SESL Australia (SESL) was engaged by Mirvac and Vianello (the client) to conduct a High Level Risk Assessment (HLRA) to identify contamination and salinity risks on land proposed for the urban extension of Glenmore Park south to Chain-O-Ponds Road in Mulgoa (the site). This investigation is required as part of the proposed 2400 lot residential development at the site. The HRLA excludes that land already zoned for urban purposes which has been approved for subdivision by Penrith Council for urban development.

The objectives of this Tier 1 HLRA were to:

- Prepare a HLRA report in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra;
- Assess the potential inventory of contamination within the site as a result of past and present land uses;
- Establish Potential Areas of Environmental Concern (PAECs) relevant to the site;
- Assess the potential impact potential contaminants may have on the proposed land use and possible effect on human and environmental health;
- Review the risks that naturally occurring salinity in the area may pose for the proposed development and land use; and
- Assess the need for additional environmental works based on the results of this investigation (site walkover, detailed site investigation, remedial works and validation) (if required).

The scope of works for this HLRA included the following:

- Undertaking of a comprehensive site history review including a review of selected historical aerial photographs;
- Searches for information held by relevant state authorities in relation to contaminated land;
- Obtaining information pertaining to the site's environmental setting including the proximity of the site to sensitive receptors and information on site geology;
- Development of a list of Potential Areas of Environmental Concern (PAECs) to identify data gaps that require additional environmental information;
- Review of salinity risk maps, and assessment of the potential risks associated with salinity pertaining to the proposed development;
- Discussion of the outcome of previous investigations relating to Glenmore Park Stage 2 findings, with Vianello Holdings;
- Preparation of this HLRA report in accordance with relevant guidelines for contaminated lands and salinity assessment; and
- Proposal of additional assessments or suitable remedial and validation strategies for the site, if required.

A desktop review of available information, including current and historical aerial photographs identified the following potential areas of environmental concern (PAECs):

- AEC 1: General Agriculture;
- AEC 2: Intensive Agriculture/Horticulture;
- AEC 3: Rural/Semi-Rural Residencies;
- AEC 4: Scrap, Drum and Vehicle Storage;
- AEC 5: Rural Dams; and
- AEC 6: Historical Filling & Imported Fill.

Based on the site history review of available information, a range of current and former land use activities undertaken at the site have the potential to have caused contamination to soil, groundwater or other media. This is typical of most greenfield release areas that have been used for rural purposes over a prolonged period. During the review of available information for the development of this HLRA, there has been nothing identified to suggest that previous land uses have resulted in a degree of contamination at the site that cannot be remediated prior to the development of the site, at the development application stage.

Based on this assessment, SESL recommends that further investigation is required to determine the presence and/or extent of contamination associated with the PAECs identified, prior to the proposed development. This additional investigation must include:

- The undertaking of a Tier 1 Detailed Site Investigation (DSI) to determine the presence and/or extent of contamination at the site, associated with the identified Potential Areas of Environmental Concern (PAECs);
- This investigation must be adequately designed to assess all identified Contaminants of Potential Concern (COPC) within site soils and groundwater; and
- In the event that site soils or groundwater are determined to be contaminated, a Remedial Action Plan (RAP) will need to be developed with the contaminated material to be managed and remediated during the construction phase.

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ABBREVIATIONS

AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
BaP	Benzo(a)pyrene
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
CLM	Contaminated Land Management Act
COC	Chain of Custody
CPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
DEC	Department of Environment and Conservation NSW
DECC	Department of Environment and Climate Change NSW
DECCW	Department of Environment, Climate Change and Water NSW
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EILs	Ecological Investigation Levels.
EPA	Environmental Protection Authority
ESLs	Ecological Screening Levels
HILs	Health Investigation Levels
HSLs	Health Screening Levels
NATA	The National Association of Testing Authorities
NEHF	National Environment and Health Forum
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OCP	Organochlorine Pesticides
OEH	Office of Environment and Heritage NSW
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photo Ionisation Detector
PSI	Preliminary Site Investigation
RAC	Remediation Acceptance Criteria
RAP	Remedial Action Plan
SAC	Soil Assessment Criteria
SESL	SESL Australia
SMP	Site Management Plan
SVR	Site Validation Report
TEQ	Toxic Equivalence Quotient
TRH	Total Recoverable Hydrocarbon
UCL	Upper confidence Limit

1 INTRODUCTION

SESL Australia (SESL) was engaged by Mirvac and Vianello (the client) to conduct a High Level Risk Assessment (HLRA) to identify contamination and salinity risks on land a proposed for urban extension of Glenmore Park south to Chain O Ponds Road in Mulgoa (the site). This investigation is required as part of the proposed 2400 residential dwellings at the site. The HRLA excludes that land already zoned for urban purposes which has been approved for subdivision by Penrith Council for urban development.

This HLRA was prepared in November 2017 and updated in April 2018, based on a desktop review of available information.

1.1 BACKGROUND

SESL has been advised that the site is to be developed from its current farmland and low-density semi-rural residential use to a 2400 residential dwelling development. SESL understands that the development works involve the demolition of existing buildings as well as construction of new road and service infrastructure, residential houses, open space, school and retail offerings. The scope of works for this assessment was agreed to by the client prior to the commencement of site works. This investigation has been performed in accordance with the scope of works in the SESL Proposal Q7704.

1.2 OBJECTIVES

The objectives of this Tier 1 HLRA were to:

- Prepare a HLRA report in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013, Canberra;
- Assess the potential inventory of contamination within the site as a result of past and present land uses;
- Establish Potential Areas of Environmental Concern (PAECs) relevant to the site;
- Assess the potential impact potential contaminants may have on the proposed land use and possible effect on human and environmental health;
- Review the risks that naturally occurring salinity in the area may pose for the proposed development and land use; and
- Assess the need for additional environmental works based on the results of this investigation (site walkover, detailed site investigation, remedial works and validation) (if required).

1.3 REGULATORY GUIDELINES

The investigation and preparation of this report was undertaken with reference to (but not limited to) the following regulatory guidance documents and standards:

- *ANZECC and ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (October 2000);*
- *ASTM (2000). Standard Practice D2488 90 Description and Identification of Soils (Visual-Manual Procedure). American Society for Testing and Materials;*

- *CRC CARE (2011). Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater;*
- *CRC CARE (2013) Petroleum hydrocarbon vapour intrusion assessment: Australian guidance, CRC CARE Technical Report no. 23, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia;*
- *Enhealth (2012) Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia (2012);*
- *Managing Land Contamination: Planning Guidelines – Remediation of Land, NSW EPA 1997 (SEPP 55 Guidelines)*
- *National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013);*
- *NHMRC & NRMMC (2011). Australian Drinking Water Guidelines (ADWG) - National Health and Medical Research Council & Natural Resource Management Ministerial Council;*
- *NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (2nd Ed.) (2006);*
- *NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination (March 2007);*
- *NSW DECCW (2010) Vapour Intrusion: Technical Practice Note, September 2010;*
- *NSW Department of Urban Affairs and Planning (1998) Managing Land Contamination: Planning Guidelines: SEPP 55 Remediation of Land, August (1998);*
- *NSW EPA (1995). Sampling Design Guidelines (1995);*
- *NSW EPA (1996). Protection of the Environment Operations (Waste) Regulation (1996);*
- *NSW EPA (2014). Technical Note: Investigation of Service Station Sites, NSW EPA, April (2014);*
- *NSW EPA (2014). Waste Classification Guidelines (November 2014);*
- *NSW EPA (2015). Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (July 2015);*
- *NSW OEH (2011). Guidelines for Consultants Reporting on Contaminated Sites (2011). NSW Office of Environment and Heritage;*
- *Standards Australia (1993) AS1726-1993. Geotechnical Site investigations Australian Standard;*
- *Standards Australia (2005). Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds AS4482.1 (2005) and Part 2: Volatile substances, AS4482.2 (2005);*
- *USEPA (2000). Guidance for the Data Quality Objectives Process, EPAC QA/G-4 DEC/600/r-96/055, United States Environmental Protection Agency Office of Environmental Information, Washington DC; and*
- *Western Australia Department of Health (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.*

1.4 SCOPE OF WORKS

The scope of works for this HLRA included the following:

- Undertaking of a comprehensive site history review including a review of selected historical aerial photographs;
- Discussion of the outcome of the investigation with Vianello;
- Searches for information held by relevant state authorities in relation to contaminated land;
- Obtaining information pertaining to the site's environmental setting including the proximity of the site to sensitive receptors and information on site geology;
- Development of a list of Potential Areas of Environmental Concern (PAECs) to identify data gaps that require additional environmental information;
- Review of salinity risk maps, and assessment of the potential risks associated with salinity pertaining to the proposed development;
- Discussion of the outcome of previous investigations relating to Glenmore Park Stage 2 findings, with Vianello Holdings;
- Preparation of this HLRA report in accordance with relevant guidelines for contaminated lands and salinity assessment; and
- Proposal of additional assessments or suitable remedial and validation strategies for the site, if required.

1.5 PERSONNEL

SESL's Environmental Scientists conducted a review of available desktop information in November 2017. The personnel involved for this project is shown in Table 1.

Table 1 – Project Personnel

Personnel	Position	Project Task
Ryan Jacka B Env Sc, M Env Sc, MEIANZ, ASSSI	Senior Environmental Scientist	• Conduct report review and authorisation.
Andrew Jacovides B Nat Sc (Env Mgt)	Environmental Scientist	• Conduct historical data review • Conduct Report drafting.
Stuart Jamieson BSc (Hons)	Graduate Environmental Scientist	• Conduct historical data review • Conduct Report drafting.

2 SITE DESCRIPTION

2.1 SITE LOCATION AND OWNERSHIP

The site is bound by Chain-O-Ponds Road to the south and The Northern Road to the east. The Penrith Landfill site and Mulgoa Nature Reserve exist to the west. The total site area is approximately 203 ha and encompasses 21 individual lots, which are outlined in Table 2 below.

2.2 SITE IDENTIFICATION

The following details describe the portion of land subject to this HLRA.

Table 2 – Site Identification

Site Address	Mulgoa, NSW 2745
Lot and DP Number	Lot 18 DP244610, Lot 19 DP244610, Lot 25 DP244610, Lot 26 DP244610, Lot 27 DP244610, Lot 28 DP244610, Lot 29 DP244610, Lot 30 DP244610, Lot 31 DP244610, Lot 1 DP795841, Lot 8 DP29081, Lot 1 DP1088989, Lot 1 D29081, Lot 2 DP29081, Lot 3 D29081, Lot 4 D29081, Lot 5 D29081, Lot 6 DP29081, Lot 2 DP224861, Lot 2 DP1224642 and Lot 3 DP1224642
Local Government Area	Penrith City Council
Current Zoning	RU2 – Rural Landscape and E3 Environmental Management under Penrith LEP 2010
Distance from Sydney CBD	Approximately 48km west of the CBD
Geographical Coordinates	33°49'00"S 151°41'00"E
Site Area	Approximately 205 ha (Figure 1)
Site Elevation	Approximately 55 - 85m AHD
Locality Map	Figure 1
Site Layout	Figure 2

2.3 SITE LAYOUT AND INFRASTRUCTURE

The site layout can be viewed in Figure 1 & Figure 2. The site consists of a number of rural lots, the majority with residential dwellings, dams and storage sheds. Additionally, some lots are used for intensive agriculture/horticulture, while others have been used to store wastes, including scrap and vehicles. Site features and corresponding lots are detailed below in Table 3.

Table 3 – Site Features

Site Feature	Affected Lots
Residential Dwellings/Sheds	Lot 18 DP244610, Lot 19 DP244610, Lot 25 DP244610, Lot 26 DP244610, Lot 27 DP244610, Lot 28 DP244610, Lot 29 DP244610, Lot 30 DP244610, Lot 31 DP244610, Lot 1 DP795841, Lot 8 DP29081, Lot 1 DP1088989, Lot 1 D29081, Lot 2 DP29081, Lot 3 D29081, Lot 4 D29081, Lot 5 D29081, Lot 6 DP29081, Lot 2 DP224861 and Lot 2 DP1224642

Rural Dams	Lot 18 DP244610, Lot 19 DP244610, Lot 25 DP244610, Lot 26 DP244610, Lot 27 DP244610, Lot 28 DP244610, Lot 29 DP244610, Lot 30 DP244610, Lot 31 DP244610, Lot 1 DP795841, Lot 1 DP1088989, Lot 1 D29081, Lot 2 DP29081, Lot 3 D29081, Lot 4 D29081, Lot 5 D29081, Lot 6 DP29081, Lot 2 DP224861, Lot 2 DP1224642 and Lot 3 DP1224642
Intensive Horticulture	Lot 18 DP244610, Lot 19 DP244610 and Lot 1 DP795841
Scrap Storage	Lot 8 DP29081, Lot 27 DP244610, Lot 5 D29081 and Lot 2 DP1224642

2.4 SURROUNDING LAND USE

The site is zoned E3 Environmental Management and RU2 Rural Landscape under the Penrith LEP 2010. The surrounding land shares these zonings as well as other zonings to reflect their historic or current uses (Appendix A).

3 Environmental Setting

3.1 TOPOGRAPHY AND DRAINAGE

In general, the site topography forms a discrete valley, and undulates in various directions. Two distinct drainage lines exist, while dams and water bodies are located in these drainage lines and local depressions. The direction of surface runoff is predominantly controlled by local topography, with stormwater mostly conveyed to the west of the site, to Mulgoa Creek and Nepean River beyond.

3.2 GEOLOGY

The Penrith 1:100 000 Geological Map (Clark and Jones, 1991) indicates that the soils within the site are underlain by Bringelly Shale of the Wianamatta Group, which was deposited during the Triassic. This geological unit is characterised by shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff. Within a 1000m buffer, there are also four (4) other geological units: Qal (fine-grained sand, silt and clay) and Cranebrook Formation (Qpc - gravel, sand, silt, clay) of Quaternary age, as well as Ashfield Shale (Rwa - Dark-grey to black claystone-siltstone and fine sandstone-siltstone laminate) and Minchinbury Sandstone (Rwm - Fine to medium-grained quartz-lithic sandstone) which are also part of the Wianamatta Group.

The Soil Landscapes of the Penrith 1:100,000 Sheet (Bannerman and Hazelton, 1990) indicates soil across the site is likely to belong to Blacktown (REbt) and Luddenham (ERlu) soil groups. Blacktown group soils are residual soils characterised by a gently undulating topography with shallow to moderately deep (>100cm) hardsetting mottled texture contrasts soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes on drainage lines. Limitations of Blacktown group soils include localised seasonal waterlogging, localised water erosion hazard, moderately reactive highly plastic subsoil and localised surface movement potential. Luddenham group soils are erosional soils characterised by undulating to rolling hills with shallow (<100cm) dark podzolic soils or massive earthy clays on crests; moderately deep (70-150cm) red podzolic soils on upper slopes; moderately deep (<150cm) yellow podzolic soils and prairie soils on lower slopes and drainage lines. Limitations of Luddenham group soils include water erosion hazard, localised steep slopes, localised mass movement hazard, localised shallow soils, localised surface movement potential, localised impermeable highly plastic subsoil and are moderately reactive. In addition to these two soil groups, within the 1000m buffer there is also alluvial soil from the South Creek soil group (ALsc) and colluvial soil from the Picton soil group (COpn) (Appendix A).

The classification of the soils on and surrounding the site by the *Atlas of Australian Soils* indicates that two kurosols are present within the site boundary. Soil with map unit code Pb12 is the predominant soil on site and Pb13 is also indicated to exist on site. Within the dataset buffer, there is also a sodosol (Tb35) to the west of the site. A map of the location of these soils, as well as full descriptions for the soil map units, can be found in Appendix A.

3.3 HYDROGEOLOGY

The aquifers within a 2000m buffer of the site are described as porous, extensive aquifers of low to moderate productivity and porous, extensive highly productive aquifers. A search of the groundwater bores within the vicinity identified seventeen (17) bores within a 2000m buffer of the site. Thirteen (13) of these bores are used for monitoring, with the remaining used for irrigation, stock and domestic purposes (Appendix A).

3.4 SURFACE WATER

A review of aerial photos and satellite imagery has revealed a number of water bodies and dams on the site of the proposed development. There are several large dams, the largest of which is located in the northwest of the site and is approximately 33 000m^2. Surface waters at the site are expected to be manipulated by the present drainage lines & contour banks and collected in dams present at the site.

3.5 ACID SULFATE SOIL

Acid sulfate soils typically occur in low-lying coastal areas less than 5m above the high tide level. A search of the Atlas of Australian Acid Sulfate Soil Categories within the dataset buffer revealed that the majority of the site had an Extremely Low (1-5%) probability of occurrence of Acid Sulfate Soils. The western section of the site had a Low (6-70%) probability of occurrence of Acid Sulfate Soils (Appendix A).

3.6 PROXIMITY TO LOCAL SENSITIVE ENVIRONMENTS

A number Critically Endangered, Endangered and Vulnerable species exist within a 10 km radius of the site (Appendix A).

4 Site History

A review of the site history was undertaken to identify previous uses on the site, and in particular activities with potential to contaminate soil, groundwater and surface water at the site. The historical review was subcontracted to Lotsearch Pty Ltd. The search included:

- Current and historical aerial photographs;
- Existing environmental reports for the site (where available);
- Council planning documentation; and
- The NSW EPA Contaminated Lands database.

4.1 HISTORICAL AERIAL PHOTOGRAPHS

Aerial photographs from 1965, 1970, 1982, 1991, 2002, 2009 and 2014 were obtained from Land and Property Information Division for review to assess the history of the development of the site, copies of the aerial photographs can be in Appendix A.

1956 The site appears to be used as agricultural land with two dwellings present at the site. The site contains a small number of dams, shrubs and trees. Vegetation somewhat concentrated in the gullies of the site, particularly in the southwest, as well as along the Northern Road to the east and part of the northern boundary. The site is immediately surrounded by lots of similar land usage. There appears to be disturbed areas on the opposite (eastern) side of The Northern Road. It is important to note the aerial photography from this year is in black and white and of lower quality than more recent aerial photos.

1961 There are a number of new structures that have been built in the southeast section of the site. There has also been construction in the surrounding area east of the Northern Road, where the disturbance was evident in the 1956 aerial photograph. It is important to note the aerial photography from this year is in black and white and of lower quality than more recent aerial photos.

1965 The site appears to be similar to the previous aerial photographs. There has been another dam constructed in the northeast of the site. The site is immediately surrounded by Lots of similar usage to the site. It is important to note the aerial photography from this year is in black and white and of lower quality than more recent aerial photos.

1970 The site and its immediate surrounding lots have remained relatively the same as seen in the previous 1965 historical aerial photograph with some minor changes. There are additional dwellings along The Northern Road and additional dams have been constructed. The site is immediately surrounded by lots of similar usage. The surrounding area is occupied by lots of similar usage to the site. It is important to note the aerial photography from this year is in black and white and of lower quality than more recent aerial photos.

1982 Additional dwellings have been constructed along the eastern boundary of the site, and agricultural/horticultural activities have commenced in the south-western corner of the site. A dam has been constructed towards the north-western corner of the site.

1991 The site and its immediate surrounding lots have remained relatively the same as seen in the previous 1982 historical aerial photograph. Evidence of irrigation and general agricultural activities can be seen across much of the site, particularly in the north eastern section of the site.

2002 Land use on site appears to be similar to the previous 1991 historical aerial photograph. Extensive development has occurred in areas north of the site.

2009 Land use on site appears to be similar to the previous 1991 and 2002 historical aerial photographs. Residential development on surrounding land to the north of the site has continued and the density of residential dwelling has increased in this area.

2014 Land use on site appears to continue to be similar to that in previous historical aerial photographs from 1991, 2002 and 2009. The residential development on the surrounding land to the north of the site has been extended and now is directly adjacent to the boundary of the site. Comparison of this aerial photograph to more recent satellite imagery has shown the residential development to be continuing.

In summary, the aerial photographs confirm that the site was extensively cleared and used for grazing purposes in the mid-1950s. The area of the site generally north of the east-west running creek (zoned RU2 – Rural Landscapes) has continued to be used for grazing purposes to this day. The aerial photographs show periods where pasture improvement on this land has occurred, potentially through application of fertiliser. These grazing lands do not suggest high risk of contamination. There has, however, been new structures built on this land as well as new dams since the mid-1950's. This construction and semi-rural land use has the potential to be associated with contaminating activities, and may have resulted in soils and/or groundwater that will require remediation and/or removal prior to the proposed development. The areas with dam structures have a higher risk of contamination and should be subject to more detailed investigation prior to development.

Land to the south of the east-west creek traversing the site is zoned E3 Environmental Management and appears to have been subdivided in individual allotments of approximately 10 ha, commencing after 1970. In general, the post-1970 historical photographs show the construction of new residential developments and sheds, as well as the construction of new dams and more intensive agricultural uses (horticulture), particularly in the western areas of the site. These areas where dam construction and more intensive agriculture represent a higher risk of contamination and must be subject to a detailed investigation, prior to development occurring, at the development application stage.

It is noted that the more detailed investigations carried out to support the development of the northern part of the site confirm no contamination associated with the previous grazing land.

4.2 SITE ZONING AND COUNCIL RECORDS

The Penrith Local Environmental Plan 2010 is the principle-planning instrument regulating landuse and development in the area. The site is currently zoned as Environmental Management (E3) and Rural Landscape (RU2). Adjoining land also include areas zoned Environmental Conservation (E2) and Public Recreation (RE1) under the Penrith Local Environmental Plan 2010. The zones relevant to the site, and the corresponding lots are detailed in the Table 4 below.

Table 4 – Site Zoning

Site Feature	Affected Lots
E3 – Environmental Management	Lot 18 DP244610, Lot 19 DP244610, Lot 25 DP244610, Lot 26 DP244610, Lot 27 DP244610, Lot 28 DP244610, Lot 29 DP244610, Lot 30 DP244610, Lot 31 DP244610, Lot 1 DP795841, Lot 8 DP29081, Lot 1 DP1088989, Lot 1 D29081, Lot 2 DP29081, Lot 3 D29081, Lot 4 D29081, Lot 5 D29081 and Lot 6 DP29081
RU2 – Rural Landscape	Lot 2 DP1224642, Lot 2 DP1224642 and Lot 2 DP224861

4.3 EPA CONTAMINATED SITES DATABASE

A search of the NSW Environmental Protection Authority (EPA) contaminated land public record was performed to assess if the site or surrounding sites have been declared as contaminated sites. It should be noted that this database is not a comprehensive list of all contaminated land in NSW, and only lists sites regulated under Part 3 of the Contaminated Land Management Act 1997.

A search was undertaken on the 7/11/2017 using a 1000m buffer of the site at The Northern Road, Mulgoa which returned no records of former gasworks or contaminated sites notified to the Environmental Protection Authority (EPA). There was a Record of Notice for Penrith Waste Services (adjacent to the western boundary of the site) which also was recorded in the National Waster Management Site Database (see Appendix A).

4.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

SESL was not aware of any environmental investigations previously conduced for the site.

4.5 CURRENT LANDUSE AND ASSOCIATED PRACTICES

A number of land uses are currently being undertaken at the site. The site is predominately utilised for agriculture and residential purposes, with rural dwellings existing along the southern and eastern boarders of the site. Intensive agriculture/horticulture is being undertaken in two areas of the site. A suspected orchard exists in the south western corner of the site, while a market garden (or similar) exists along the western boundary of the site. Several areas of scrap, drum and vehicle storage exist across the site. Based on aerial photographs, several properties have been used for storage for an unknown amount of time. Details regarding impacted lots is provided in Table 3 and Figure 2.

Areas identified as being associated with these land uses, both currently and from historical aerial photographs, have been identified as potential areas of environmental concern and are described in further detail in Section 5.

4.6 INTEGRITY ASSESSMENT

The integrity of information provided in the HLRA was considered reliable. The HLRA followed appropriate methods of investigation with the desktop survey. Details regarding the site history and present status of the site have been largely obtained from official records sourced from Penrith City Council, NSW EPA, SafeWork NSW and NSW Land and Property Information Division. These documents are considered accurate and credible. All information provided, as part of this report was believed to be true, accurate and representative of the past and present status of the site at the time of this investigation.

5 POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

A desktop review of available information was conducted to assess the Potential Areas of Environmental Concern (PAEC) at the site. Aerial photographs of the site (including historical photographs) were used to determine the location of PAEC across the site, which are shown in Figure 2. PAEC are detailed below.

5.1 General Agriculture

Due to the historical land use of the site, there is a high likelihood of current and former general agricultural activities being undertaken at the site. Activities associated with farming practices that may result in contamination may include, but are not limited to chemical storage, grain storage, maintenance sheds, pesticide use and livestock dips. Contaminants associated with these activities can include heavy metals, organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs).

5.2 Intensive Agriculture/Horticulture

Based on a review of aerial photographs, two areas of the site appear to be subject to intensive agricultural or horticultural activities. A suspected orchard exists in the south western corner of the site, while a market garden (or similar) exists along the western boundary of the site. Contaminants associated with these activities can include heavy metals, organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs). A site inspection conducted as part of a future detailed investigation will be conducted to determine the likelihood contamination associated with these PAECs.

5.3 Rural/Semi-Rural Dwellings

Dwellings (including residential houses and farm sheds) exist across the site, with dwellings existing at the majority of lots at the site. Based on aerial photographs, it is thought that dwellings across the site have a range of uses/purposes, including residential, agricultural and storage. Contaminants associated with these dwellings include asbestos, lead (in paint) and contamination associated with chemical storage. A site inspection conducted as part of a future detailed investigation will be conducted to determine the likelihood contamination associated with these PAECs.

5.4 Scrap, Drum and Vehicle Storage

Several areas of scrap, drum and vehicle storage exist across the site. Based on aerial photographs, several properties have been used for storage for an unknown amount of time. Due to the nature of a desktop review it isn't possible to detail the products/items stored at each of the site. Contaminants associated with storage of these items could include heavy metals, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), asbestos, lead (in paint), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRHs), polychlorinated biphenyls (PCBs) and benzene, ethyl-benzene, toluene & xylene (BTEX). A site inspection conducted as part of a future detailed investigation will be conducted to determine the likelihood contamination associated with these PAECs.

5.5 Rural Dams

A review of aerial photographs indicates that at least 30 rural/farm dams exist at the site. Dams of this nature are sometimes associated with imported fill or sediment contamination. Potential contaminants

associated with these dams includes heavy metals, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), asbestos, lead (in paint), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRHs), polychlorinated biphenyls (PCBs) and benzene, ethyl-benzene, toluene & xylene (BTEX). A site inspection conducted as part of a future detailed investigation will be conducted to determine the likelihood contamination associated with these PAECs

5.6 Historical Filling and Imported Materials

Although indicators of historical filling or presence of imported materials were identified based on the desktop review, there is the potential for such activities given the nature of the site. Potential contaminants associated with these dams includes heavy metals, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), asbestos, lead (in paint), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRHs), polychlorinated biphenyls (PCBs) and benzene, ethyl-benzene, toluene & xylene (BTEX). A site inspection conducted as part of a future detailed investigation will be conducted to determine whether historical filling or the importing of materials is likely to have occurred at the site.

5.7 Contaminants Associated with the PAECs

The contaminants that may exist at the site as a result of the PAECs are summarised in Table 5 below.

Table 5 - Identified Potential Areas of Environmental Concern

Identified Concern	Potential Contaminants
General Agriculture	Heavy Metals, OCP, OPP
Intensive Agriculture/Horticulture	Heavy Metals, OCP, OPP
Rural/Semi-Rural Dwellings	Heavy metals, TRH, BTEX, OCP, OPP, PCB, PAH, Asb
Scrap, Drum and Vehicle Storage	Heavy metals, TRH, BTEX, OCP, OPP, PCB, PAH, Asb
Rural Dams	Heavy metals, TRH, BTEX, OCP, OPP, PCB, PAH, Asb
Historical Filling and Imported Materials	Heavy metals, TRH, BTEX, OCP, OPP, PCB, PAH, Asb

Notes:	Asb	=	Asbestos	OPP	=	Organophosphorus pesticides
	BTEX	=	Benzene, Toulene, Ethylbenzene, Xylene	PAH	=	Polycyclic Aromatic Hydrocarbons
	Heavy metals	=	As, Cd, Cr, Cu, Pb, Hg, Ni, Zn	PCB	=	Polychlorinated Biphenyls
	OCP	=	Organochlorine Pesticides	TRH	=	Total Recoverable Hydrocarbons

6 RELEVANT GUIDELINES FOR CONTAMINATION ASSESSMENT AND MANAGEMENT

The guidelines and legislation detailed in this section must be utilised when conducting future environmental investigations and determining the suitability of the site for the proposed development.

6.1 RELEVANT GUIDELINES

Assessment criteria will be based on guidelines made or approved by the NSW EPA under Section 105 of the Contaminated Land Management Act 1997. These include EPA's Contaminated Sites series of guidelines, and fundamental guideline documents such as the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC 1992) and National Environmental Protection (Assessment of Site Contamination) Measure 1999, published by the NEPC (henceforth referred to as the NEPM).

The NEPM incorporates a recommended general process for the assessment of site contamination and a set of 9 specific guidelines. The process and guidelines are closely based on previous documentation widely used for assessing site contamination (such as ANZECC/NHRMC 1992 and the various National Environmental Health Forum monographs and proceedings). Assessment criteria have been drawn from other guidelines and information sources, if not available in the above guidelines.

6.2 PROPOSED DEVELOPMENT

SESL was advised that the proposed development includes the construction of 2400 residential dwellings at the site. The development is expected to involve the alteration of existing water bodies (farm dams), rehabilitation of riparian corridors, and the creation of public recreation space. The development is expected to be completed over multiple stages.

6.3 NATIONAL ENVIRONMENTAL PROTECTION MEASURE (CONTAMINATED SITES) 1999

National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) (NEPC 2013, Canberra) (hereafter NEPM) provides a national framework for conducting assessments of contaminated sites in Australia.

The purpose of the NEPM is to establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry.

The NEPM addresses assessment of contamination and does not provide specific guidance on prevention of site contamination. The desired environmental outcome for the NEPM is to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination.

Schedule A in the NEPM outlines the general process for assessment of site contamination, with reference to Schedules B (1) to B (9) for guidance on each step of the process.

In broad terms, the assessment process as provided in Schedule A can be described as:

Tier 1 PSI — Preliminary investigation, laboratory analysis and interpretation, and assessment of results with reference to investigations levels;

Tier 1 DSI — Where required, detailed investigation, laboratory analysis and interpretation is completed, and the need for risk assessment to derive response levels and/or the need for remediation is evaluated; and

Tier 2 or 3 — Site-specific risk assessment to confirm/define appropriate health and ecological investigation levels.

Overarching guidance is provided on community consultation and risk communication, protection of health and safety during assessment of site contamination and expected competencies of environmental auditors and related professionals.

NEPM provides a framework for the use of investigation and screening levels for the protection of human health, ecosystems, groundwater resources and aesthetics. Investigations levels and screening levels are applicable to the Tier 1 site assessment. The adopted investigation and screening levels for this assessment is as follow:

i) Health Investigation Levels (HILs);
ii) Health Screening Levels (HSLs);
iii) Ecological Investigation Levels (EILs); and
iv) Ecological Screening Levels (ESLs).

6.3.1 *Health Investigation Levels (HILs)*

HILs are scientifically based, generic assessment criteria designed to be used in the Tier 1 assessment for assessing human health risk via all relevant pathways of exposure. HILs are designed to be intentionally conservative and based on a reasonable worst-case scenario for the following generic land use settings:

A **Residential with garden/accessible soil (home grown produce contributing less than 10% of vegetable and fruit intake; no poultry) this category includes children's day-care centres, preschools and primary schools.**

B Residential with minimal opportunities for soil access, including dwellings with fully and permanently paved yard space such as high-rise apartments and flats.

C Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves), which should be subject to a site-specific assessment where appropriate.

D Commercial/industrial includes shops and offices as well as factories and industrial sites.

The site is currently used for rural (grazing), intensive agriculture/horticulture and rural residential purposes, and is proposed to be developed for residential purposes. Due to the current site landuse and proposed development, high human exposure is expected. Therefore, the HIL selected for the site is HIL A– Residential.

NEPM Schedule B7 defined the HILs as the concentration of a contaminant above, which further appropriate investigation and evaluation will be required. It is also stated "levels in excess of the HILs do not imply unacceptability or that a significant health risk is likely to be present".

The NEPM Schedule B7 states at the very least, the maximum and the 95% UCL of the arithmetic mean contaminant as well as localised elevated values must be compared to the HILs. Two additional (secondary) criteria should also be met, namely that the standard deviation of the results must be <50% of the relevant investigation level and that no single value exceeds 250% of the relevant investigation level.

NEPM also states that the HILs are not intended to be used as clean-up levels for contaminated sites. The requirement of clean-up should be based on site-specific assessment and risk management options.

The adopted HIL is shown in Table 6.

Table 6 – Health Investigation Levels for Soil Contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/Industrial[1] D
Metals and Inorganics				
Arsenic[2]	***100***	500	300	3,000
Beryllium	***60***	90	90	500
Boron	***4,500***	40,000	20,000	300,000
Cadmium	***20***	150	90	900
Chromium (VI)	***100***	500	300	3,600
Cobalt	***100***	600	300	4,000
Copper	***6,000***	30,000	17,000	240,000
Lead[3]	***300***	1,200	600	1,500
Manganese	***3800***	14,000	19,000	60,000
Mercury (Inorganic) [5]	***40***	120	80	730
Methyl Mercury[4]	***10***	30	13	180
Nickel	***400***	1,200	1,200	6,000
Selenium	***200***	1,400	700	10,000
Zinc	***7,400***	60,000	30,000	400,000
Cyanide	***250***	300	240	1,500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	***3***	4	3	40
Total PAHs[7]	***300***	400	300	4000
Phenols				
Phenol	***3,000***	45,000	40,000	240,000
Pentachlorophenol	***100***	130	120	660
Cresols	***400***	4,700	4,000	25,000
Organochlorine Pesticides				
DDT+DDE+DDD	***240***	600	400	3,600
Aldrin and Dieldrin	***6***	10	10	45
Chlordane	***50***	90	70	530
Endosulfan	***270***	400	340	2,000
Endrin	***10***	20	20	100
Heptachlor	***6***	10	10	50
HCB	***10***	15	10	80
Methoxychlor	***300***	500	400	2,500

Mirex	***10***	20	20	100
Toxaphene	***20***	30	30	160
Herbicides				
2,4,5-T	***600***	900	800	5,000
2,4-D	***900***	1,600	1,300	9,000
MCPA	***600***	900	800	5,000
MCPB	***600***	900	800	5,000
Mecoprop	***600***	900	800	5,000
Picloram	***4,500***	6,600	5,700	35,000
Other Pesticides				
Atrazine	***320***	470	400	2,500
Chlorpyrifos	***160***	340	250	2,000
Bifenthrin	***600***	840	730	4,500
Other Organics				
PCBs[8]	***1***	1	1	7
PBDE Flame Retardants (Br1-Br9)	***1***	2	2	10

Notes: This table is adapted from Table 2 in Schedule B7: Derivation of Health-Based Investigation Levels, *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013* (NEPC 2013).
BOLD indicates adopted criteria

6.3.2 *Health Screening Levels (HSLs)*

Petroleum Hydrocarbon Compounds

NEPM 2013 adopts the Health Screening Levels for various petroleum hydrocarbon compounds developed by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE). Friebel and Nadebaum 2011 provide the methodology for assessing human health risk via the inhalation and direct contact pathways of selected petroleum compounds and fractions.

The HSLs apply to the same landuse scenarios with additional consideration of soil texture and depth to determine the appropriate soil, groundwater and soil vapour criteria.

The NEPM 2013 provides HSL fractions and corresponding equivalent carbon range for petroleum hydrocarbon compounds (see Table 7). HSLs are given only for F1, F2 and BTEX as the heavier petroleum compounds of F3 and F4 are non-volatile and do not pose a concern for vapour intrusion. However exposure can be via direct contact pathways (dermal contact, incidental oral ingestion and dust in halation). Friebel and Nadebuam 2011 provides the HSLs for direct contact, however for most site assessments, these levels are unlikely to trigger further investigation or site management as the values are substantially higher than most soil screening levels.

Table 7 – HSL Fractions and Corresponding Equivalent Carbon Range

Fraction Number	Equivalent Carbon Number Range
F1	$C_6 – C_{10}$
F2	$>C_{10} – C_{16}$
F3	$>C_{16} – C_{34}$
F4	$>C_{34} – C_{40}$

HSLs for soil, groundwater and soil vapour haven been developed based on soil texture. The HSLs assume a uniform soil profile and the highest proportion of the soil texture from the soil profile should be used selecting the appropriate HSLs. For Tier 1 soil assessment, the HSL classifications of sand, silt and clay may be broadly applied to soil texture classification in Table A1 of Australian Standard 1726 as follow:

Coarse grained soil: >50% of particles (by weight) <63mm and >0.075mm

- Sand: >50% of particles (by weight) <2.36mm; or
- Gravel: >50% of particles (by weight) >2.36mm.

Fine-grained soil: >50% of particles (by weight) <0.075mm

- Silts and clays (liquid limit >50%);
- Silts and clays (liquid limit <50%); or
- Highly organic soils.

Asbestos

NEPM 2013 adopted the HSLs from the Western Australia Department of Health (WA DoH) Guidelines of Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009. The HSLs are based on scenario-specific likely exposure levels, that includes bonded and friable asbestos levels (see Table 8).

Asbestos only poses human health risk when asbestos fibres are made airborne and inhaled. Bonded asbestos is not readily made airborne except through substantial physical damage. NEPM 2013 states "the assessment and management of asbestos contamination should take into account the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres".

The HSLs are to be used for Tier 1 assessment, in the event of an exceedance that triggers the need for a Tier 2 site-specific assessment. Site-specific assessments of asbestos contaminated sites should be designed to describe the nature and quantity of asbestos present in the soil that can sufficiently develop a risk management plan for the current and proposed landuse of the site.

Table 8 – Health Screening Levels for Asbestos Contamination in Soil

	Health Screening Level (w/w)			
Form of asbestos	Residential A[1]	Residential B[2]	Recreational C[3]	Commercial/ Industrial D[4]
Bonded ACM	**0.01%**	0.04%	0.02%	0.05%
Fibrous Asbestos (FA) and Asbestos Fines (AF) [5] (Friable Asbestos)	**0.001%**			
All forms of asbestos	**No visible asbestos for surface soil**			

Note: This table is adapted from Table 7 in Schedule B1: Health Screening Levels of Asbestos Contamination in Soil, National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (NEPC 2013).

6.3.3 *Ecological Investigation Levels (EILs)*

Ecological Investigation Levels (EILs) have been developed for assessing risk to terrestrial ecosystem for common contaminants in soil. The EILs are derived for specified levels of species protection depending on land use and are principally applied to the top 2m of the soil.

Table 9 – EILs Landuse Criteria and Protection Levels

Land Use	Levels of Protection
Areas of ecological significance	99%
Urban residential areas and public open space (HIL A, B and C)	80%
Commercial and industrial	60%

Schedule B5 of NEPM 2013 provides the EILs for Arsenic, Copper, Trivalent Chromium, DDT, Naphthalene, Nickel, Lead and Zinc. The methodology to derive the EILs considers the physicochemical properties of soil and contaminants and the capacity of the local ecosystem to accommodate increases in contaminant levels above ambient background.

EILs are obtained by summing added ambient background concentration (ABC) and contaminant limit (ACL). ABC is the soil concentration in a specified locality that is the total of naturally occurring background level and the contaminant levels that have been introduced by general anthropogenic sources. ACL is the added concentration above the ACB of a contaminant which requires further investigation on the impact on ecological values.

The derivation of EILs takes into consideration the ageing of contamination (>2 years) and soil properties as the toxicity of soil contaminants will reduce over time. Values for ACL based on pH, CEC and exposure scenario are provided for Lead, Zinc, Copper, Nickel and Trivalent Chromium. This method of deriving EILs only applies to metals and metalloids, with the exception of Arsenic. Generic EILs for Arsenic, DDT and Naphthalene are shown in Appendix D.

Methodology for Tier 2 site-specific assessments to determine site-specific EILs is provided in Schedule B5(b).

6.3.4 *Ecological Screening Levels (ESLs)*

Ecological Screening Levels (ESLs) have been developed for selected petroleum hydrocarbon compounds to assess risk to terrestrial ecosystem. The ESLs adopts the same four fractions from the HSLs (see Table 7), however the soil texture standards are only divided into two; coarse or fine.

ESLs were adopted based on a review of Canadian guidance, a risk based TPH standards for human health and ecological aspects for various land uses in the Canada-wide standard for petroleum hydrocarbons in soil (CCME 2008).

In summary, the Investigation and Screening Levels adopted for this assessment is as follow:

- NEPC 2013, NEPM Schedule B7, Table 1(A)1 – Health Investigation Levels for Soil Contaminants, Exposure Setting **Residential A**;
- NEPC 2013, NEPM Schedule B7, Table 7 – Health Screening Levels for Asbestos Contamination in Soil, Exposure Setting **Residential A;**
- NEPC 2013, NEPM Schedule B7, Table 1(A)3 – Soil Health Screening Levels for Vapour Intrusion;
- NEPC 2013, NEPM Schedule B5b & B5c, Ecological Investigations Levels
- NEPC 2013, NEPM Schedule B7, Table 1(B)5 – Generic EILS for Aged As, Fresh DDT and Fresh Napthelene in Soils; and
- NEPC 2013, NEPM Schedule B7, Table 1(B)6 – ESLs for TPH Fractions F1-F4, BTEX and Benzo(a)pyrene in Soil.

6.4 THE MANAGING LAND CONTAMINATION: PLANNING GUIDELINES – REMEDIATION OF LAND, NSW EPA 1997 (SEPP55 GUIDELINES)

The Managing Land Contamination: Planning Guidelines – Remediation of Land, NSW EPA 1997 (SEPP55 Guidelines) establishes the best practice for managing land contamination through the planning and development control process. The planning and development control process as provided for in the Environmental Planning and Assessment Act 1979 plays an important role in the management of land contamination. The integration of land contamination management into the planning and development control process will:

- Ensure that changes of land use will not increase the risk to health or the environment;
- Avoid inappropriate restrictions on land use; and
- Provide information to support decision-making and to inform the community.

The SEPP55 Guidelines include:

a) Information to assist in the investigation of contamination possibilities;
b) A decision-making process that responds to the information obtained from an investigation;
c) Information on how planning and development control can cover the issues of contamination and remediation;
d) A suggested policy approach for planning authorities;
e) Discussion of information management systems and notification and notation schemes, including the use of Section 149 planning certificates notations; and
f) Approaches to prevent contamination and reduce the environmental impact from remediation activities.

SEPP 55 Guidelines provides consistent statewide planning and development controls for the remediation of contaminated land and ensures the following:

- Land use changes do not occur until planning authorities consider whether the land is contaminated and whether it needs to be remediated to make it suitable for the proposed use;

- Remediation of contaminated land is permissible throughout the State;
- Remediation requires consent only where it has the potential for significant environmental impacts or does not comply with a council's policy for contaminated land;
- Most remediation proposal which require consent are advertised for public comment;
- All remediation is carried out in accordance with appropriate standards and guidelines;
- Applications for remediation are not refused without substantial justification; and
- Councils are notified at commencement and completion of remediation.

6.5 RELEVANT LEGISLATION

NSW has a comprehensive suite of guidelines relating to assessment and management of contamination, administered under the Contaminated Land Management Act (CLM Act) 1997 and the Environmental Planning and Assessment Act 1997. These include the following:

- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, NSW OEH, 2011;
- Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, NSW DEC, April 2006;
- Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995;
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land, NSW EPA 1998; and
- Waste Classification Guidelines Part 1: Classifying Waste, NSW EPA 2014.

Guidelines approved under the CLM Act also include ADWG (2011) Australian Drinking Water Guidelines, ANZECC/ARMCANZ (2000) Water Quality Guidelines and GMRRW (2008) Guidelines for Managing Risk in Recreational Waters.

7 CONCLUSION

7.1 SITE CHARACTERISATION

SESL Australia (SESL) was engaged by Mirvac and Vianello (the client) to conduct a High Level Risk Assessment (HLRA) to identify contamination and salinity risks on land a proposed for the urban extension of Glenmore Park south to Chain-O-Ponds Road in Mulgoa (the site). The land use of the site is predominantly agriculture and low density, semi-rural residential. This investigation is required as part of the proposed 2400 lot residential development at the site. The HRLA excludes that land already zoned for urban purposes which has been approved for subdivision by Penrith Council for urban development.

A desktop review of available information, including current and historical aerial photographs identified the following potential areas of environmental concern (PAECs):

- General Agriculture;
- Intensive Agriculture/Horticulture;
- Rural/Semi-rural residencies;
- Scrap, Drum and Vehicle Storage;
- Rural Dams; and
- Historical Filling & Imported Fill.

Further detail of these PAECs, including the associated contaminants, is provided in Section 5 of this report. This preliminary assessment was limited to a desktop review of available information. As such, certain land use activities or areas of environmental concern may not have been identified as part of this limited assessment.

Based on the site history review of available information, a range of current and former land use activities undertaken at the site have the potential to have caused contamination to soil, groundwater or other media. The identified PAECs are typical of most properties with similar historical and current land uses, and the environmental investigation works are standard for most greenfield locations where land use change is proposed, especially for residential development. The PAECs identified are a list that may be found on the site, that have the potential to have caused contamination to soil, groundwater or other media. These PAECs will not necessarily be present at the site or may be isolated in discrete locations. As such, further investigation is required to determine the presence and/or extent of these PAECs prior to development, at the development application stage.

During the review of available information for the development of this HLRA, there has been nothing identified to suggest that previous land uses have resulted in a degree of contamination at the site that cannot be remediated prior to the development of the site.

Further assessments will be required in additional stages, including a Historical Title Search, Section 149 Planning Certificate Search and Dangerous Goods Licence Search – Workcover NSW.

7.2 SUMMARY

Based on this assessment, SESL recommends that further investigation is required to determine the presence and/or extent of contamination associated with the PAECs identified, prior to the proposed development, at the development application stage. This additional investigation must include:

- The undertaking of a Tier 1 Detailed Site Investigation (DSI) to determine the presence and/or extent of contamination at the site, associated with the identified Potential Areas of Environmental Concern (PAECs);
- This investigation must be adequately designed to assess all identified Contaminants of Potential Concern (COPC) within site soils and groundwater; and
- In the event that site soils or groundwater are determined to be contaminated, a Remedial Action Plan (RAP) will need to be developed with the contaminated material to be managed and remediated during the construction phase.

8 LIMITATIONS

This report only covers the site conditions using information available from historical aerial photos. To ensure that all potential contaminants can be identified, further assessments will be required in additional stages, including a Historical Title Search, Section 149 Planning Certificate Search and Dangerous Goods License Search – Workcover NSW.

This report is for the use of the client and any relevant authorities that rely on the information for development applications and approval processes. Any reliance on this report by third parties shall be at such parties' sole risk. This report shall only be presented in full and may not be used to support any other objective other than those set out in the report.

SESL's assessment is necessarily based on the result of limited site investigations and upon the restricted program of visual assessment of the surface and consultation of available records. Neither SESL, nor any other reputable consultant, can provide unqualified warranties nor does SESL assume any liabilities for site conditions not observed, or accessible during the time of investigations.

No site investigations can be thorough enough to provide absolute confirmation of the presence or absence of substances, which may be considered contaminating, hazardous or polluting. Similarly, the level of testing undertaken cannot be considered to unequivocally characterise the degree or extent of contamination on site. In addition, regulatory or guideline criteria for the evaluation of environmental soil and groundwater quality are frequently being reviewed and concentrations of contaminants which are considered acceptable at present may in the future be considered to exceed acceptance criteria. Similar conditions may prevail in regard to site remediation standards as different regulatory mechanisms are developed and implemented.

9 REFERENCES

ANZECC (1996) *Guidelines for the Laboratory Analysis of Contaminated Soils* – Australian and New Zealand Environment and Conservation Council

Australian Standard AS1726:1994 *Geotechnical Site Investigations*

Australian Standards AS4482.1:2005 *Guide to the Sampling and Investigation of Potentially Contaminated Soil (Part 1 & 2)*

enHealth 2012, Australian exposure factor guidance. Environmental Health Subcommittee (enHealth) of the Australian Health Protection Principal Committee, Canberra, Australia.

Bannerman SM and Hazelton PA, 1990, *Soil Landscapes of the Penrith 1:100,000 Sheet map and report*, Soil Conservation Service of NSW, Sydney

Clark N.R. and Jones D.C., 1991, *Penrith 1:100 000 Geological Sheet 9030*, 1st edition. Geological Survey of New South Wales, Sydney.

Lotsearch (2017) Environmental Risk and Planning Report: The Northern Road, Mulgoa, NSW 2745

National Environmental Protection (Assessment of Site Contamination) Measures, NEPC 1999;

National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) (NEPC 2013, Canberra
NSW DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*

NSW EPA (Revised 2014) *Waste Classification Guidelines Part 1: Classifying Waste*

NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*

NSW EPA (1999) *Contaminated Sites: Guidelines of Significant Risk of Harm from Contaminated Land and the Duty to Report*

NSW OEH (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*

Penrith Local Environmental Plan 2010

Soil Series No. 1, 2nd Edition, 1998 and 3rd Edition, (1999) *Health-Based Soil Investigation Levels, National Environmental Health Forum monographs*

WA DoH (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)

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Figure 1

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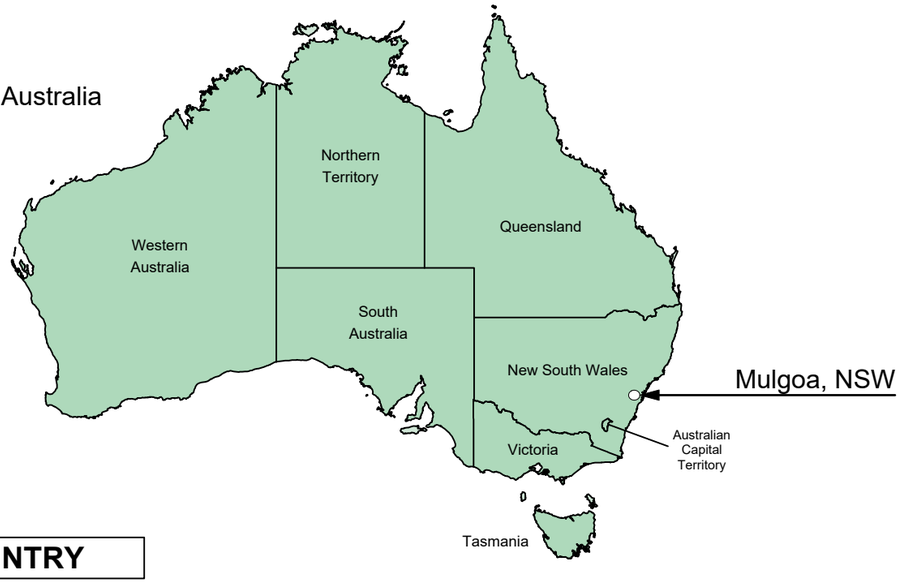
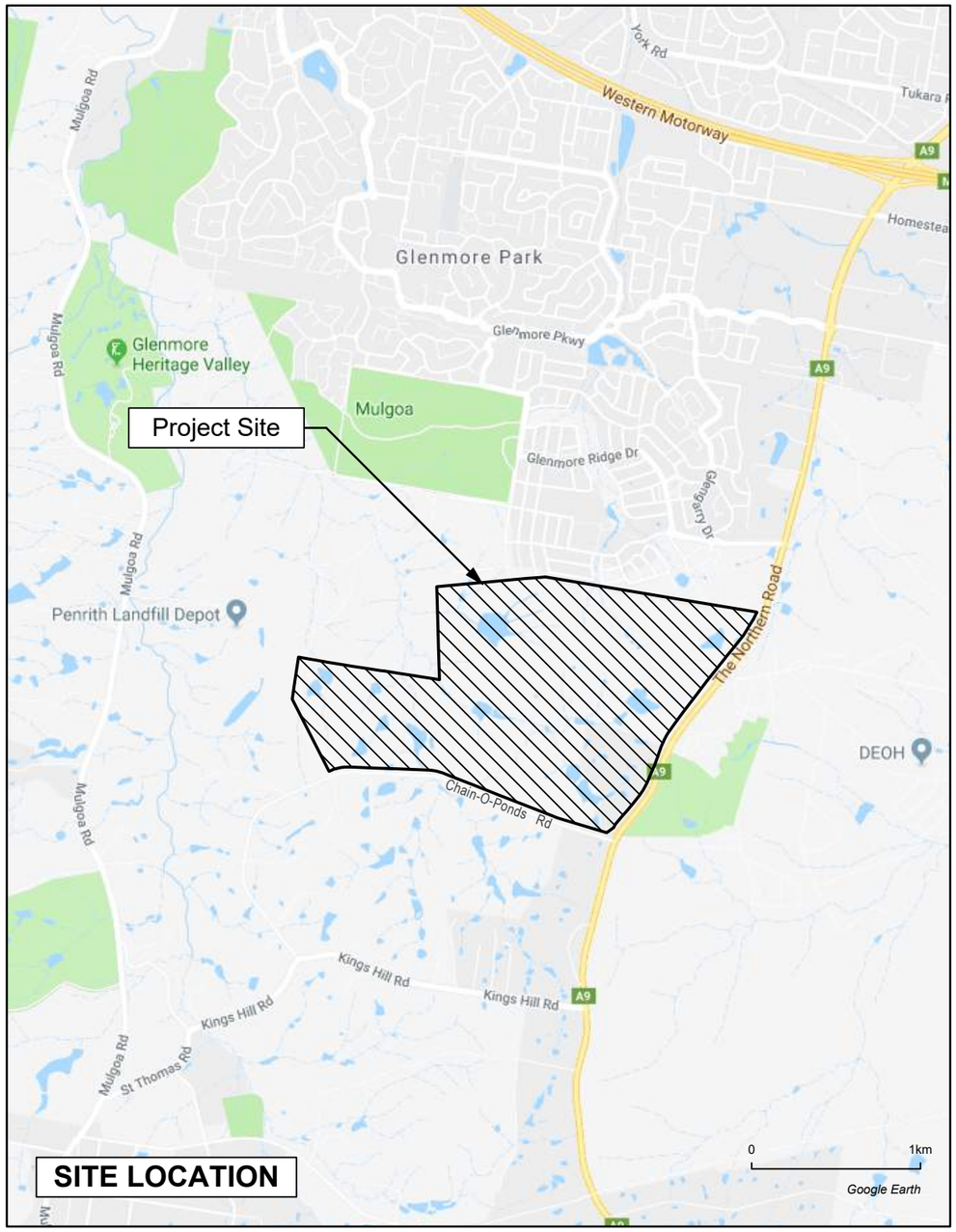
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006



COUNTRY

REGION



SITE LOCATION

VER	DATE	AMENDMENTS	DRW	CKD
01	22/11/2017	initial draft	LDW	

COMMERCIAL IN CONFIDENCE

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FIGURE 1
SITE LOCATION

Project Ref:	C8043Q7704J000470
Project:	High Level Risk Assessment
Location:	The Northern Road, Mulgoa NSW
Client:	Mirvac Homes (NSW) Pty Ltd

Easting: 285350	Northing: 6256150	Datum mAHD; UTM GRA 56H	PRINT: A3 (L)

SESL AUSTRALIA
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Figure 2

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QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

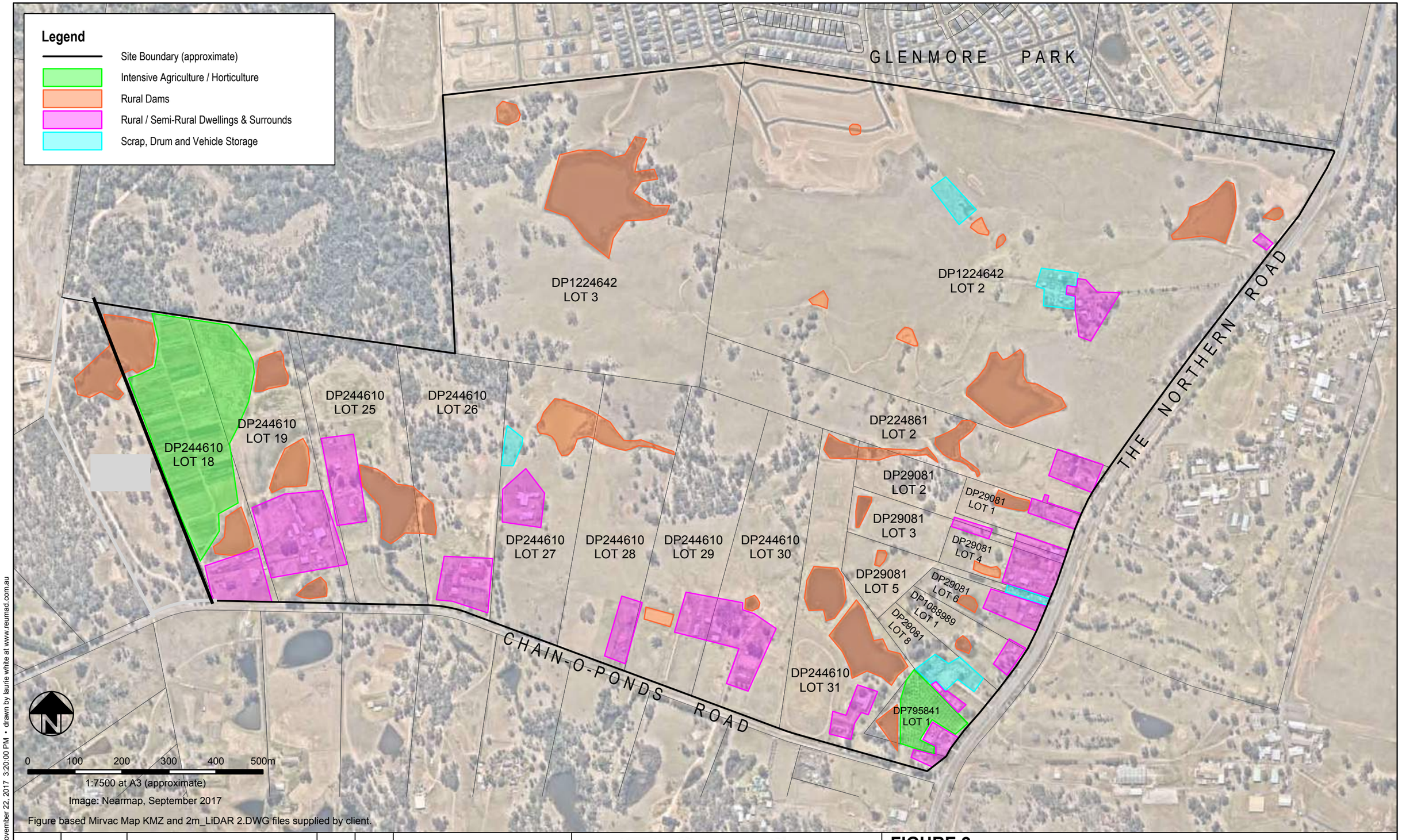

Figure based Mirvac Map KMZ and 2m_LiDAR 2.DWG files supplied by client.

VER	DATE	AMENDMENTS	DRW	CKD
01	22/11/2017	initial draft	LDW	

COMMERCIAL IN CONFIDENCE

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FIGURE 2
SITE LAYOUT & POSSIBLE AREAS OF ENVIRONMENTAL CONCERN

Project Ref:	C8043Q7704J000470
Project:	High Level Risk Assessment
Location:	The Northern Road, Mulgoa NSW
Client:	Mirvac Homes (NSW) Pty Ltd

Easting: 285350 | Northing: 6256150 | Datum mAHD; UTM MGA 56H | PRINT: A3 (L)

Mulgoa Figures V2.vwx • Wednesday, November 22, 2017 3:20:00 PM • drawn by laurie white at www.reumad.com.au

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Figure 3

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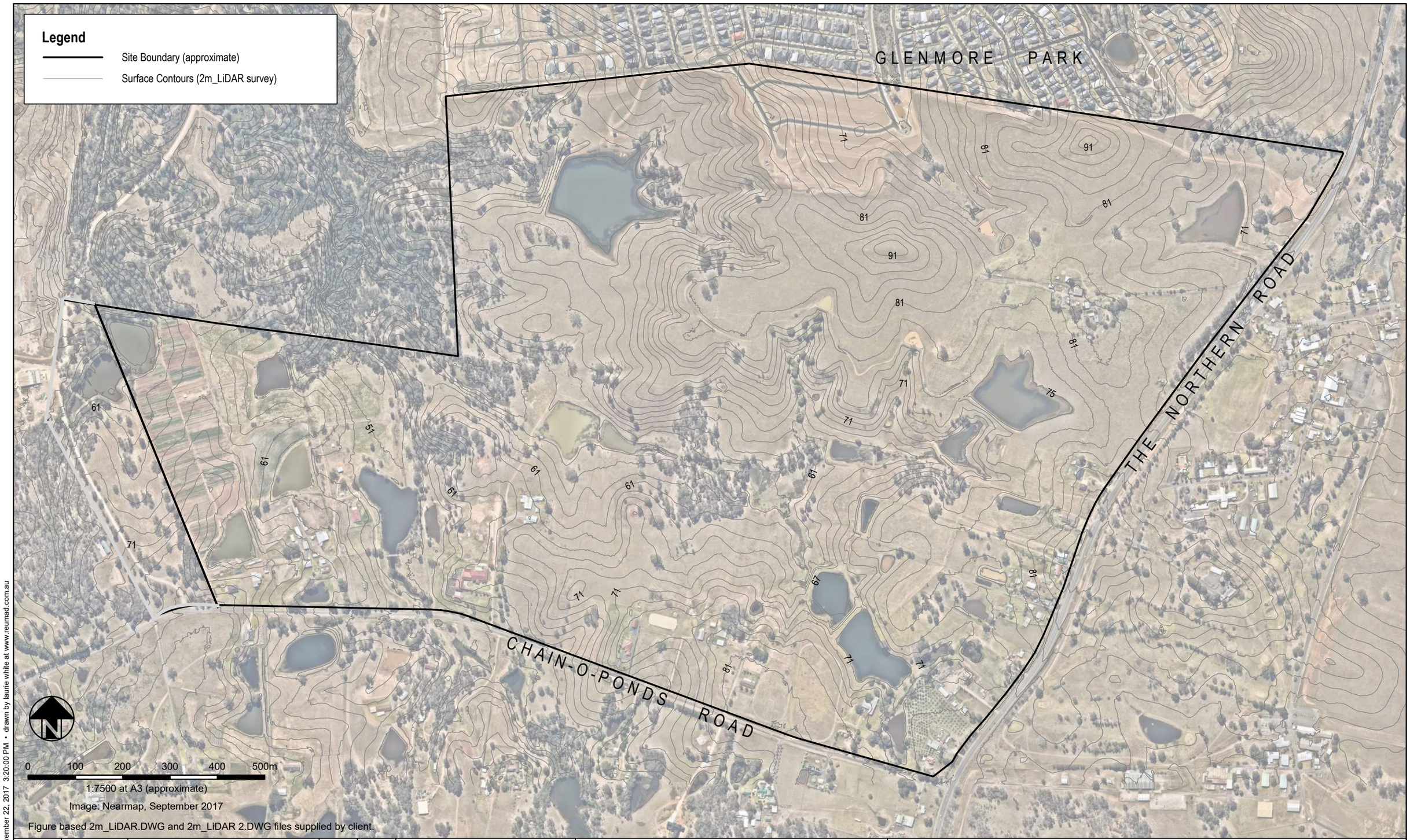
LAB 16 Chilvers Rd, Thornleigh NSW 2120
ACT Level 5 Tower A, 7 London Cct, Canberra ACT 2601
VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006



VER	DATE	AMENDMENTS	DRW	CKD
01	22/11/2017	initial draft	LDW	

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FIGURE 3
CONTOUR PLAN

Project Ref:	C8043Q7704J000470
Project:	High Level Risk Assessment
Location:	The Northern Road, Mulgoa NSW
Client:	Mirvac Homes (NSW) Pty Ltd

Easting: 285350	Northing: 6256150	Datum mAHD; UTM MGA 56H	PRINT: A3 (L)

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Appendix A

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QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

Environmental Risk and Planning Report

The Northern Road, Mulgoa, NSW 2745

Report Date: 07 Nov 2017 18:56:44

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

Table of Contents

Location Confidences

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

LC Code	Location Confidence
1	Georeferenced to the site location / premise or part of site
2	Georeferenced with the confidence of the general/approximate area
3	Georeferenced to the road or rail
4	Georeferenced to the road intersection
5	Feature is a buffered point
6	Land adjacent to Georeferenced Site
7	Georeferenced to a network of features

Dataset Listing

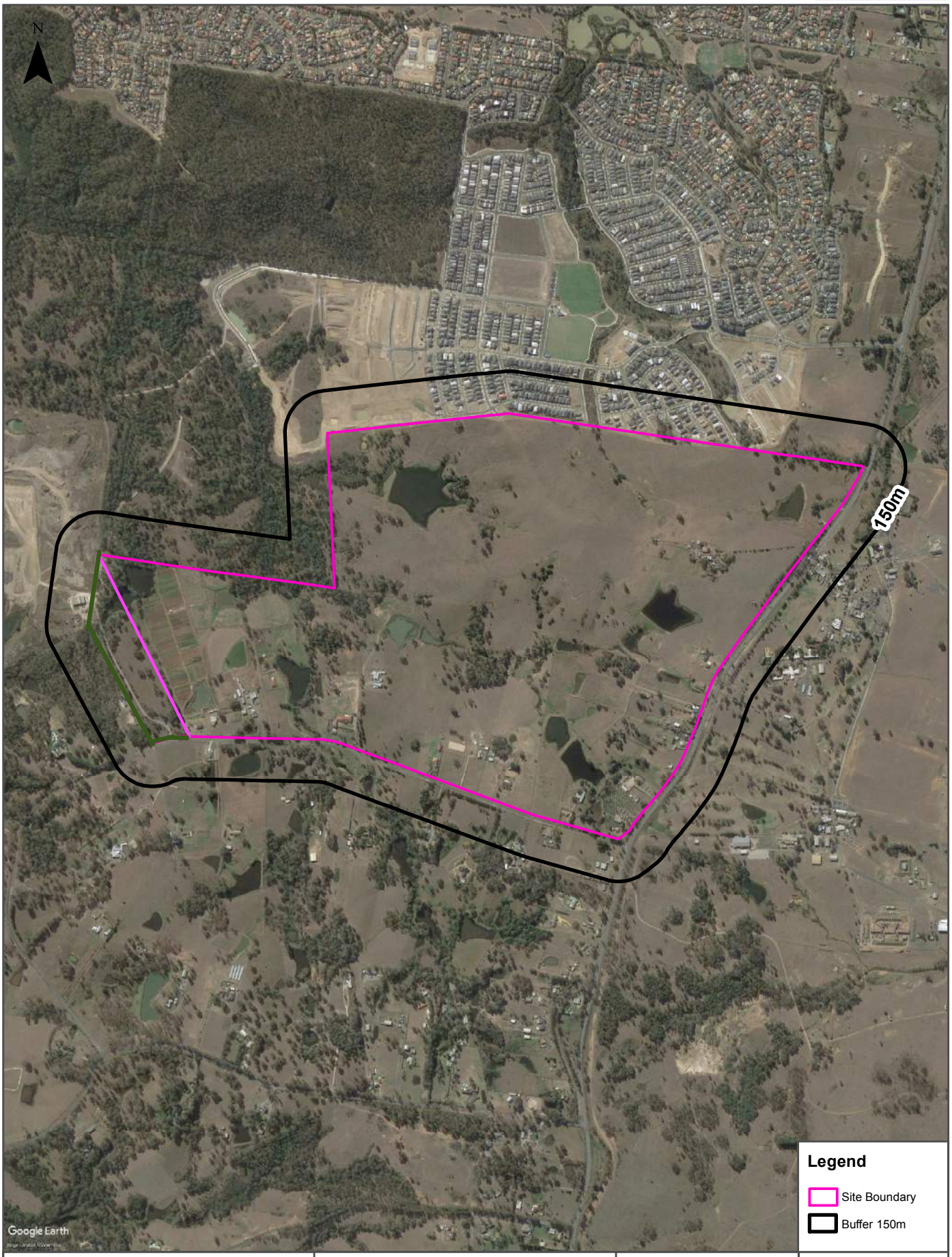
Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	Dept. Finance, Services & Innovation	07/11/2017	07/11/2017	Daily	-	-	-	-
Topographic Data	Dept. Finance, Services & Innovation	10/04/2015	01/04/2015	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	30/10/2017	04/09/2017	Monthly	1000	0	0	0
Contaminated Land: Records of Notice	Environment Protection Authority	30/10/2017	30/10/2017	Monthly	1000	0	1	1
Former Gasworks	Environment Protection Authority	23/10/2017	12/09/2017	Monthly	1000	0	0	0
National Waste Management Site Database	Geoscience Australia	23/10/2017	07/03/2017	Quarterly	1000	0	1	1
EPA PFAS Investigation Program	Environment Protection Authority	23/10/2017	23/10/2017	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	23/10/2017	23/10/2017	Quarterly	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	0	2	2
Delicensed POEO Activities still Regulated by the EPA	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	3	4	4
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	1	1	1
UBD Business to Business Directory 1991 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business to Business Directory 1991 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business to Business Directory 1986 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business to Business Directory 1986 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	1000	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	1000	-	0	0
Points of Interest	Dept. Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	3
Tanks (Areas)	Dept. Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	0
Tanks (Points)	Dept. Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	2
Major Easements	Dept. Finance, Services & Innovation	01/02/2017	01/02/2017	As required	1000	1	1	3
State Forest	Dept. Finance, Services & Innovation	01/02/2017	29/06/2016	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	01/02/2017	31/12/2016	Annually	1000	0	0	1

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	2	2	2
Groundwater Boreholes	NSW Dept. of Primary Industries - Office of Water / Water Administration Ministerial Corporation; Commonwealth of Australia (Bureau of Meteorology)	21/03/2016	01/12/2015	Annually	2000	0	0	17
Geological Units 1:100,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	1	-	5
Geological Structures 1:100,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1000	2	-	4
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1000	2	2	3
Standard Local Environmental Plan Acid Sulfate Soils	NSW Planning and Environment	07/10/2016	07/10/2016	As required	500	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	2
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	1
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	4	4	6
Mining Subsidence Districts	Dept. Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	0	0	0
SEPP 14 - Coastal Wetlands	NSW Planning and Environment	17/12/2015	24/10/2008	Annually	1000	0	0	0
SEPP 26 - Littoral Rainforest	NSW Planning and Environment	17/12/2015	05/02/1988	Annually	1000	0	0	0
SEPP 71 - Coastal Protection	NSW Planning and Environment	17/12/2015	01/08/2003	Annually	1000	0	0	0
SEPP Major Developments 2005	NSW Planning and Environment	09/03/2013	25/05/2005	Under Review	1000	0	0	0
SEPP Strategic Land Use Areas	NSW Planning and Environment	01/08/2017	28/01/2014	Annually	1000	0	0	0
LEP - Land Zoning	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	1000	4	12	27
LEP - Minimum Subdivision Lot Size	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	2	-	-
LEP - Height of Building	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	1	-	-
LEP - Floor Space Ratio	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	0	-	-
LEP - Land Application	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	1	-	-
LEP - Land Reservation Acquisition	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	0	-	-
State Heritage Items	NSW Office of Environment & Heritage	01/08/2017	27/05/2016	Quarterly	1000	0	0	1
Local Heritage Items	NSW Planning and Environment	23/09/2017	23/09/2017	Monthly	1000	0	0	2
Bush Fire Prone Land	NSW Rural Fire Service	24/09/2017	06/09/2017	Quarterly	1000	2	3	3
Remnant Vegetation of the Cumberland Plain	NSW Office of Environment & Heritage	07/10/2014	04/08/2011	Unknown	1000	6	6	10
RAMSAR Wetlands	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	The Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	11	13	94
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	07/11/2017	07/11/2017	Daily	10000	-	-	-

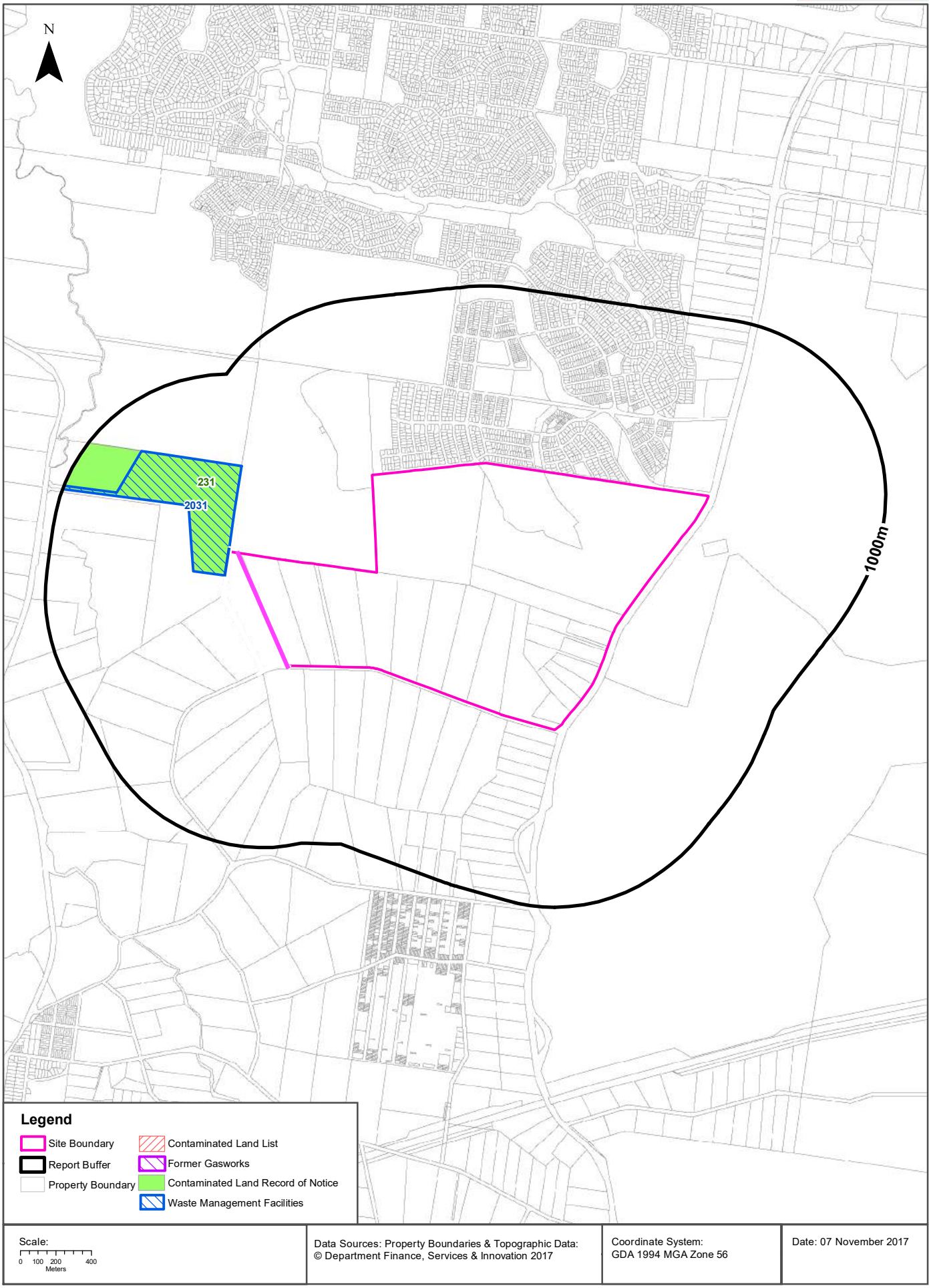
Aerial Imagery 2016

The Northern Road, Mulgoa, NSW 2745



Contaminated Land & Waste Management Facilities

The Northern Road, Mulgoa, NSW 2745



Contaminated Land & Waste Management Facilities

The Northern Road, Mulgoa, NSW 2745

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
N/A	No records in buffer								

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

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

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land & Waste Management Facilities

The Northern Road, Mulgoa, NSW 2745

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
231	Penrith Waste Services	Mulgoa Road	Mulgoa	2 former	3081	Premise Match	0m	West

Contaminated Land Records of Notice Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit
http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

Former Gasworks within the dataset buffer:

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

Former Gasworks Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

National Waste Management Site Database

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

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
2031	Penrith Waste Services Pty Ltd	Penrith Waste Services Pty Ltd	842 Mulgoa Road	Mulgoa	Landfill	Operational				Premise Match	0m	West

Wate Management Facilities Data Source: Australian Governement Geoscience Australia
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

EPA PFAS Investigation Program

The Northern Road, Mulgoa, NSW 2745

EPA PFAS Investigation Program

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

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

EPA PFAS Investigation Program: Environment Protection Authority

EPA Other Sites with Contamination Issues

The Northern Road, Mulgoa, NSW 2745

EPA Other SIte with Contamination Issues

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

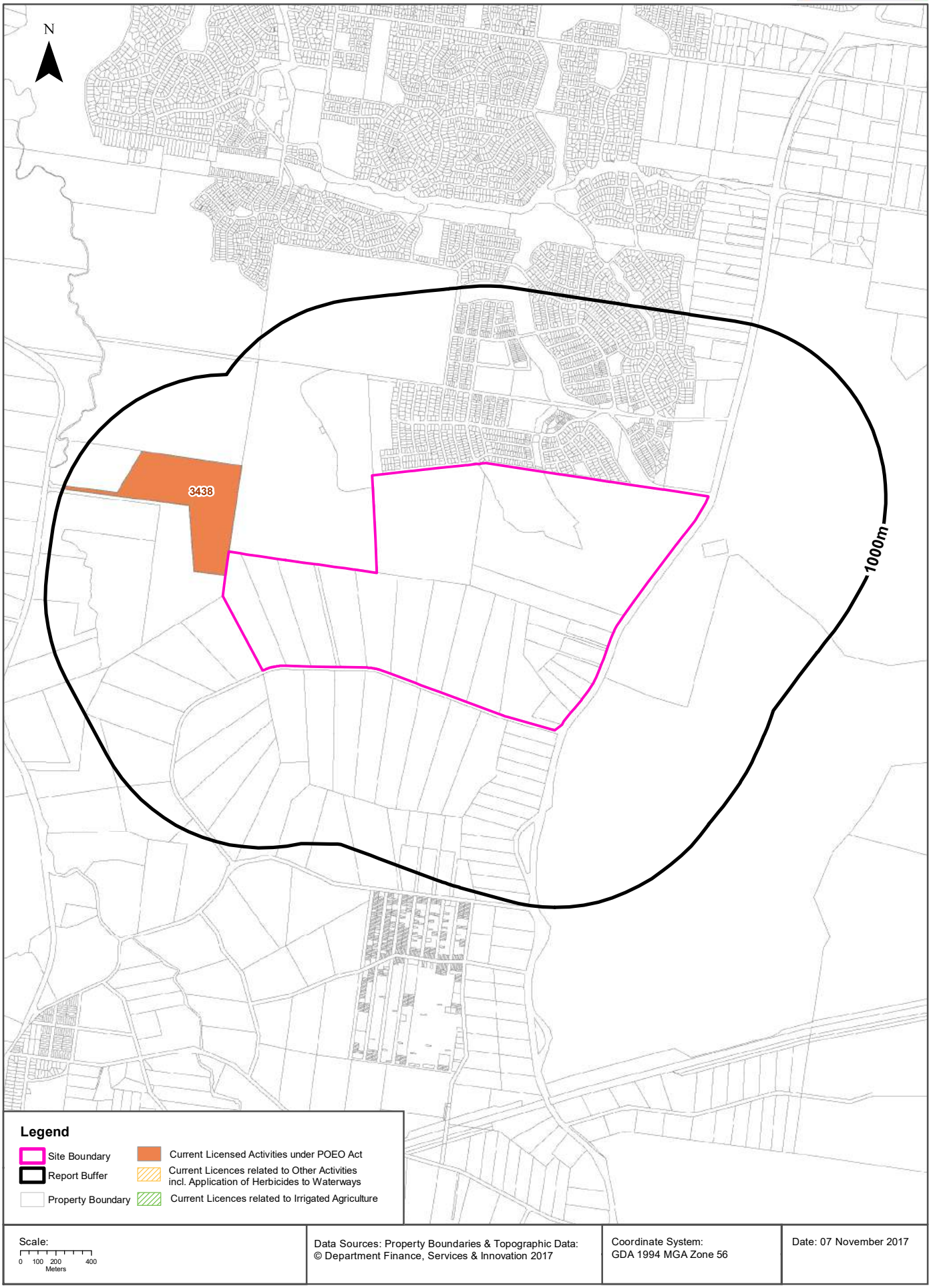
- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill

Sites within the dataset buffer:

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

Current EPA Licensed Activities

The Northern Road, Mulgoa, NSW 2745



EPA Activities

The Northern Road, Mulgoa, NSW 2745

Licensed Activities under the POEO Act 1997

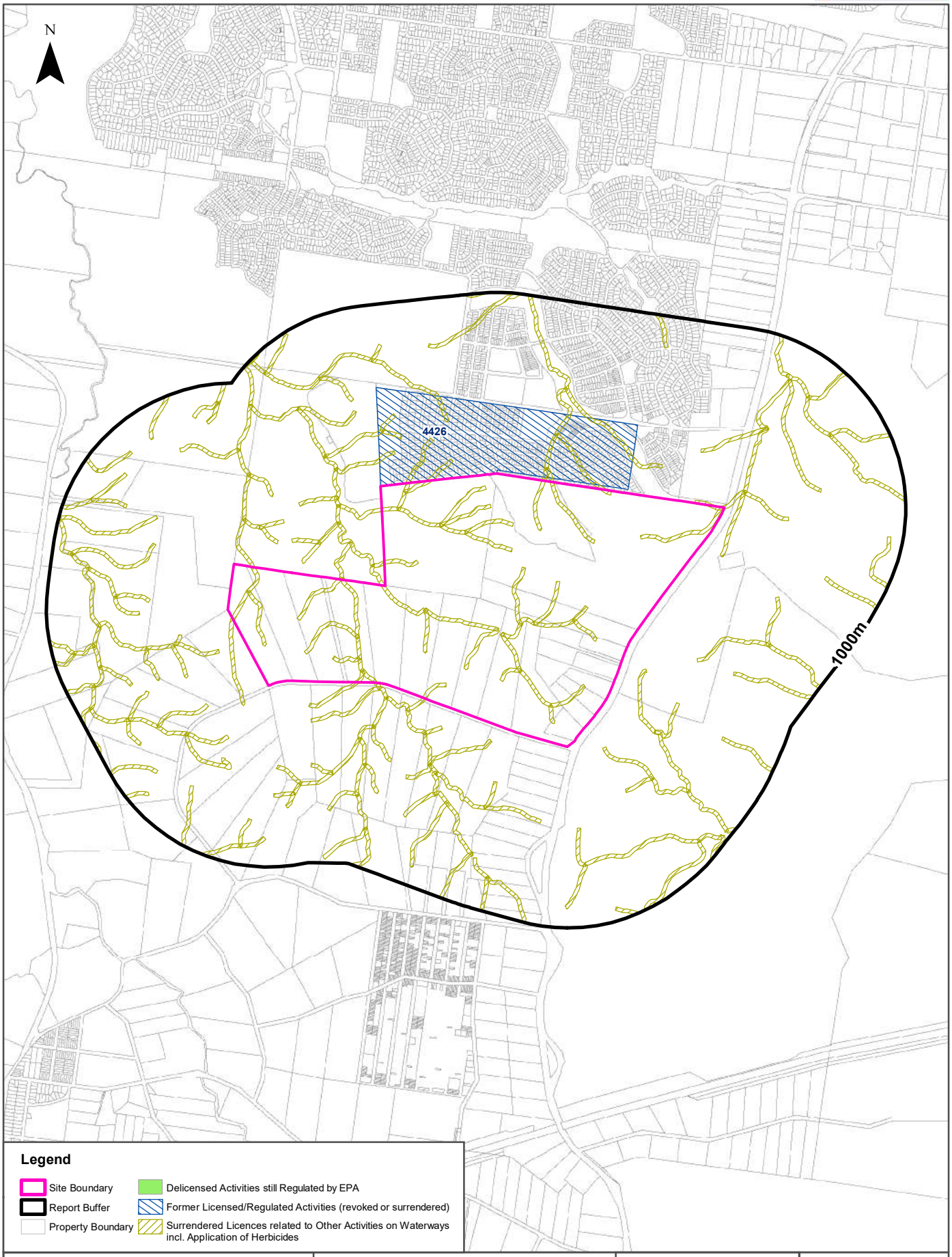
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
3438	PENRITH WASTE SERVICES PTY. LIMITED	PENRITH WASTE SERVICES PTY LTD	842 MULGOA ROAD	MULGOA	Waste disposal by application to land	1	0m	West
3438	PENRITH WASTE SERVICES PTY. LIMITED	PENRITH WASTE SERVICES PTY LTD	842 MULGOA ROAD	MULGOA	Waste storage - other types of waste	1	0m	West

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

The Northern Road, Mulgoa, NSW 2745



EPA Activities

The Northern Road, Mulgoa, NSW 2745

Delicensed Activities still regulated by the EPA

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

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

Delicensed Activities Data Source: Environment Protection Authority

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

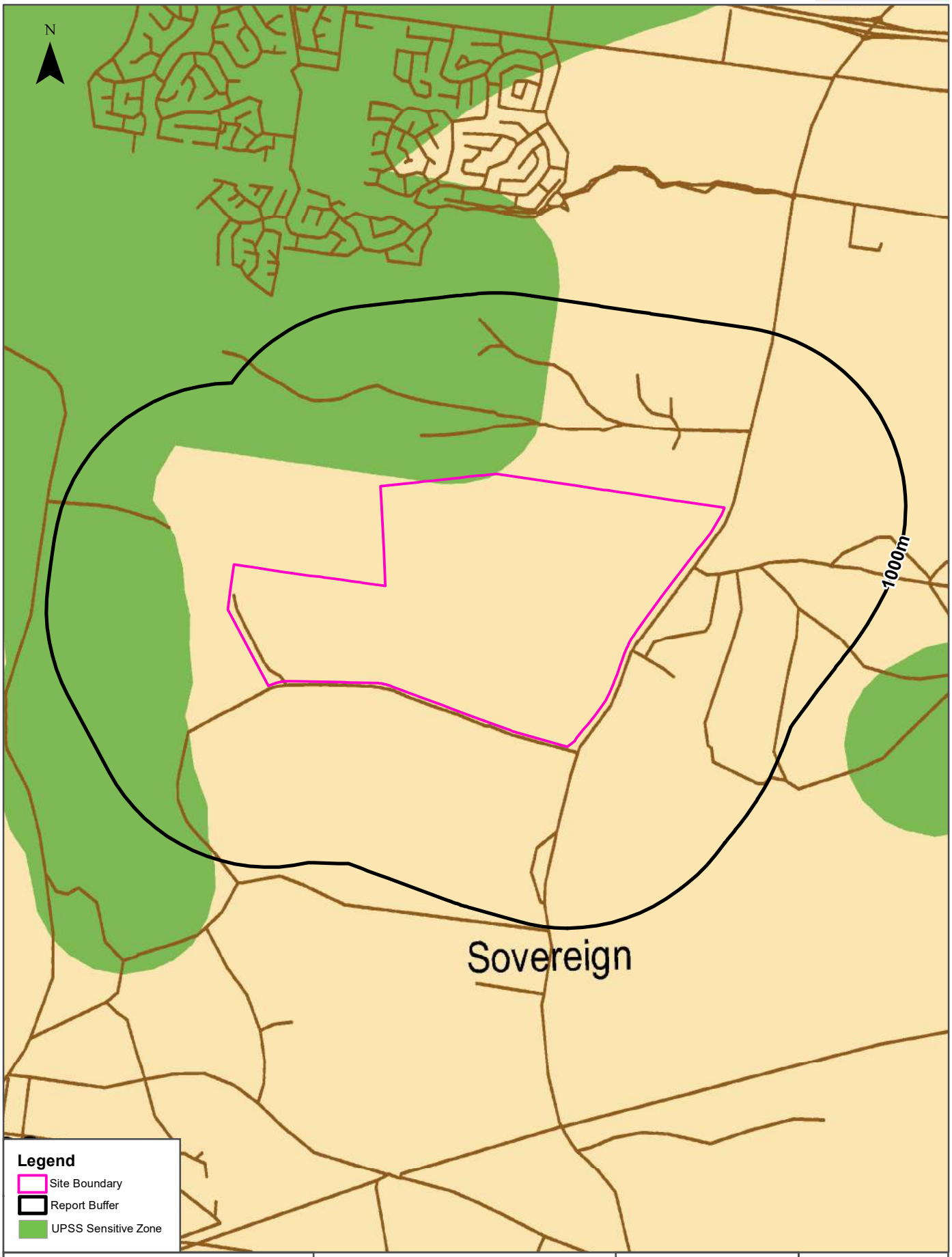
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite
4426	MULGOA QUARRIES PTY LTD	LOT 1 BRADLEY STREET, ORCHARD HILLS, NSW 2748	Surrendered	03/05/2001	Other Land-Based Extraction	1	0m	North

Former Licensed Activities Data Source: Environment Protection Authority

UPSS Sensitive Zones

The Northern Road, Mulgoa, NSW 2745



Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1991 Business to Business Directory Records Premise or Road Intersection Matches

Records from the 1991 UBD Business to Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Organisation	Address	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1991 Business to Business Directory Records Road or Area Matches

Records from the 1991 UBD Business to Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Organisation	Address	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1986 Business to Business Directory Records
Premise or Road Intersection Matches

Records from the 1986 UBD Business to Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1986 Business to Business Directory Records
Road or Area Matches

Records from the 1986 UBD Business to Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1970 Business Directory Records
Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records
Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1961 Business Directory Records
Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records
Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

1950 Business Directory Records
Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records
Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

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

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

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

The Northern Road, Mulgoa, NSW 2745

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

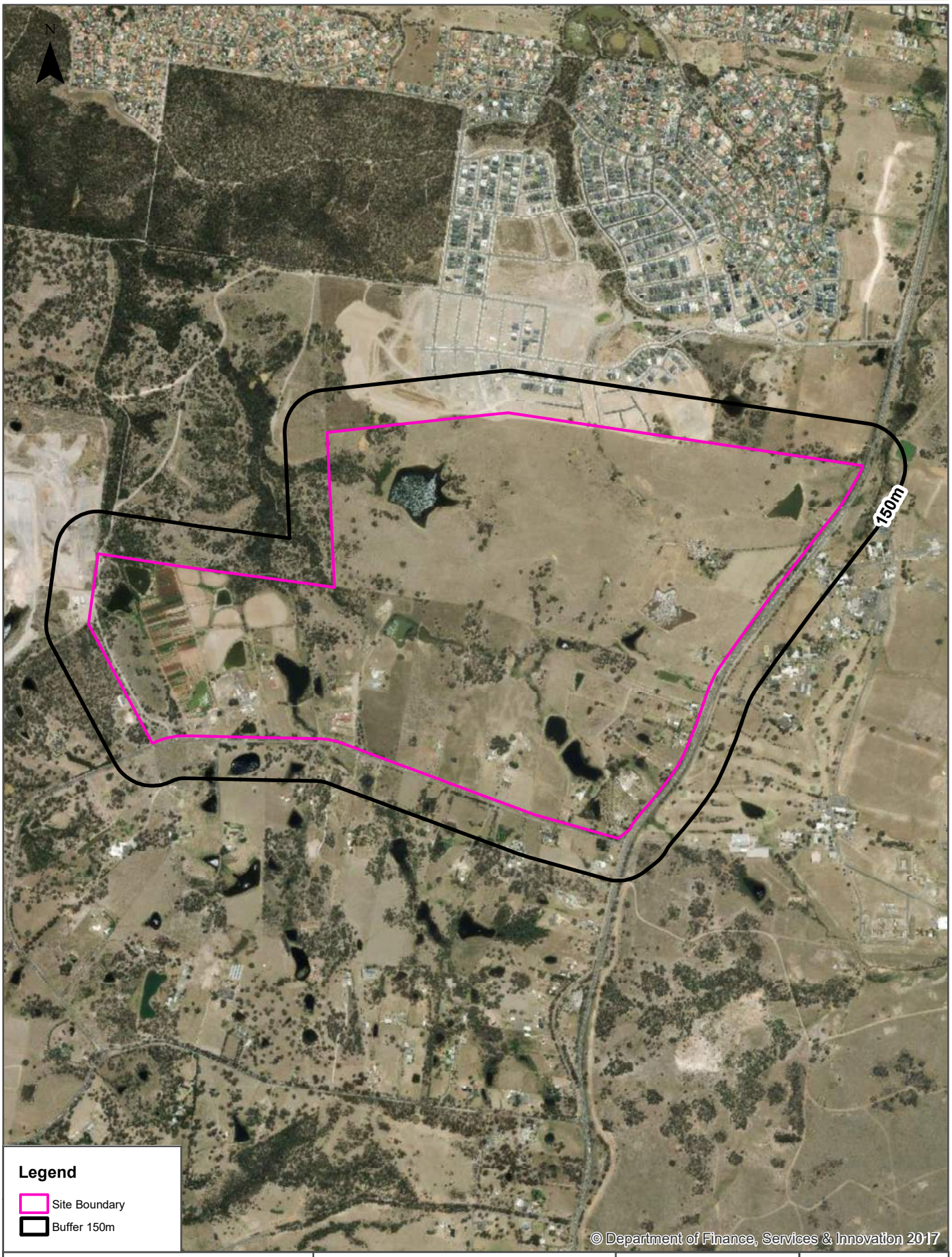
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Aerial Imagery 2014

The Northern Road, Mulgoa, NSW 2745

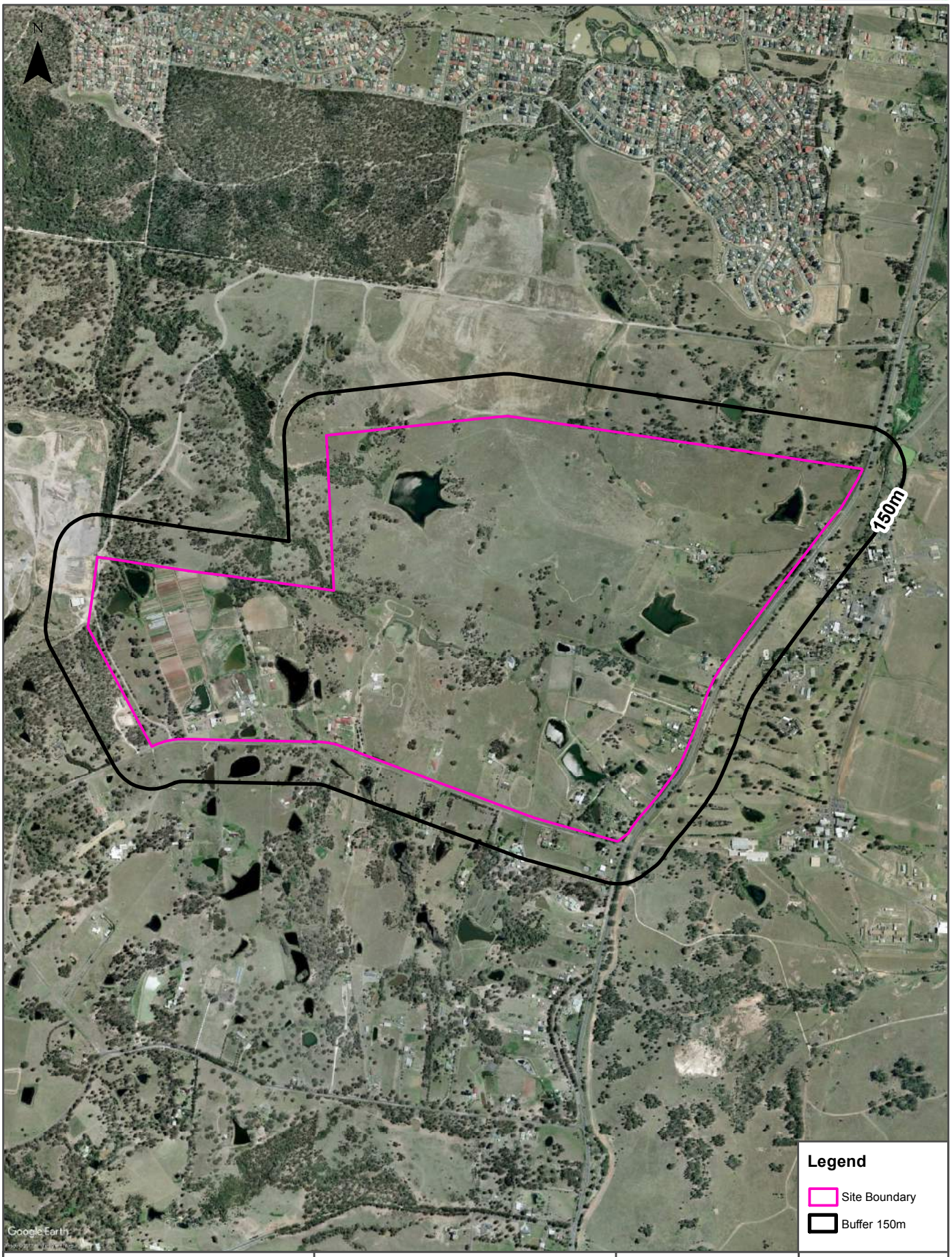


Scale:	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 07 November 2017

0 2550 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950
Meters

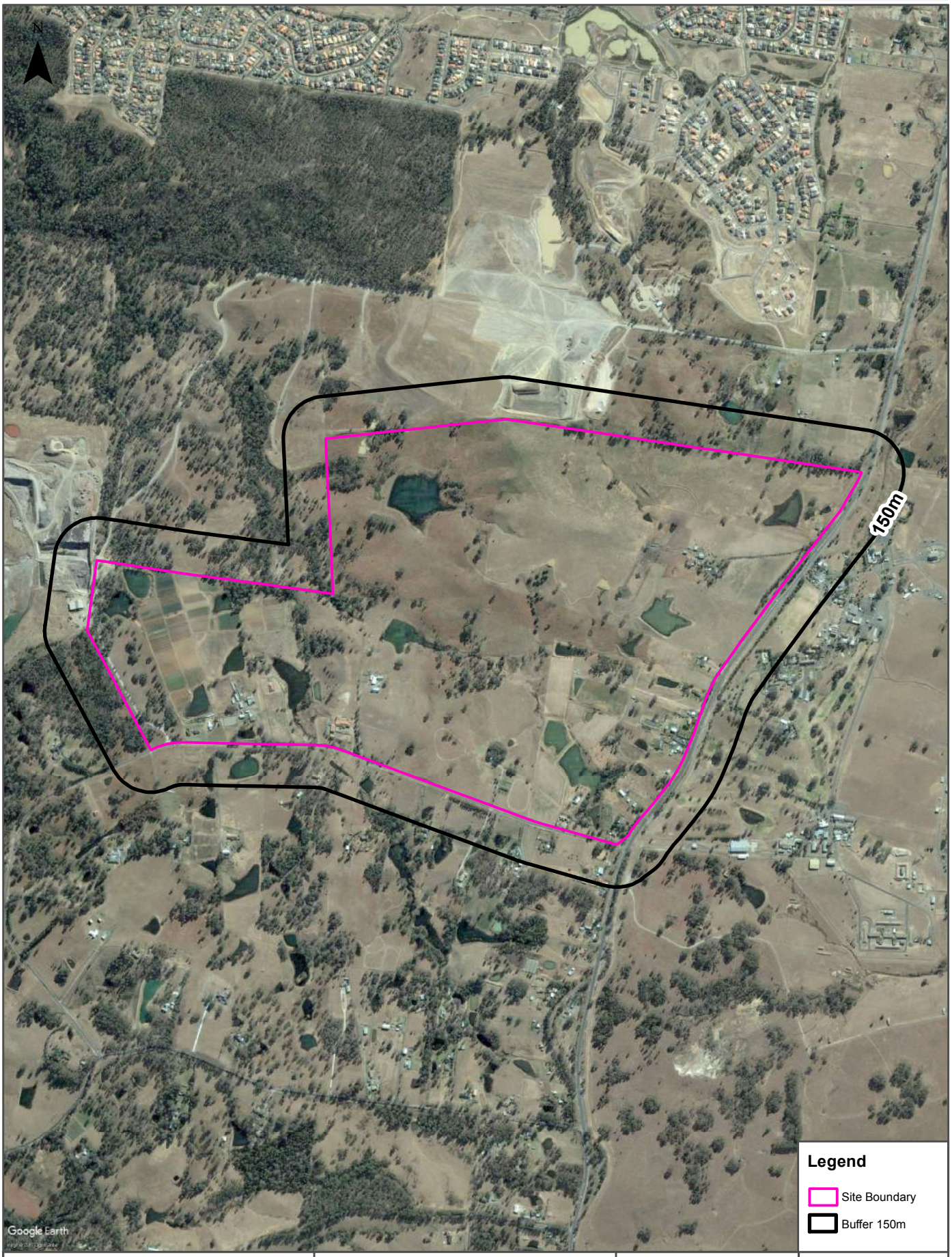
Aerial Imagery 2009

The Northern Road, Mulgoa, NSW 2745



Aerial Imagery 2002

The Northern Road, Mulgoa, NSW 2745

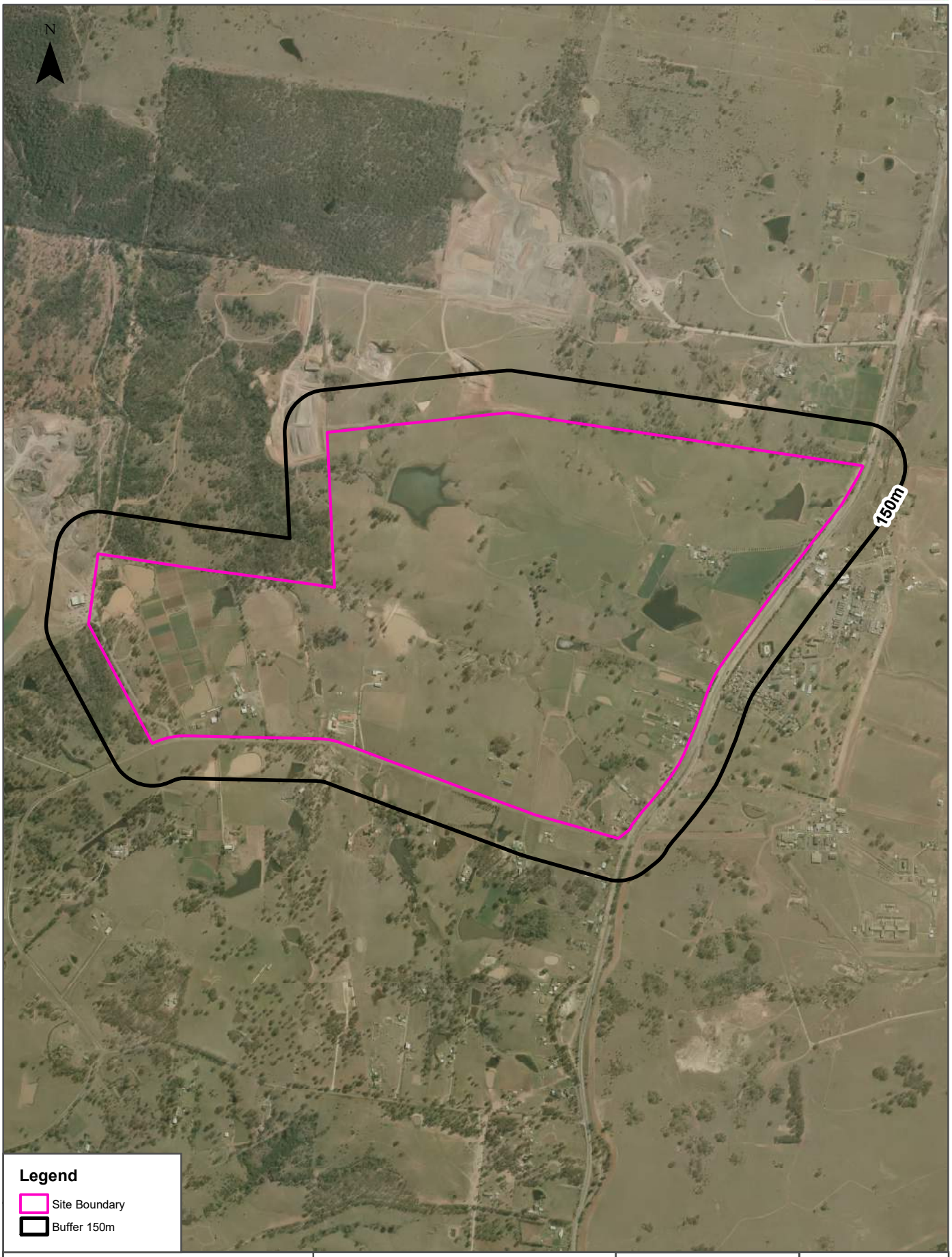


Scale:	Data Sources: Aerial Imagery © 2017 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 06 November, 2017

0 250 500 1,000
Meters

Aerial Imagery 1991

The Northern Road, Mulgoa, NSW 2745

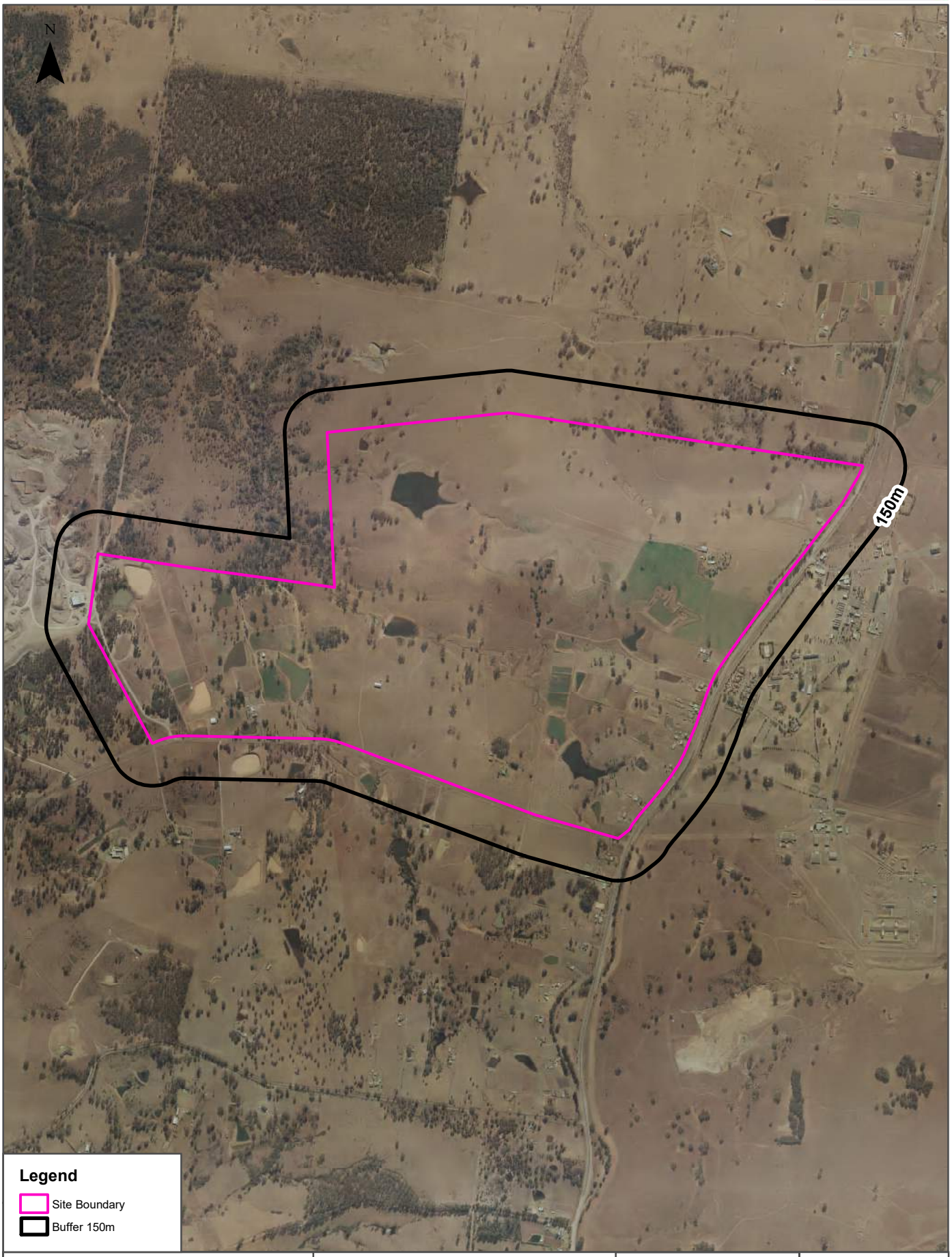


Scale:	Data Sources: Aerial Imagery © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 07 November 2017

0 2550 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950
Meters

Aerial Imagery 1982

The Northern Road, Mulgoa, NSW 2745



Scale:
0 2550 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950
Meters

Data Sources: Aerial Imagery © Department Finance, Services & Innovation

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

Aerial Imagery 1970

The Northern Road, Mulgoa, NSW 2745

Aerial Imagery 1970

The Northern Road, Mulgoa, NSW 2745

Legend

Site Boundary

Buffer 150m

Scale: 0 250 500 1,000 Meters

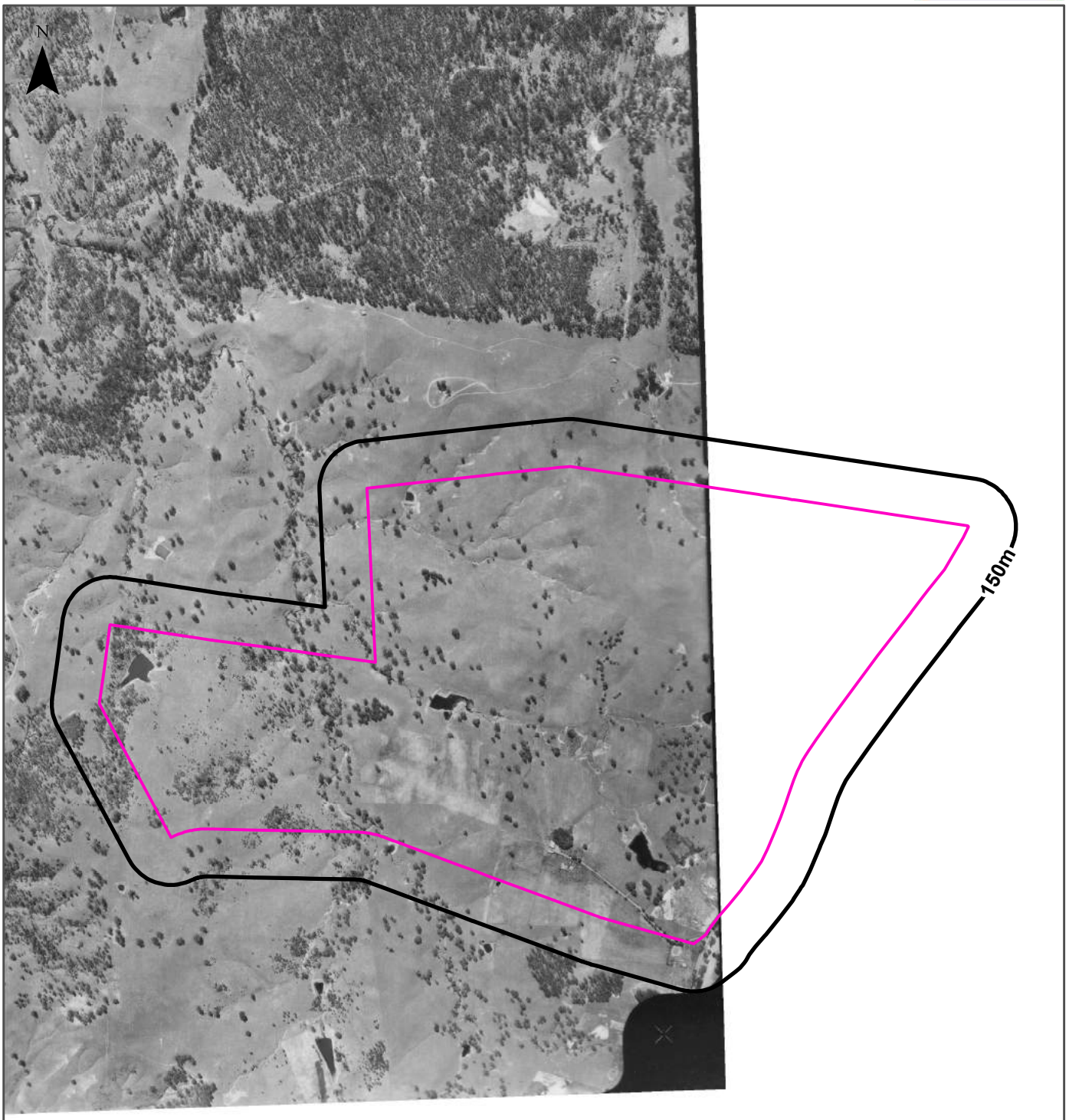
Data Sources: Historical Aerials: © Department Finance, Services & Innovation

Coordinate System: GDA 1994 MGA Zone 56

Date: 06 November, 2017

Aerial Imagery 1965

The Northern Road, Mulgoa, NSW 2745



Legend

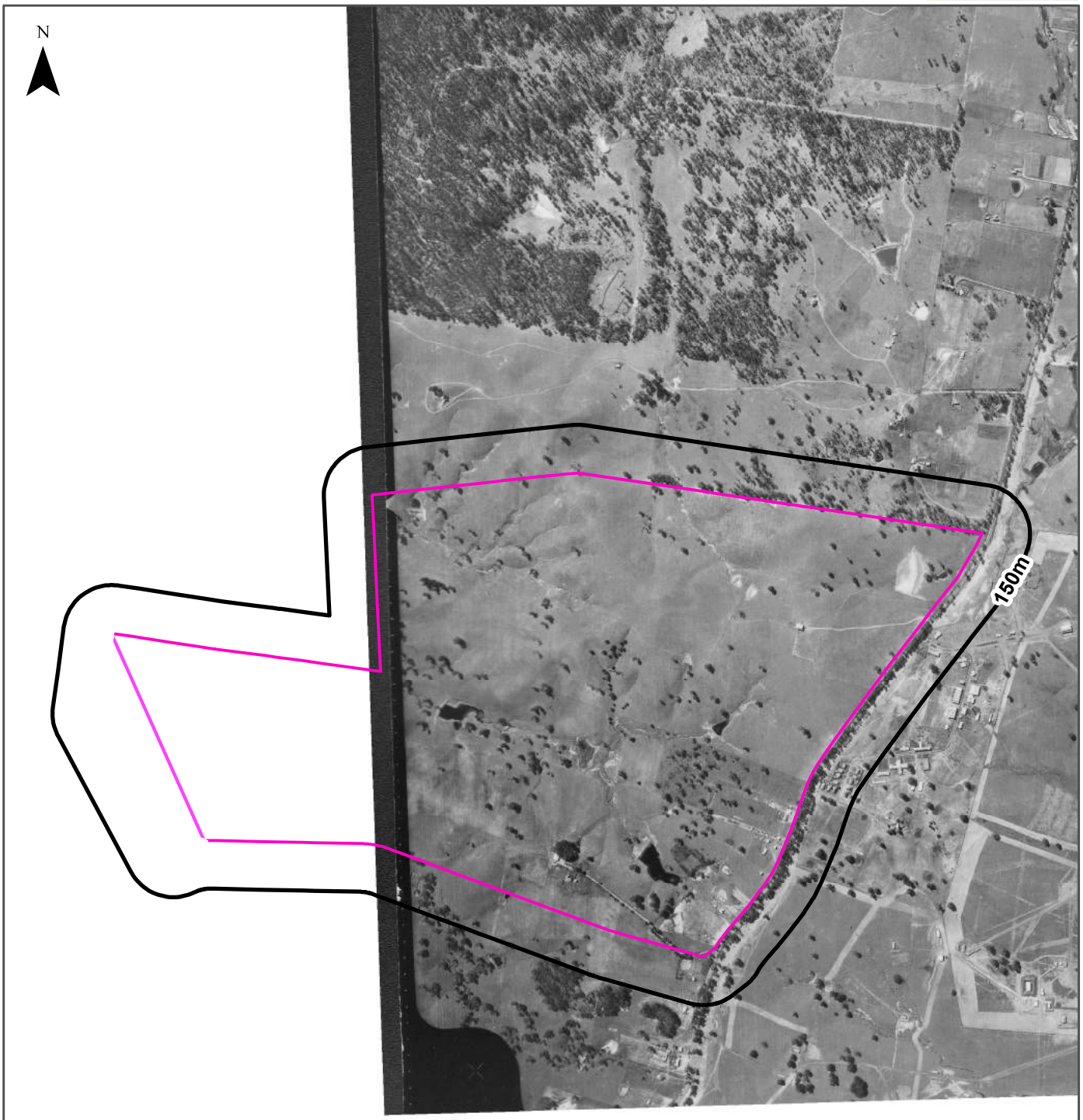
Site Boundary

Buffer 150m

Scale: 0 250 500 Meters 1,000	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 06 November, 2017

Aerial Imagery 1965

The Northern Road, Mulgoa, NSW 2745



Legend

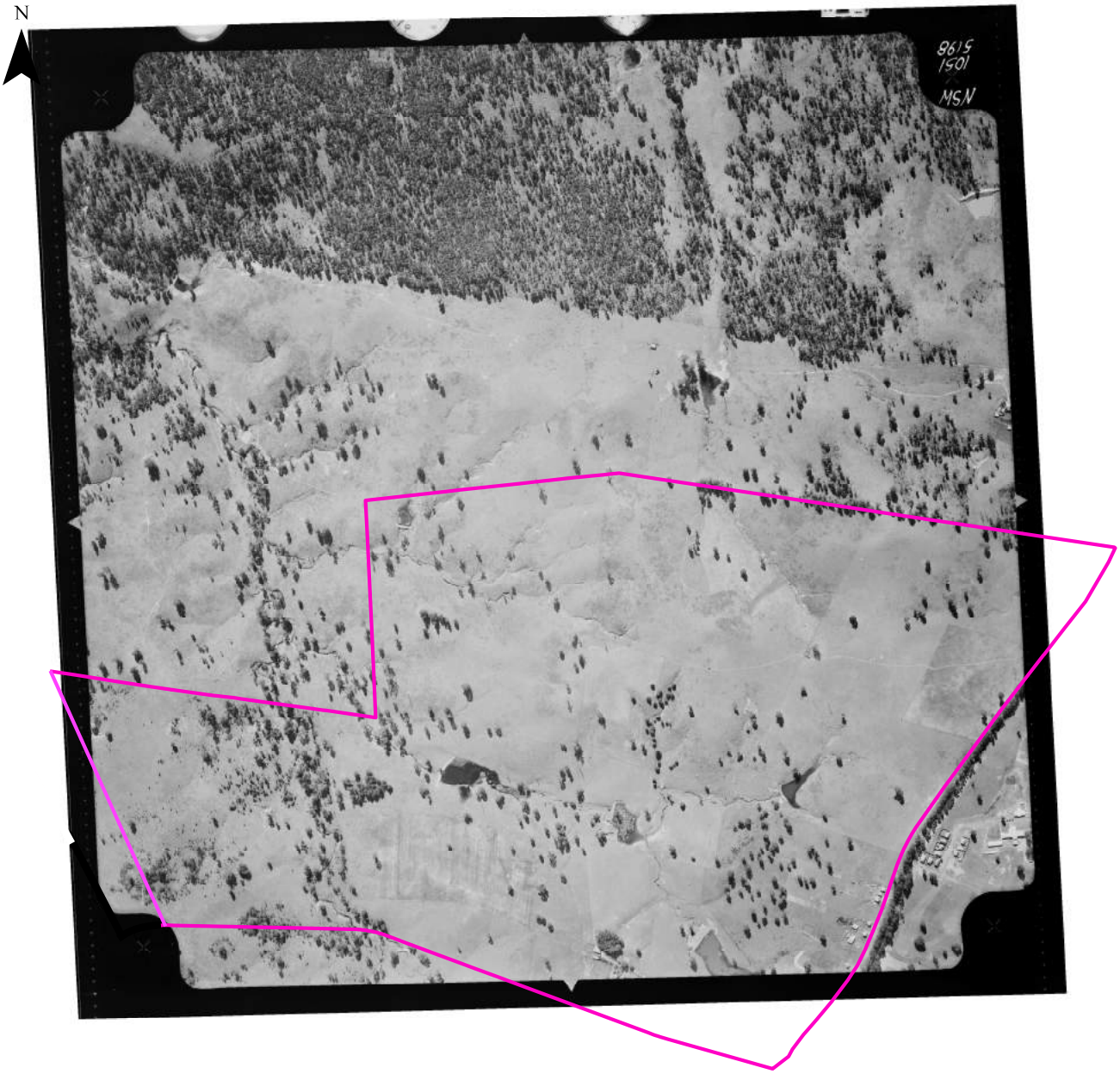
Site Boundary

Buffer 150m

Scale: 0 250 500 Meters 1,000	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 06 November, 2017

Aerial Imagery 1961

The Northern Road, Mulgoa, NSW 2745



Legend

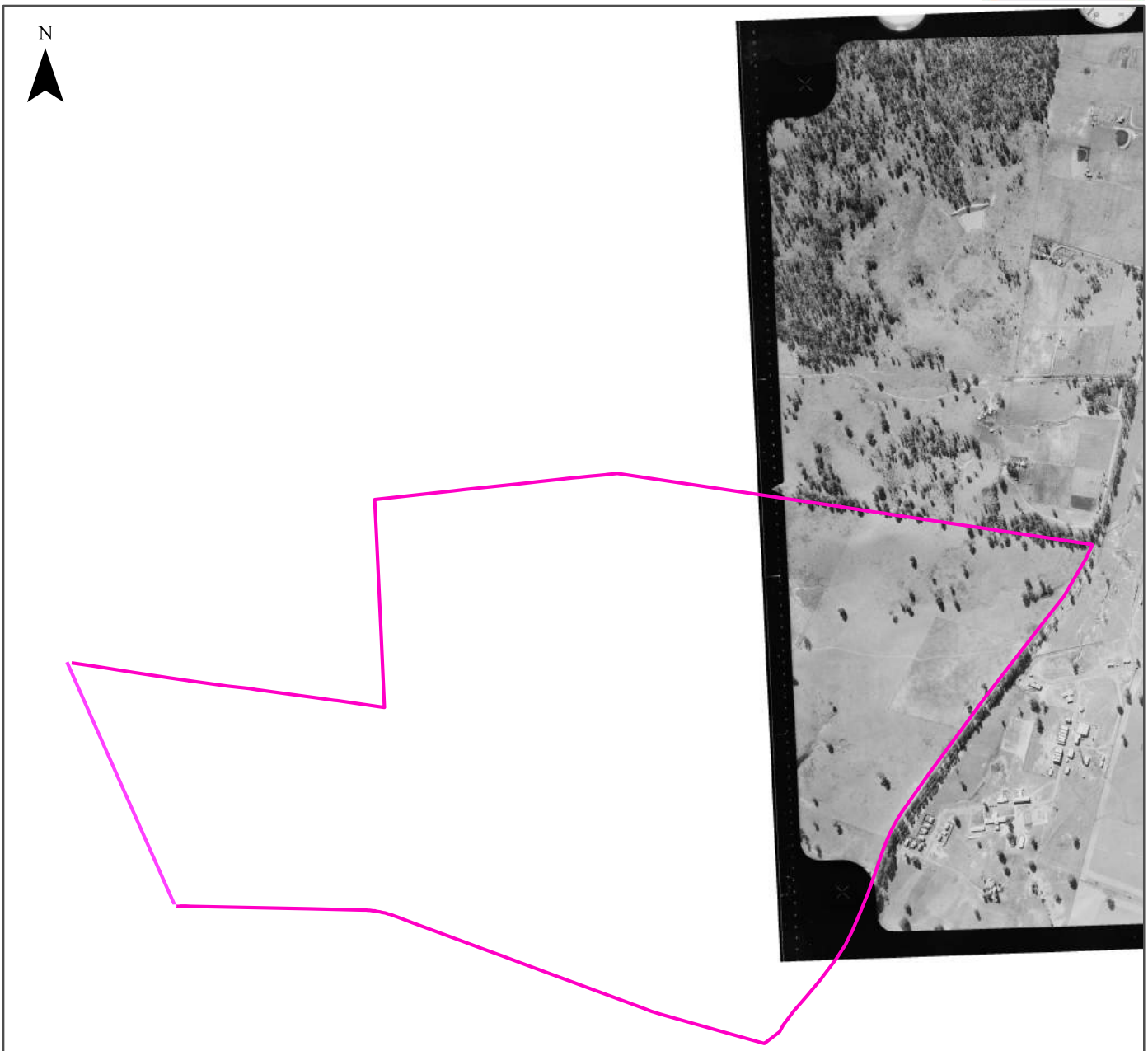
Site Boundary

Scale:	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 10 November 2017

0 225 450 900
Meters

Aerial Imagery 1961

The Northern Road, Mulgoa, NSW 2745



Legend

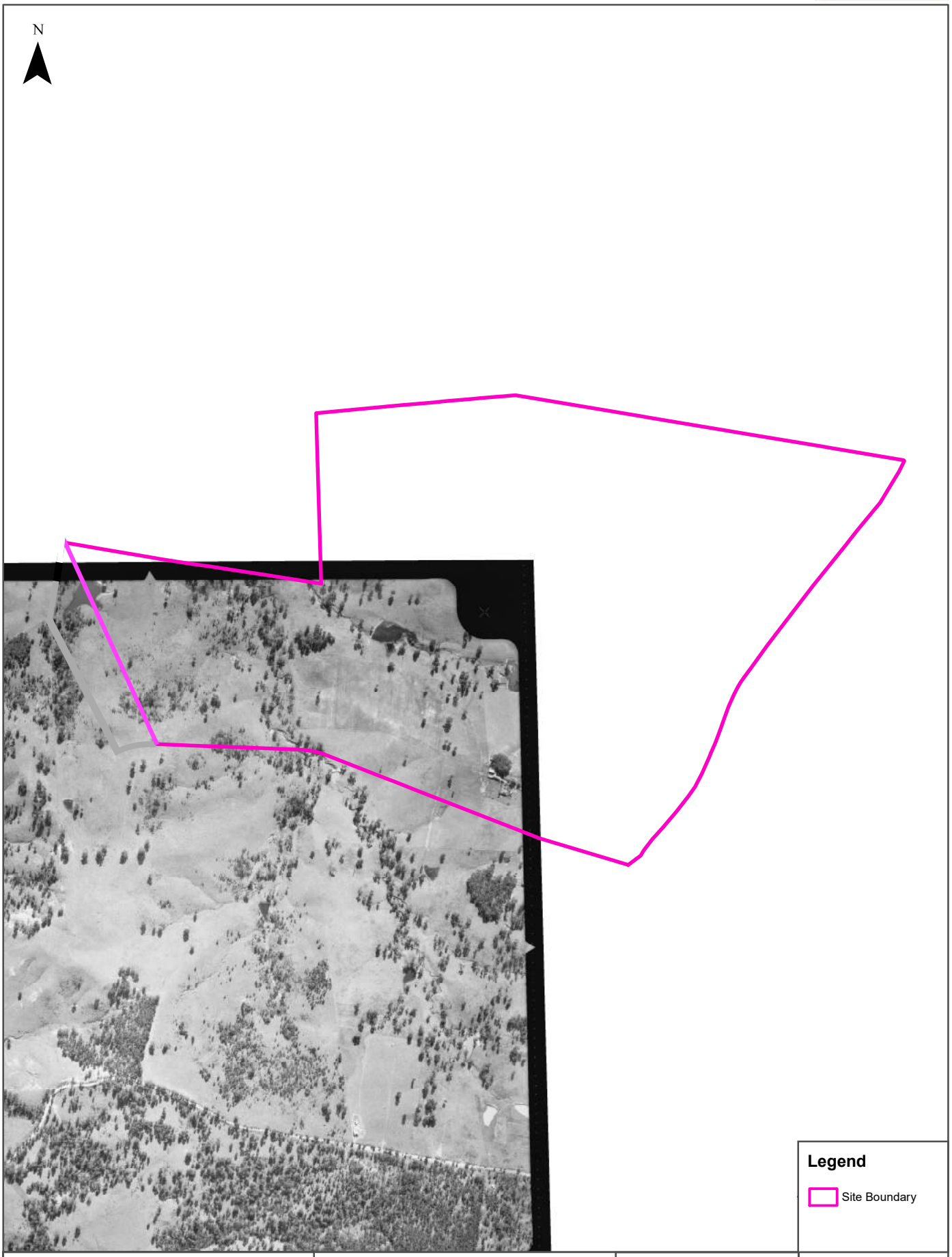
Site Boundary

Scale:	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 10 November 2017

0 225 450 900
Meters

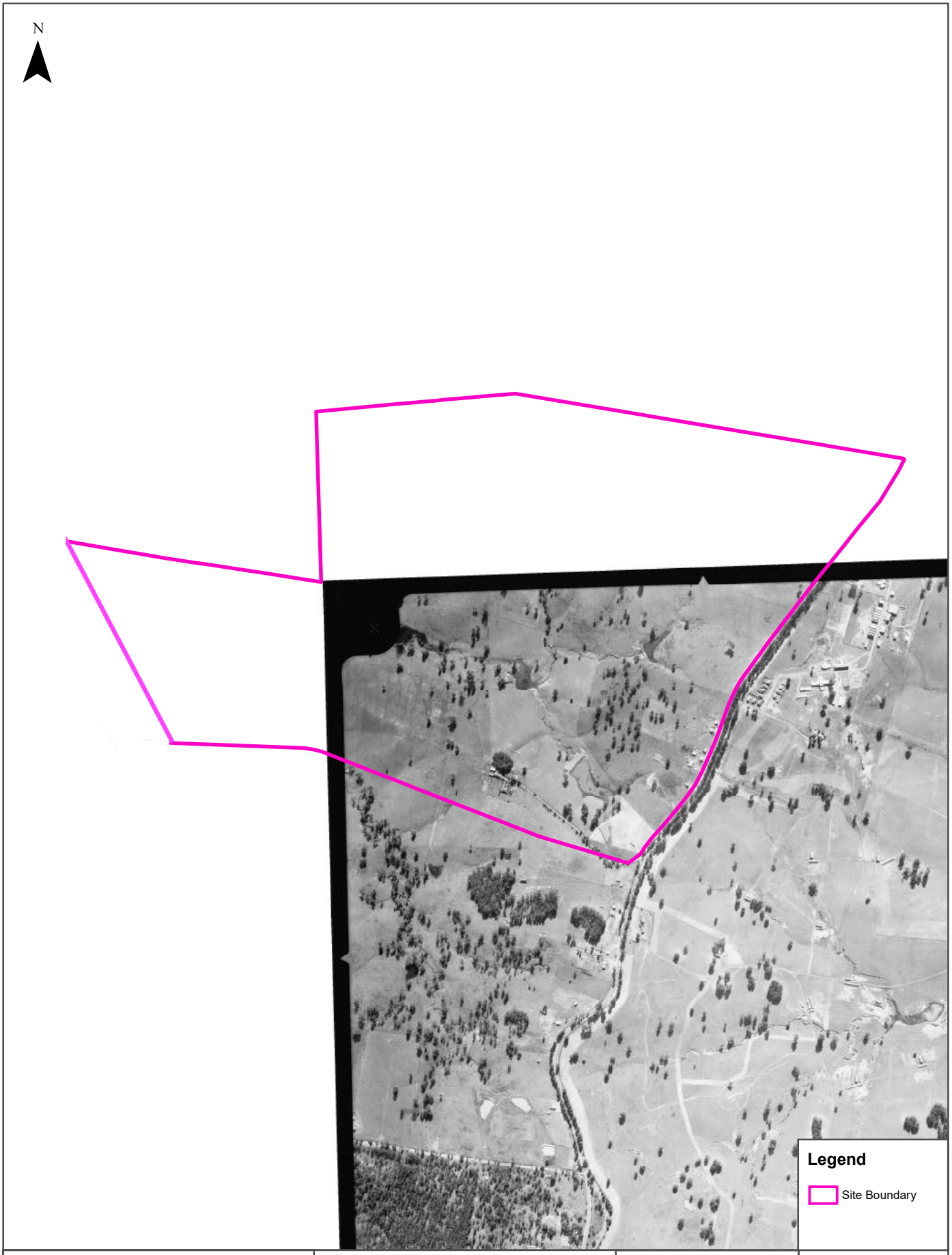
Aerial Imagery 1961

The Northern Road, Mulgoa, NSW 2745



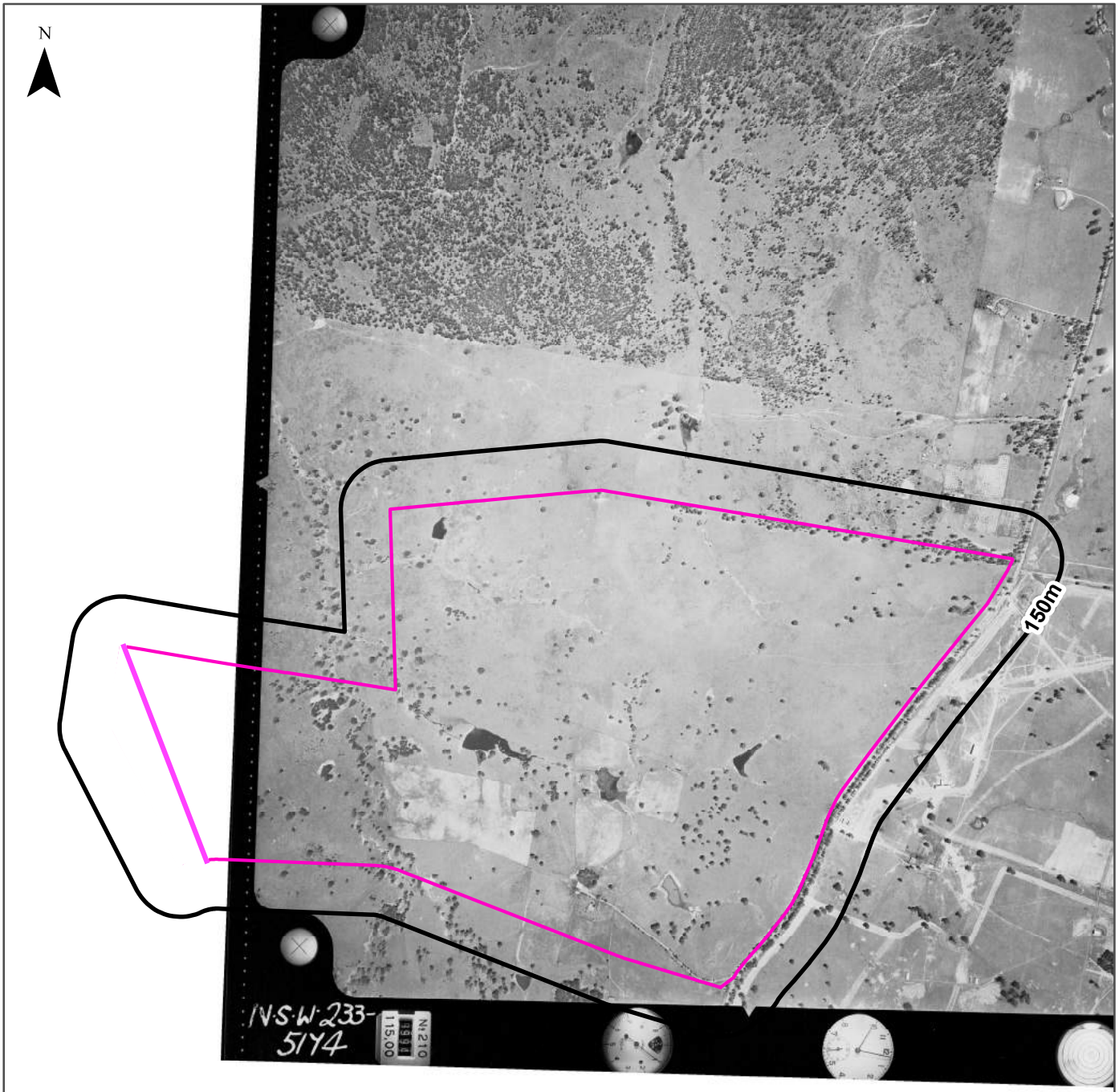
Aerial Imagery 1961

The Northern Road, Mulgoa, NSW 2745



Aerial Imagery 1956

The Northern Road, Mulgoa, NSW 2745



Legend

Site Boundary

Buffer 150m

Scale: 0 250 500 1,000 Meters

Data Sources: Aerial Imagery © Department Finance, Services & Innovation

Coordinate System: GDA 1994 MGA Zone 56

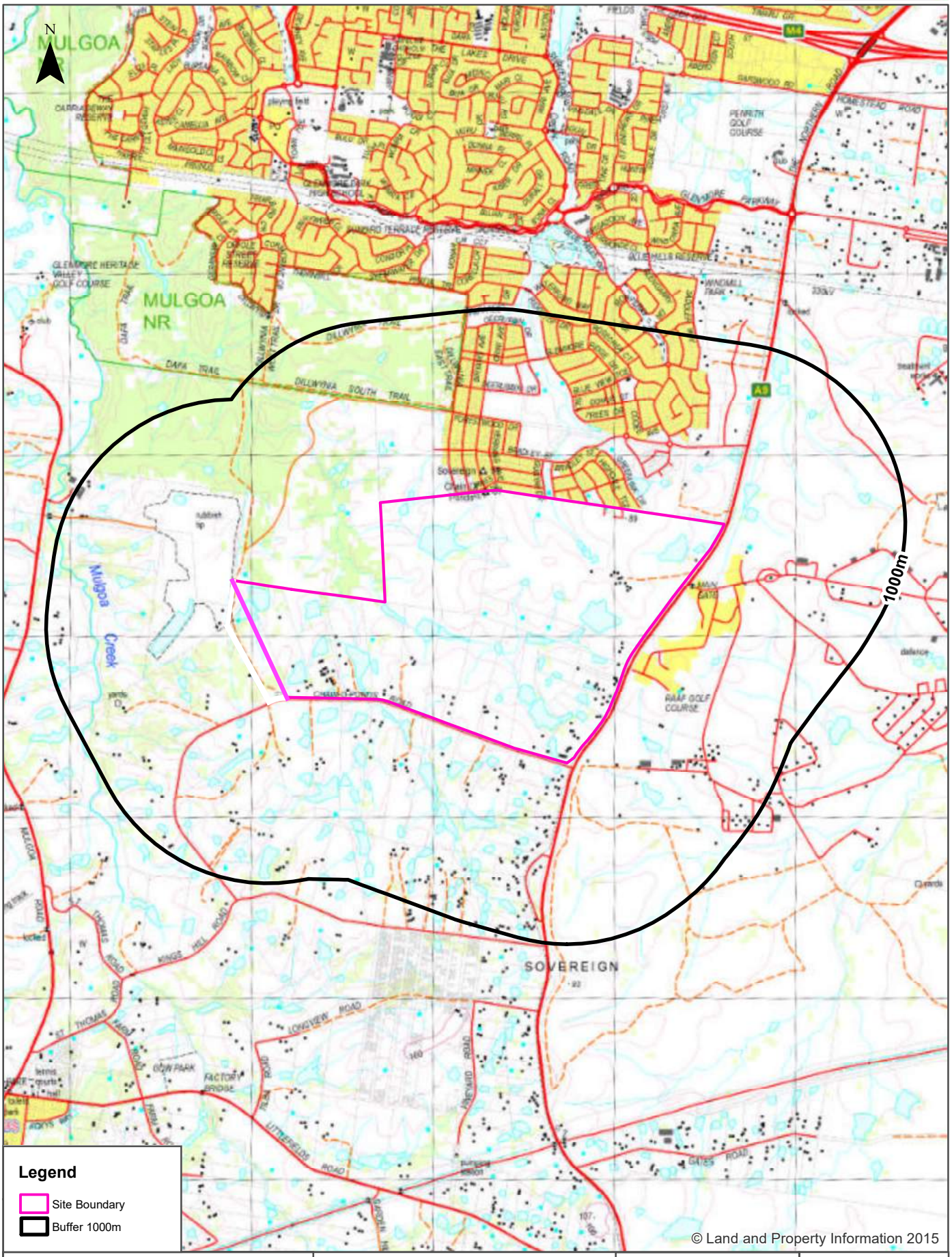
Date: 08 November 2017

Aerial Imagery 1956

The Northern Road, Mulgoa, NSW 2745

Topographic Map 2015

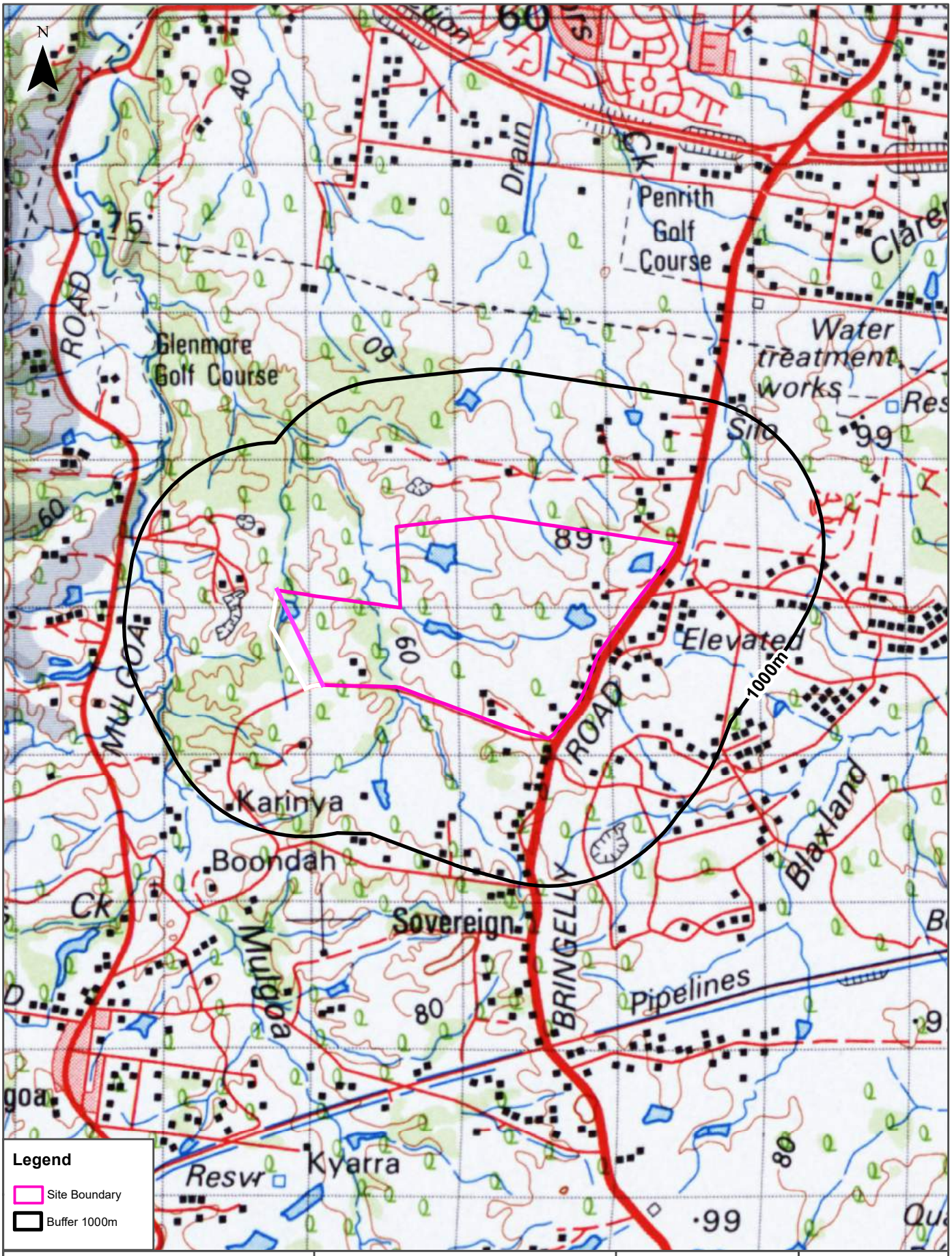
The Northern Road, Mulgoa, NSW 2745



Scale: 0 150 300 600 900 1,200 1,500 Meters	Data Sources: Topographic Map Data © NSW Land and Property Information	Coordinate System: GDA 1994 MGA Zone 56	Date: 07 November 2017

Historical Map 1975

The Northern Road, Mulgoa, NSW 2745



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

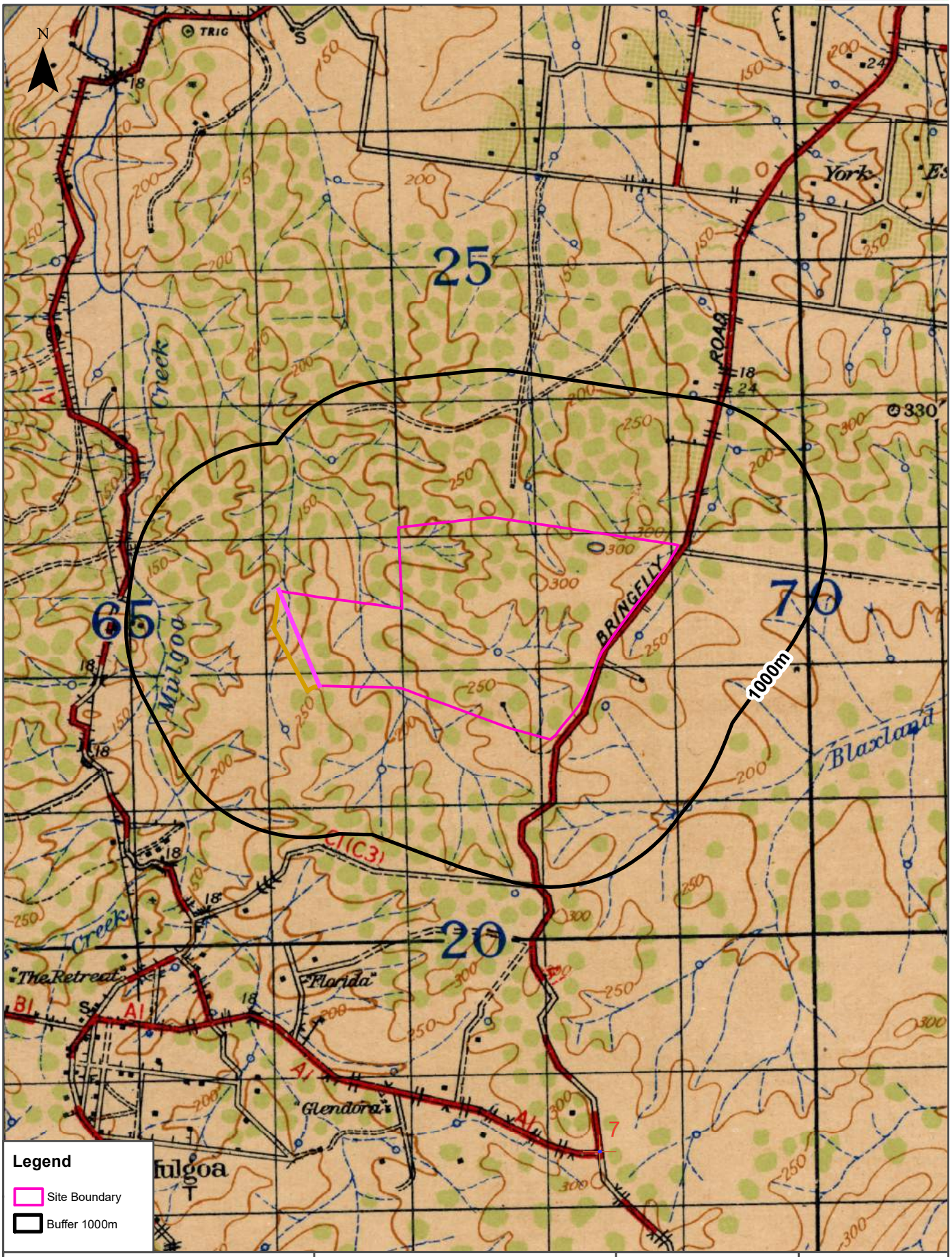
Data Sources: Sheet 9030, Edition 1, Penrith, NSW National Topographic Map Series Commonwealth of Australia

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

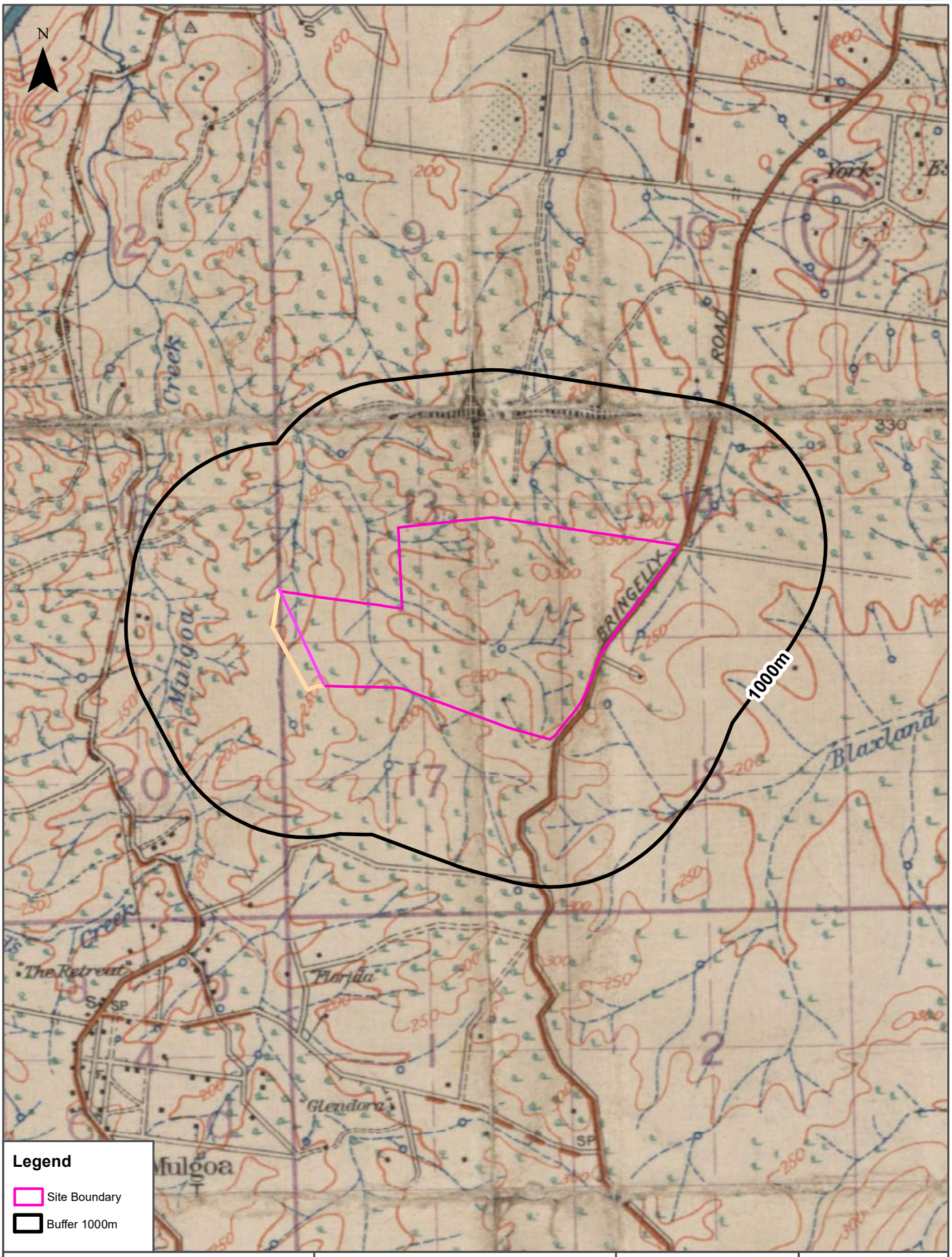
Historical Map 1942

The Northern Road, Mulgoa, NSW 2745



Historical Map 1929

The Northern Road, Mulgoa, NSW 2745



Scale: 0 400 800 1,600 Meters

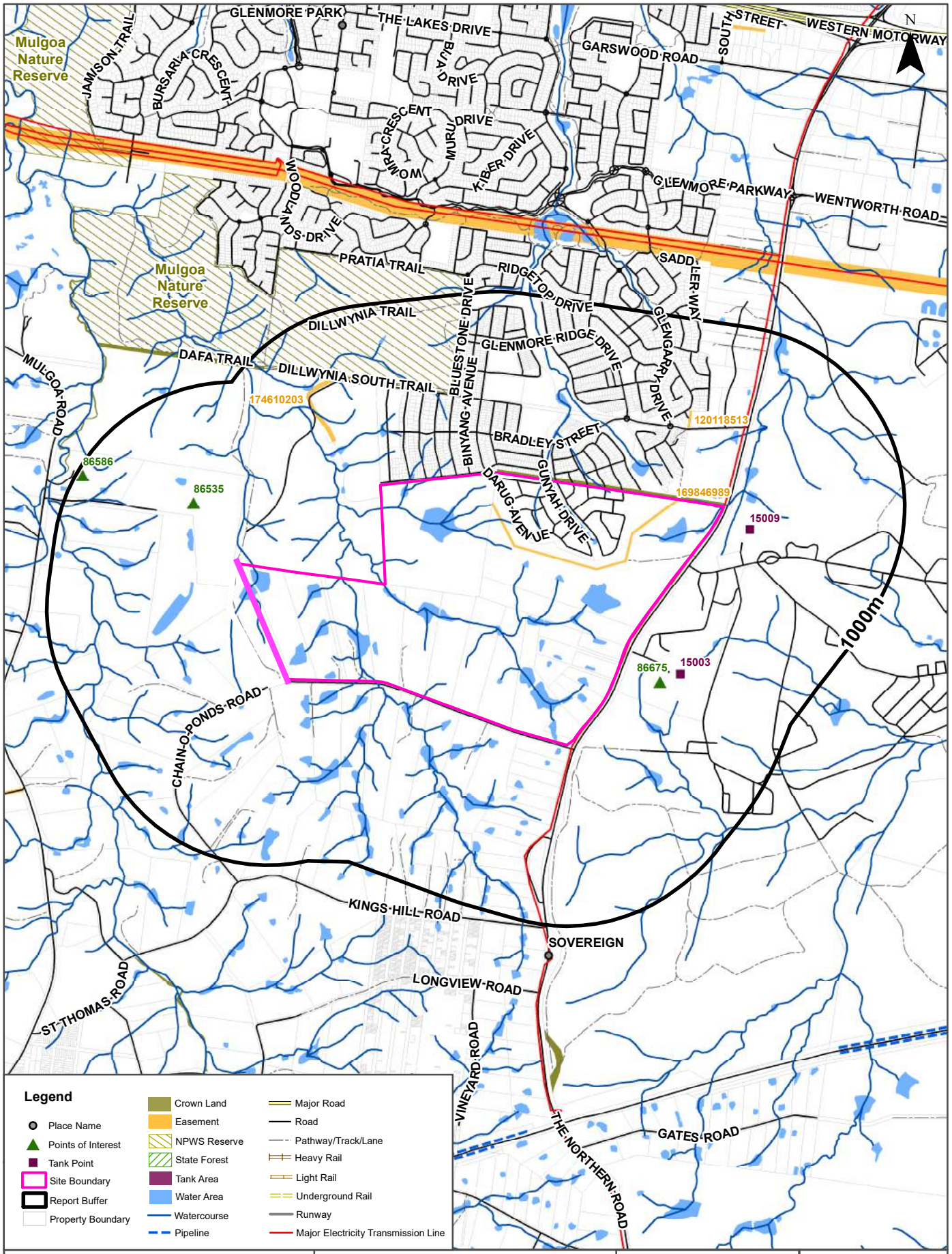
Data Sources: Australia 1:63360 Sheet 422, Liverpool, New South Wales. Prepared by Commonwealth Section Imperial General Staff

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

Topographic Features

The Northern Road, Mulgoa, NSW 2745



Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

Topographic Features

The Northern Road, Mulgoa, NSW 2745

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
86675	Golf Course	RAAF GOLF COURSE	241m	South East
86535	Rubbish Depot	PENRITH LANDFILL DEPOT	398m	West
86586	Combined Primary-Secondary School	NEPEAN CHRISTIAN SCHOOL	964m	West

Topographic Features

The Northern Road, Mulgoa, NSW 2745

Tanks (Areas)

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

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

Tanks (Points)

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

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
15009	Water	Operational		04/12/2000	184m	East
15003	Water	Operational		04/12/2000	334m	East

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
169846989	Primary	Right of way	5m	0m	Onsite
174610203	Primary	Right of way		352m	North West
120118513	Primary	Undefined		401m	North East

Topographic Features

The Northern Road, Mulgoa, NSW 2745

State Forest

What State Forest exist within the dataset buffer?

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

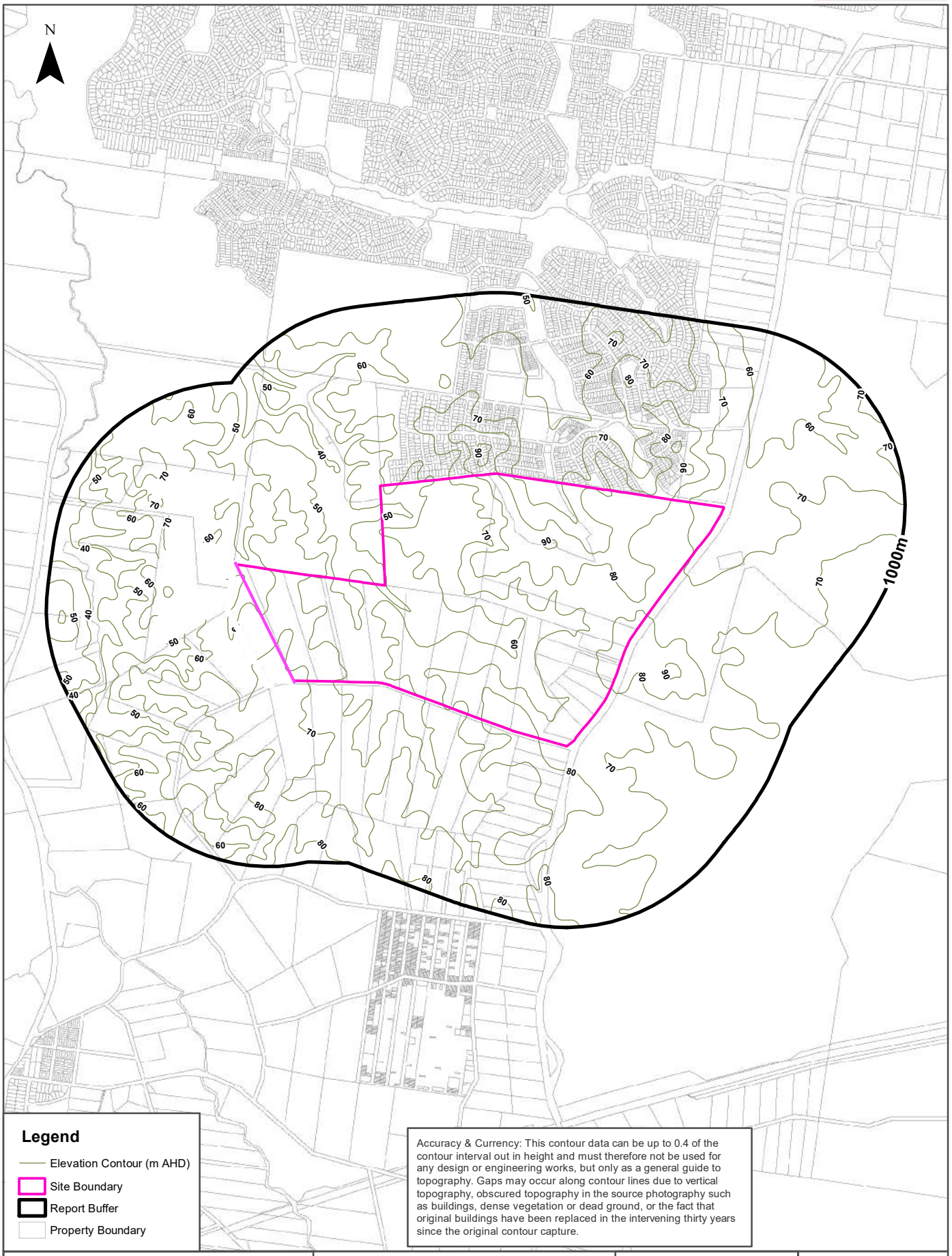
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N0712	NATURE RESERVE	Mulgoa Nature Reserve	23/12/1994	463m	North West

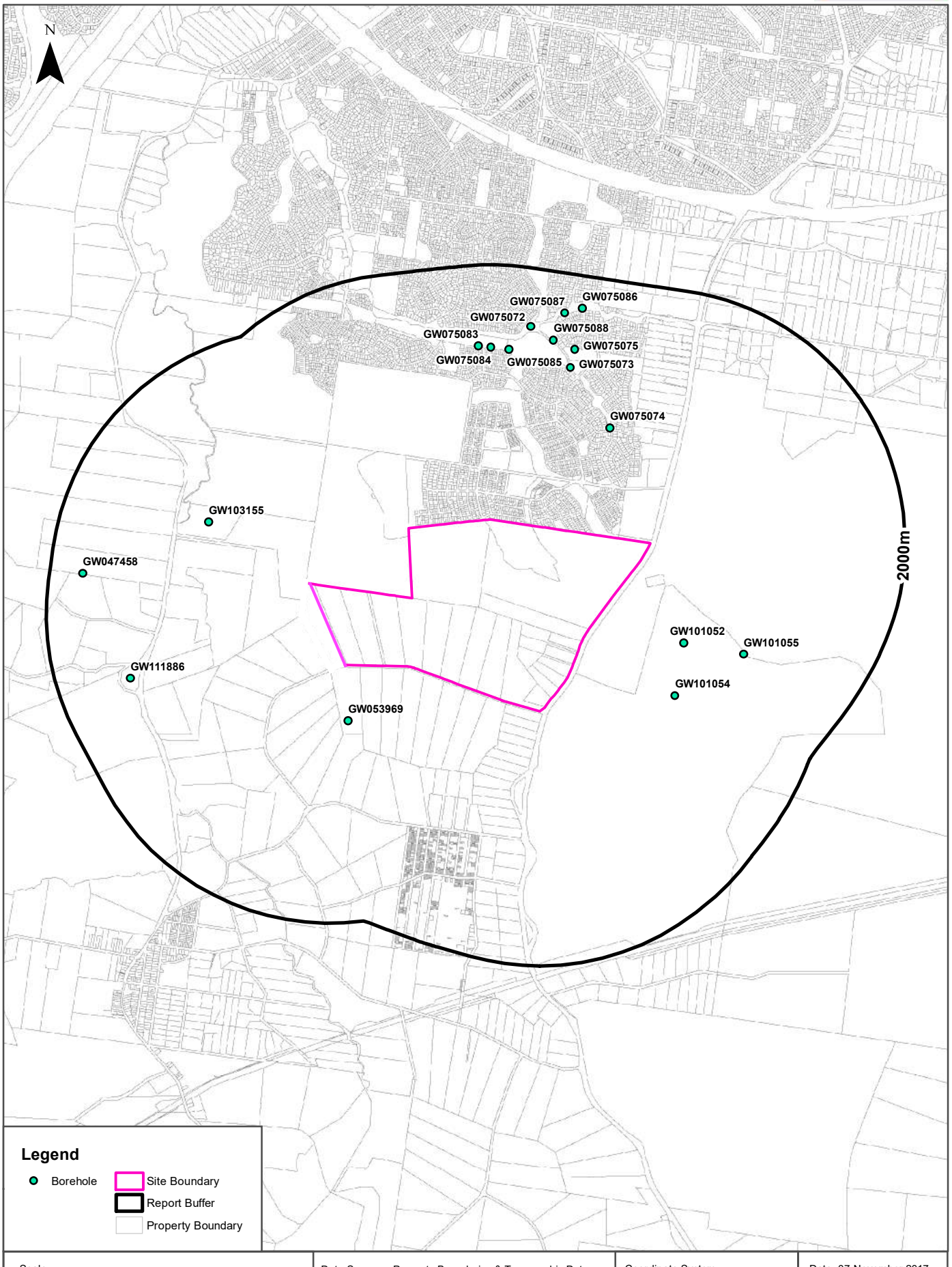
Elevation Contours (m AHD)

The Northern Road, Mulgoa, NSW 2745



Groundwater Boreholes

The Northern Road, Mulgoa, NSW 2745



Hydrogeology & Groundwater

The Northern Road, Mulgoa, NSW 2745

Hydrogeology

Description of aquifers on-site:

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

Description of aquifers within the dataset buffer:

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

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Purpose	Contractor	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW053969	10BL112638	Bore	Private	Irrigation		01/07/1981	0.00	138.70	Salty				436m	South West
GW101052	10BL158231	Bore	Private	Monitoring	Intertec Drilling Services	05/08/1997	32.20	32.20	6560	13.60		69.41	665m	East
GW101054	10BL158231	Bore	Private	Monitoring	Intertec Drilling Services	07/08/1997	35.00	35.00	10300	30.18		73.64	837m	South East
GW075074		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	14/08/2001	6.00	6.00				60.12	848m	North East
GW103155	10BL159818, 10WA108466	Bore		Domestic	Watermin Drillers Pty Ltd	26/04/1990	97.00	97.00	Good		1.140		897m	West
GW101055	10BL158231	Bore	Private	Monitoring	Intertec Drilling Services	07/08/1997	21.00	21.00	9970			59.31	1091 m	East
GW075073		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	14/08/2001	6.50	6.50				51.11	1268 m	North
GW075085		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	24/03/2003	5.30	5.50				50.35	1341 m	North
GW075084		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	24/03/2003	5.50	6.00				55.03	1351 m	North
GW075083		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	24/03/2003	4.50	5.00				60.64	1364 m	North
GW075075		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	14/08/2001	2.50	2.50				53.44	1417 m	North

GW No.	Licence No	Work Type	Owner Type	Purpose	Contractor	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW111886	10BL601035, 10WA109143	Bore	Private	Domestic, Stock		27/04/2007	200.00	200.00					1429 m	West
GW075088		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	25/03/2003	8.90	8.90				49.15	1465 m	North
GW075072		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	13/08/2001	6.50	6.50				45.83	1544 m	North
GW075087		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	25/03/2003	1.60	1.60				53.88	1688 m	North
GW047458	10BL110805, 10BL141588, 10WA108237	Bore	Private	Irrigation		01/11/1979	20.00	20.00	Salty				1741 m	West
GW075086		Bore	NSW Office of Water	Monitoring	Intertec Drilling Services	24/03/2003	3.80	4.00				59.31	1745 m	North

Hydrogeology & Groundwater

The Northern Road, Mulgoa, NSW 2745

Driller's Logs

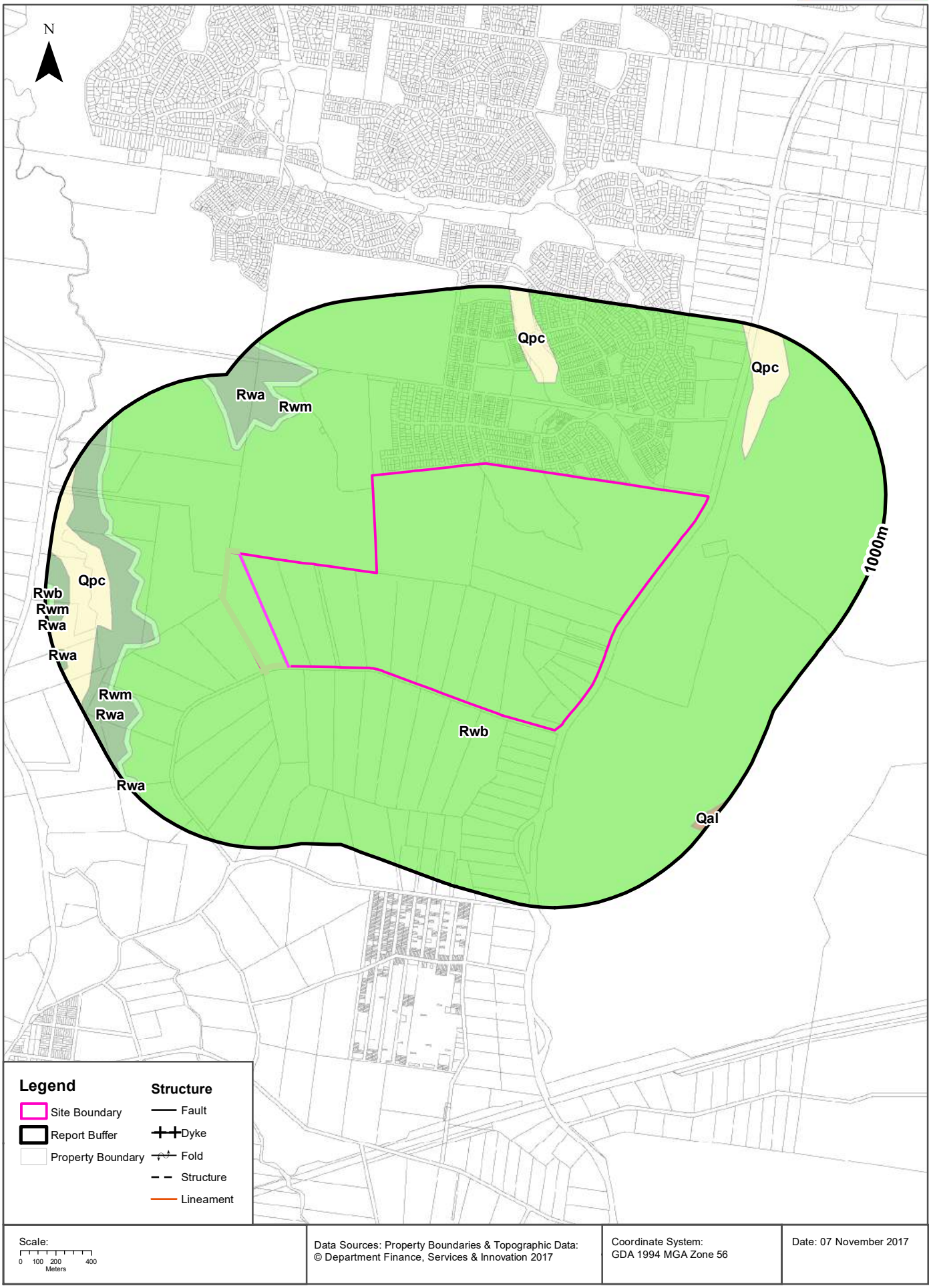
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW053969	0.00m-0.30m Topsoil 0.30m-4.60m Clay Red 4.60m-6.10m Shale Decomposed 6.10m-33.50m Shale Clay Bands 33.50m-106.70m Shale 106.70m-138.70m Sandstone Water Supply	436m	South West
GW101052	0.00m-1.20m FILL: brown and brown-red, some iron stone gravel plastic, reworked material, slight moisture. 1.20m-3.00m CLAY: light grey with red-brown streaks, silty low plasticity, firm, slight moisture. 3.00m-4.00m SHALE/SILTSTONE: brown-grey, moderately weathered semi-competent and friable, trace of brown clay bands. 4.00m-6.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, minor fine grained sandstone, partly ferruginised 6.00m-7.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, some brown-grey massive claystone, softer 7.00m-9.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 9.00m-10.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competent 10.00m-11.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 11.00m-14.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent, base of weathering at 12 m, increasing hardness 14.00m-15.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competen 15.00m-22.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 22.00m-23.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 23.00m-24.00m SHALE/SILTSTONE: slightly weathered, dark grey, carbonaceous, low-medium hardness, competent 24.00m-25.00m SHALE/SILTSTONE: slightly weathered, medium grey, carbonaceous in parts, low-medium hardness, competent 25.00m-27.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent 27.00m-28.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent, some brown-grey massive claystone, softer 28.00m-29.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent 29.00m-30.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competent, some brown-grey massive claystone, softer 30.00m-32.00m SHALE/SILTSTONE: slightly weathered, dark grey, dominantly carbonaceous, moderately hard, appears massive, competen	665m	East
GW101054	0.00m-4.00m CLAY: light grey with red-brown streaks, low plasticity, silty to stiff, slight moisture. 3.00m-4.00m some red-brown iron stone gravel. 4.00m-32.00m SHALE/SILTSTONE: brown-grey, moderately weathered semi-competent and friable, trace of brown clay and sandy bands. 5.00m-10.00m slightly weathered, medium to dark grey, carbonaceous in parts, low-medium hardness, competent. 7.00m-10.00m trace of fine grained sandstone-lighter grey. 9.00m-32.00m predominantly dark grey carbonaceous, mod.hard, fossiliferous , some traces of lamination. 11.00m-11.00m base of weathering, increasing hardness. 12.00m-15.00m trace of fine grained sandstone-lighter grey 17.00m-24.00m slightly lighter grey, less carbonaceous, harder, trace of fine grained sandstone. 25.00m-27.00m slightly lighter grey, less carbonaceous, harder, trace of fine grained sandstone. 33.00m-35.00m slightly lighter grey, less carbonaceous, harder, trace of fine grained sandstone.	837m	South East
GW075074	0.00m-0.50m TOPSOIL 0.50m-3.00m CLAY, BROWN 3.00m-4.50m CLAY, GREY 4.50m-6.00m SHALE	848m	North East
GW103155	0.00m-1.00m TOPSOIL 1.00m-9.00m BROWN SHALE AND WHITE CLAY 9.00m-37.00m HARD BLACK SHALE 37.00m-97.00m HARD SANDSTONE	897m	West

Groundwater No	Drillers Log	Distance	Direction
GW101055	0.00m-1.50m FILL: grey-brown, clay and shale, compacted, semi-cohesive, firm to stiff, slight moisture (access road). 1.50m-2.00m FILL: mottled, light-medium brown and light grey, silty clay with minor fine grained sand, low plasticity, firm, slight moisture 2.00m-5.00m FILL: mottled, light-medium brown and light grey, silty clay with minor fine grained sand, low plasticity, firm, slight moisture, some plant rootlets, occasional ironstone gravel 5.00m-5.50m FILL: mottled, light-medium brown and light grey, silty clay with minor fine grained sand, low plasticity, firm, slight moisture, some plant rootlets, occasional ironstone gravel, trace of white brick 5.50m-6.50m SHALE/SILTSTONE: brown-grey, highly weathered, semi-competent, some brown silty clay, slight moisture 6.50m-7.00m SHALE/SILTSTONE: grey-brown, moderately weathered, semi-competent, some brown silty clay, slight moisture, partly carbonaceous 7.00m-9.00m SHALE/SILTSTONE: dark grey, slightly weathered, competent, some brown silty clay, slight moisture, carbonaceous, low hardness, friable, some traces of lamination, base of weathering at 9 m, increasing 9.00m-10.00m SHALE/SILTSTONE: predominantly dark grey, slightly weathered, moderately hard, carbonaceous, fossiliferous, some traces of lamination 10.00m-11.00m SHALE/SILTSTONE: predominantly dark grey, slightly weathered, moderately hard, carbonaceous, fossiliferous, some traces of lamination, some brown-grey claystone, softer 11.00m-15.00m SHALE/SILTSTONE: predominantly dark grey, slightly weathered, moderately hard, carbonaceous, fossiliferous, some traces of lamination 15.00m-21.00m SHALE/SILTSTONE: grey, slightly weathered, becoming slightly harder, carbonaceous, fossiliferous, some traces of lamination	1091m	East
GW075073	0.00m-0.50m TOPSOIL 0.50m-6.00m CLAY, BROWN 6.00m-6.50m SHALE	1268m	North
GW075085	0.00m-2.00m CLAY, BROWN 2.00m-4.00m CLAY, LIGHT BROWN 4.00m-5.50m SHALE, BROWN	1341m	North
GW075084	0.00m-1.00m CLAY, BROWN 1.00m-3.50m SHALE, BROWN 3.50m-6.00m SHALE, GREY	1351m	North
GW075083	0.00m-1.00m CLAY, BROWN 1.00m-3.50m SHALE, BROWN 3.50m-5.00m SHALE, GREY	1364m	North
GW075075	0.00m-0.30m TOPSOIL 0.30m-1.50m CLAY, BROWN 1.50m-2.50m SHALE	1417m	North
GW111886	0.00m-6.00m CLAY 6.00m-42.00m SHALE 42.00m-60.00m SHALE/SANDSTONE 60.00m-72.00m SANDSTONE 72.00m-78.00m SHALE 78.00m-114.00m SANDSTONE 114.00m-127.00m SANDSTONE / SHALE 127.00m-150.00m SANDSTONE 150.00m-156.00m SANDSTONE / SHALE 156.00m-200.00m SANDSTONE	1429m	West
GW075088	0.00m-1.00m CLAY, BROWN 1.00m-6.00m SHALE, BROWN 6.00m-8.90m SHALE, GREY	1465m	North
GW075072	0.00m-0.50m TOPSOIL 0.50m-4.00m CLAY, BROWN 4.00m-6.50m SANDY CLAY	1544m	North
GW075087	0.00m-1.00m CLAY, WEATHERED 1.00m-1.50m SHALE, BROWN 1.50m-1.60m IRONSTONE	1688m	North
GW047458	0.00m-0.20m Topsoil Dark 0.20m-11.30m Clay Shale 11.30m-17.00m Clay Grey Shale 17.00m-18.30m Clay Grey 17.00m-18.30m Gravel Fine Rounded Water Supply 18.30m-20.00m Clay Grey Shale	1741m	West
GW075086	0.00m-1.00m CLAY, BROWN 1.00m-3.00m SHALE, BROWN 3.00m-4.00m SHALE, GREY	1745m	North

Geology 1:100,000

The Northern Road, Mulgoa, NSW 2745



Geology

The Northern Road, Mulgoa, NSW 2745

Geological Units

What are the Geological Units onsite?

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

What are the Geological Units within the dataset buffer?

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

Geological Structures

What are the Geological Structures onsite?

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

What are the Geological Structures within the dataset buffer?

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

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

Naturally Occurring Asbestos Potential

The Northern Road, Mulgoa, NSW 2745

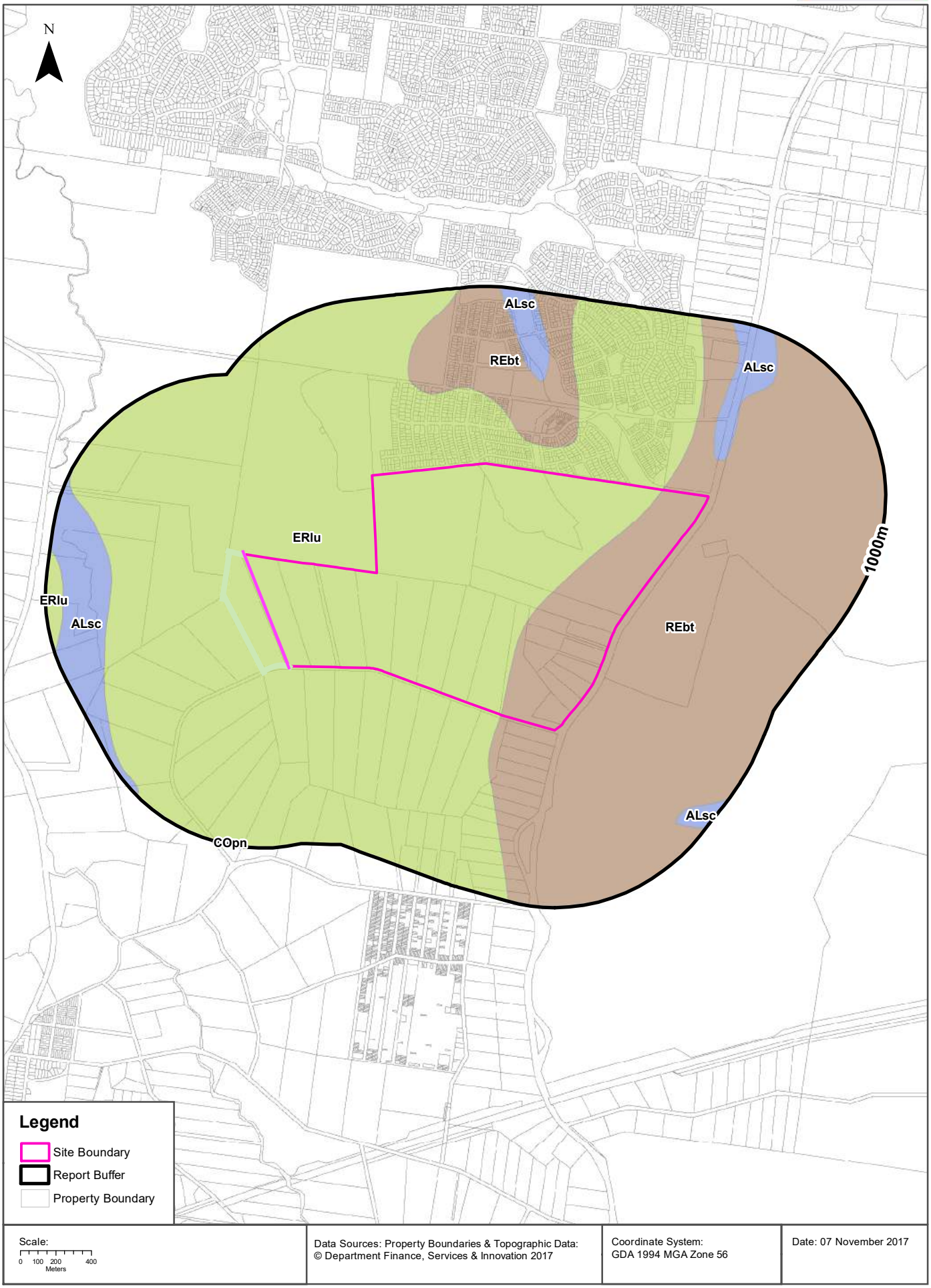
Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

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

Soil Landscapes

The Northern Road, Mulgoa, NSW 2745



Soils

The Northern Road, Mulgoa, NSW 2745

Soil Landscapes

What are the onsite Soil Landscapes?

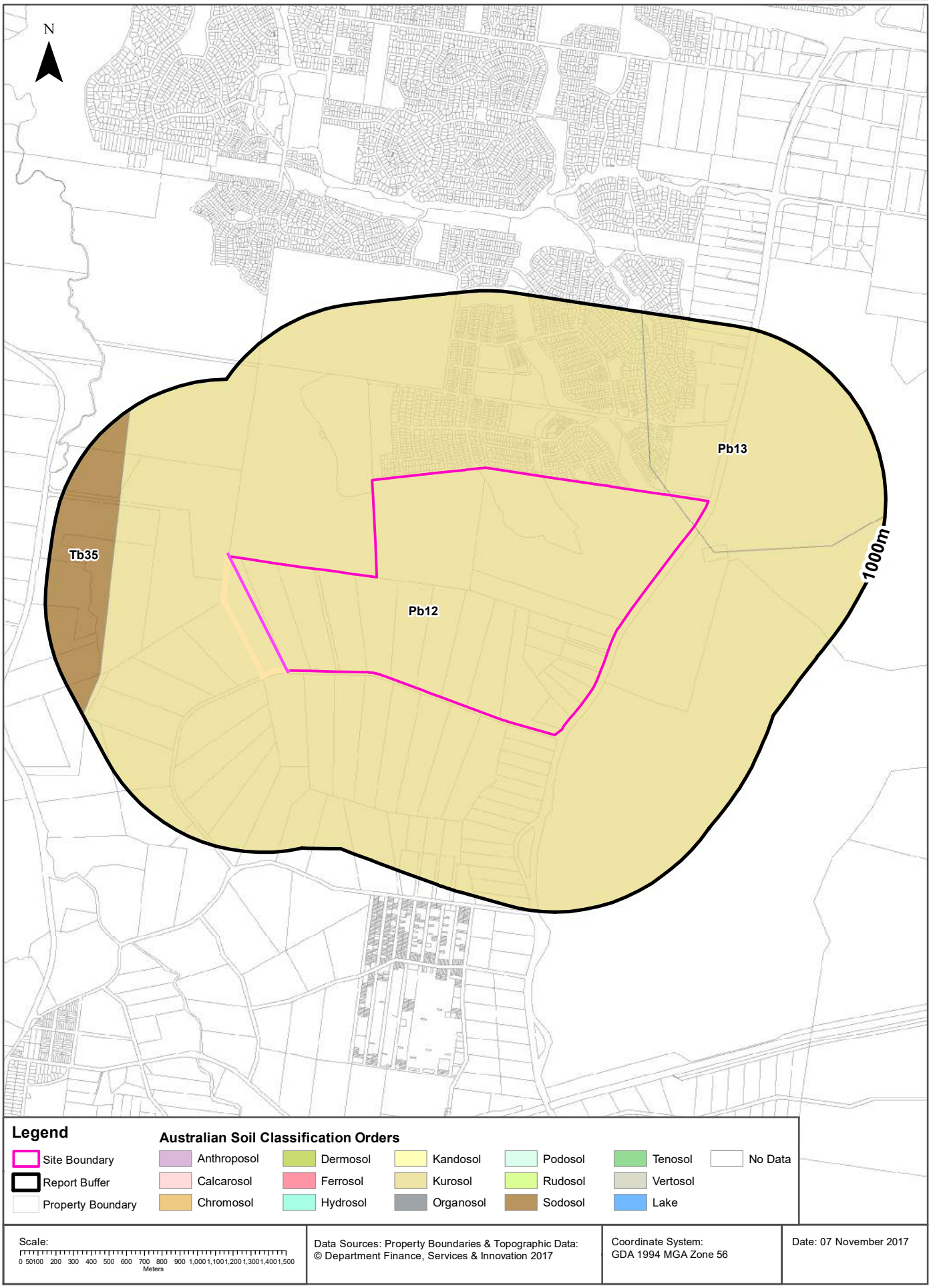
Soil Code	Name	Group	Process	Map Sheet	Scale
ERlu	LUDDENHAM		EROSIONAL	Penrith	1:100,000
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

What are the Soil Landscapes within the dataset buffer?

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

Atlas of Australian Soils

The Northern Road, Mulgoa, NSW 2745



Soils

The Northern Road, Mulgoa, NSW 2745

Atlas of Australian Soils

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

Map Unit Code	Soil Order	Map Unit Description	Distance
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m
Pb13	Kurosol	Ridge and valley country of gently undulating ridge tops and steep side slopes often with slumping, also rounded hilly to steep hilly areas and relatively narrow valleys: chief soils are hard acidic red soils (Dr2.21) with hard acidic yellow mottled soils (Dy3.41); in places some ironstone gravels occur in both these soils. Associated are hard neutral and alkaline red soils (Dr2.22 and Dr2.23) in saddles and some mid-slope positions; (Dy3.42 and Dy3.43) soils, usually in depressions; and small areas of undescribed soils in wet soaks and valley areas. Small areas of other soils are likely throughout.	0m
Tb35	Sodosol	Dissected plateau remnants--flat to undulating ridge tops with moderate to steep side slopes: chief soils are hard acidic yellow and yellow mottled soils (Dy3.41), (Dy2.21), and (Dy2.41) and hard acidic red soils (Dr2.21); many shallow profiles occur and profile thickness varies considerably over short distances. Associated are: (Gn3.54), (Gn3.14), and possibly other (Gn3) soils; (Db1.2) soils on some ridges; (Dy5.81) soils in areas transitional to unit Mb2; soils common to unit Mb2; and eroded lateritic remnants. Small areas of other soils are likely. Flat ferruginous shale or sandstone fragments are common on and/or in and/or below the soils of this unit.	644m

Acid Sulfate Soils

The Northern Road, Mulgoa, NSW 2745

Standard Local Environmental Plan Acid Sulfate Soils

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

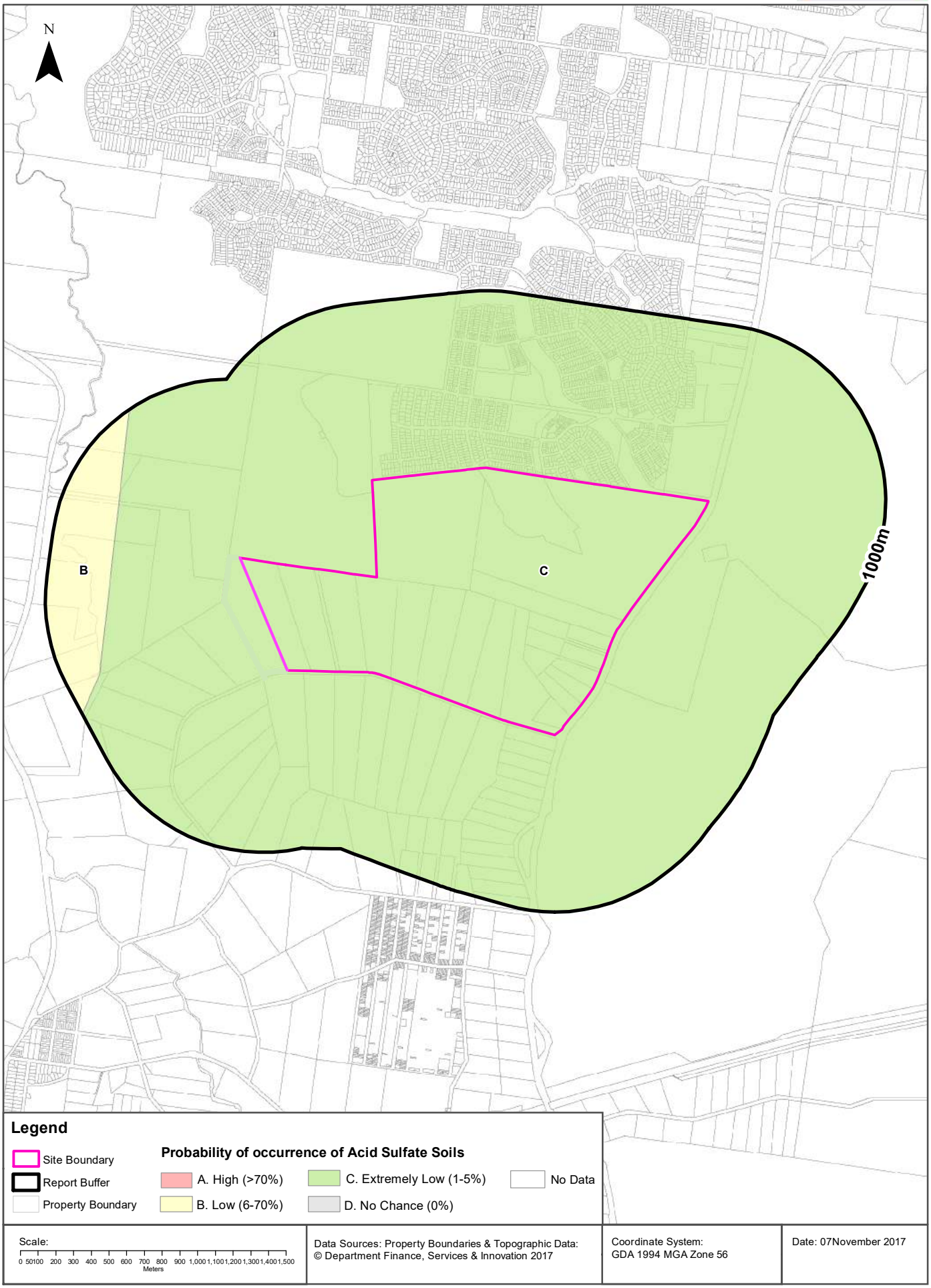
Soil Class	Description	LEP
N/A		

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

Soil Class	Description	LEP	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

The Northern Road, Mulgoa, NSW 2745



Acid Sulfate Soils

The Northern Road, Mulgoa, NSW 2745

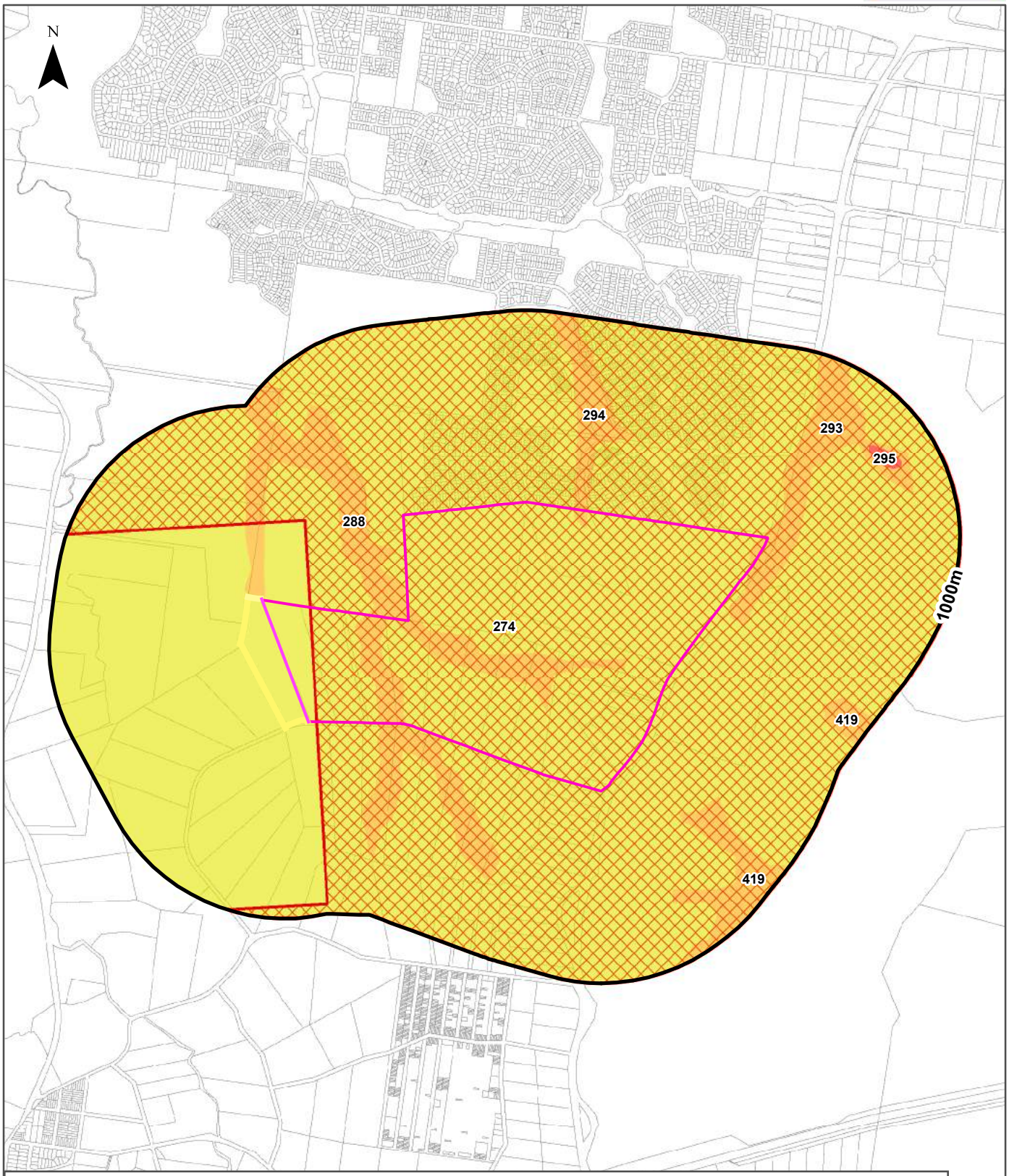
Atlas of Australian Acid Sulfate Soils

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

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m
B	Low Probability of occurrence. 6-70% chance of occurrence.	645m

Dryland Salinity

The Northern Road, Mulgoa, NSW 2745



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Dryland Salinity - National Assessment

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

Salinity Potential of Western Sydney

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

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

Dryland Salinity

The Northern Road, Mulgoa, NSW 2745

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

Yes

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

Yes

What Dryland Salinity assessments are given?

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

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
274	MODERATE	Area of Moderate Salinity Potential	0m	Onsite
288	HIGH	Area of High Salinity Potential	0m	Onsite
293	HIGH	Area of High Salinity Potential	0m	Onsite
294	HIGH	Area of High Salinity Potential	0m	Onsite
419	HIGH	Area of High Salinity Potential	365m	East
295	SALT	Area of Known Salinity	685m	North East

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

Mining Subsidence Districts

The Northern Road, Mulgoa, NSW 2745

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

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

Environmental Zoning

The Northern Road, Mulgoa, NSW 2745

State Environmental Planning Policy Protected Areas

Are there any State Environmental Planning Policy Protected Areas onsite or within the dataset buffer?

Dataset	Onsite	Within Site Buffer	Distance
SEPP14 - Coastal Wetlands	No	No	N/A
SEPP26 - Littoral Rainforests	No	No	N/A
SEPP71 - Coastal Protection Zone	No	No	N/A

SEPP Protected Areas Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Major Developments (2005)

State Environmental Planning Policy Major Developments within the dataset buffer:

Map Id	Feature	Effective Date	Distance	Direction
N/A	No records within buffer			

SEPP Major Development Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Strategic Land Use Areas

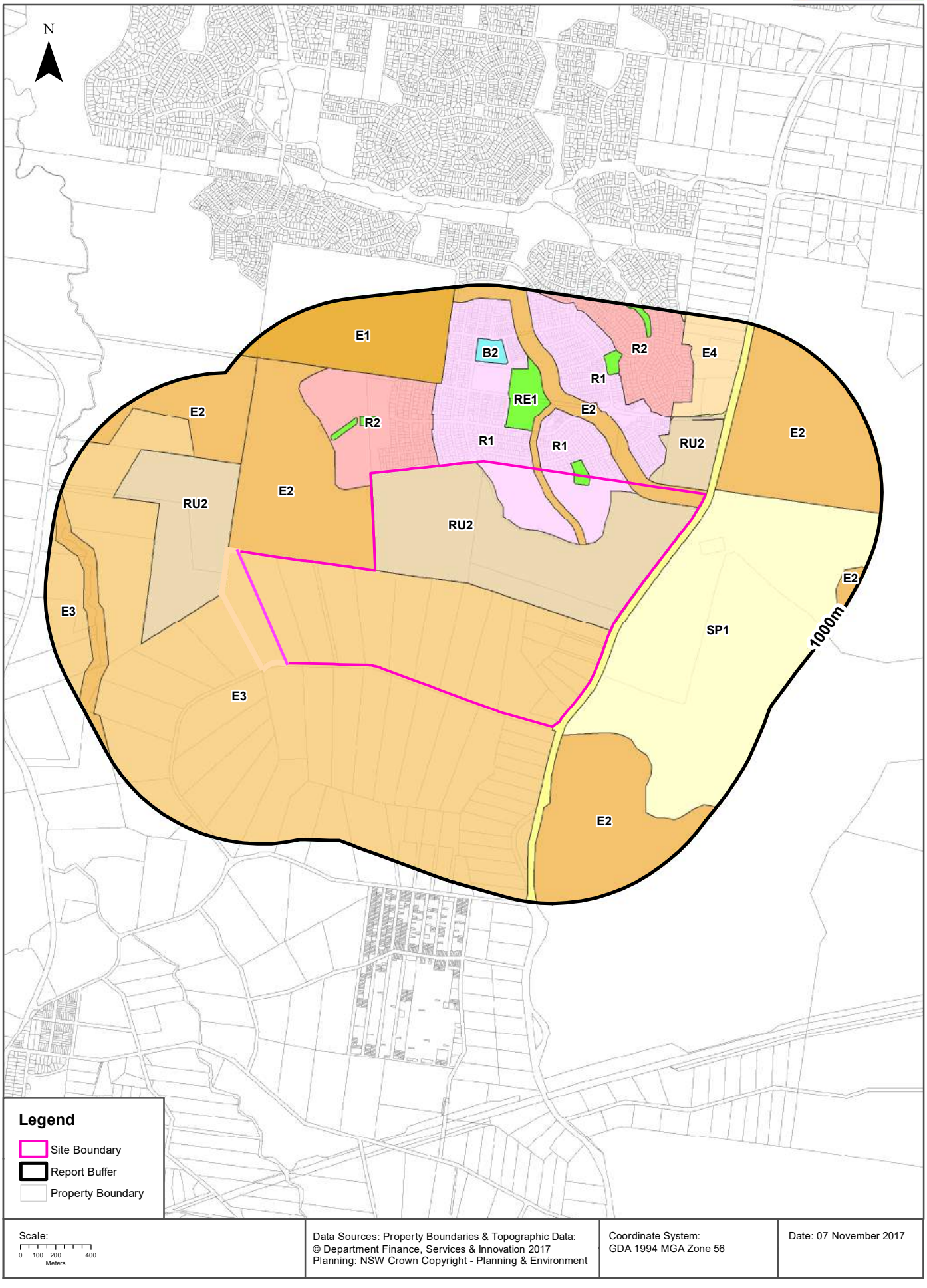
State Environmental Planning Policy Strategic Land Use Areas onsite or within the dataset buffer:

Strategic Land Use	SEPPNo	Effective Date	Amendment	Amendment Year	Distance	Direction
No records within buffer						

SEPP Strategic Land Use Data Source: NSW Department of Planning & Environment

LEP Planning Zones

The Northern Road, Mulgoa, NSW 2745



Local Environmental Plan

The Northern Road, Mulgoa, NSW 2745

Land Zoning

What Local Environmental Plan Land Zones exist within the dataset buffer?

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
E3	Environmental Management		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		0m	Onsite
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		0m	Onsite
R1	General Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	0m	Onsite
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	0m	Onsite
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	0m	North East
E2	National Parks and Nature Reserves		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	0m	North West
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	0m	North West
SP2	Infrastructure	Classified Road	Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		0m	South East
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		20m	North East
R1	General Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	35m	North East
SP1	Special Activities	Defence	Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		41m	East
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		58m	East
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	207m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	264m	North West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	277m	North West
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	381m	North East
E4	Environmental Living		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	401m	North East
R2	Low Density Residential		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	401m	North East
SP2	Infrastructure		Penrith Local Environmental Plan 2010	14/10/2016	14/10/2016	11/08/2017	Amendment No 11	402m	North East
SP2	Infrastructure		Penrith Local Environmental Plan 2010	14/10/2016	14/10/2016	11/08/2017	Amendment No 11	421m	North East
E1	National Parks and Nature Reserves		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		463m	North West
E2	Environmental Conservation		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		488m	West
B2	Local Centre		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	558m	North
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	589m	North East
E3	Environmental Management		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		775m	West
RE1	Public Recreation		Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	827m	North
E4	Environmental Living		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		946m	North East

Local Environmental Plan

The Northern Road, Mulgoa, NSW 2745

Minimum Subdivision Lot Size

What are the onsite Local Environmental Plan Minimum Subdivision Lot Sizes?

Symbol	Minimum Lot Size	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
AB2	20 ha	Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		50.75
AB3	40 ha	Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017		37.58

Maximum Height of Building

What are the onsite Local Environmental Plan Maximum Height of Buildings?

Symbol	Maximum Height of Building	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
15	15.00 m	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	Amendment No 4	8.8

Floor Space Ratio

What are the onsite Local Environmental Plan Floor Space Ratios?

Symbol	Floor Space Ratio	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

Land Application

What are the onsite Local Environmental Plan Land Applications?

Application Type	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
Included	Penrith Local Environmental Plan 2010	11/08/2017	11/08/2017	11/08/2017	Amendment No 12	100

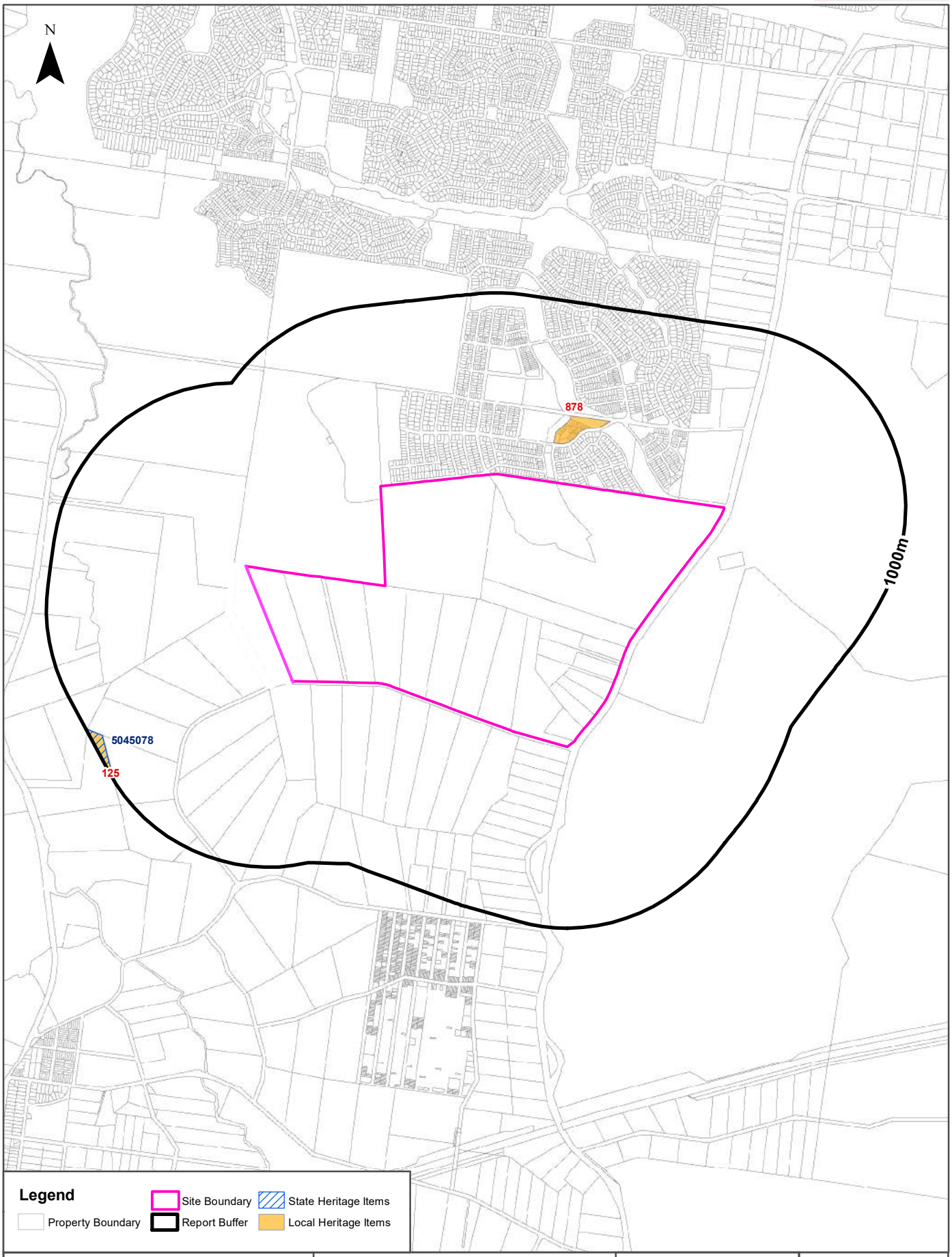
Land Reservation Acquisition

What are the onsite Local Environmental Plan Land Reservation Acquisitions?

Reservation	LEP	Published Date	Commenced Date	Currency Date	Amendment	Comments	Percentage of Site Area
No Data							

Heritage Items

The Northern Road, Mulgoa, NSW 2745



Heritage

The Northern Road, Mulgoa, NSW 2745

State Heritage Items

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

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5045078	Cox's Cottage	2 St Thomas Road Mulgoa	Penrith	02/04/1999	171	2330	939m	South West

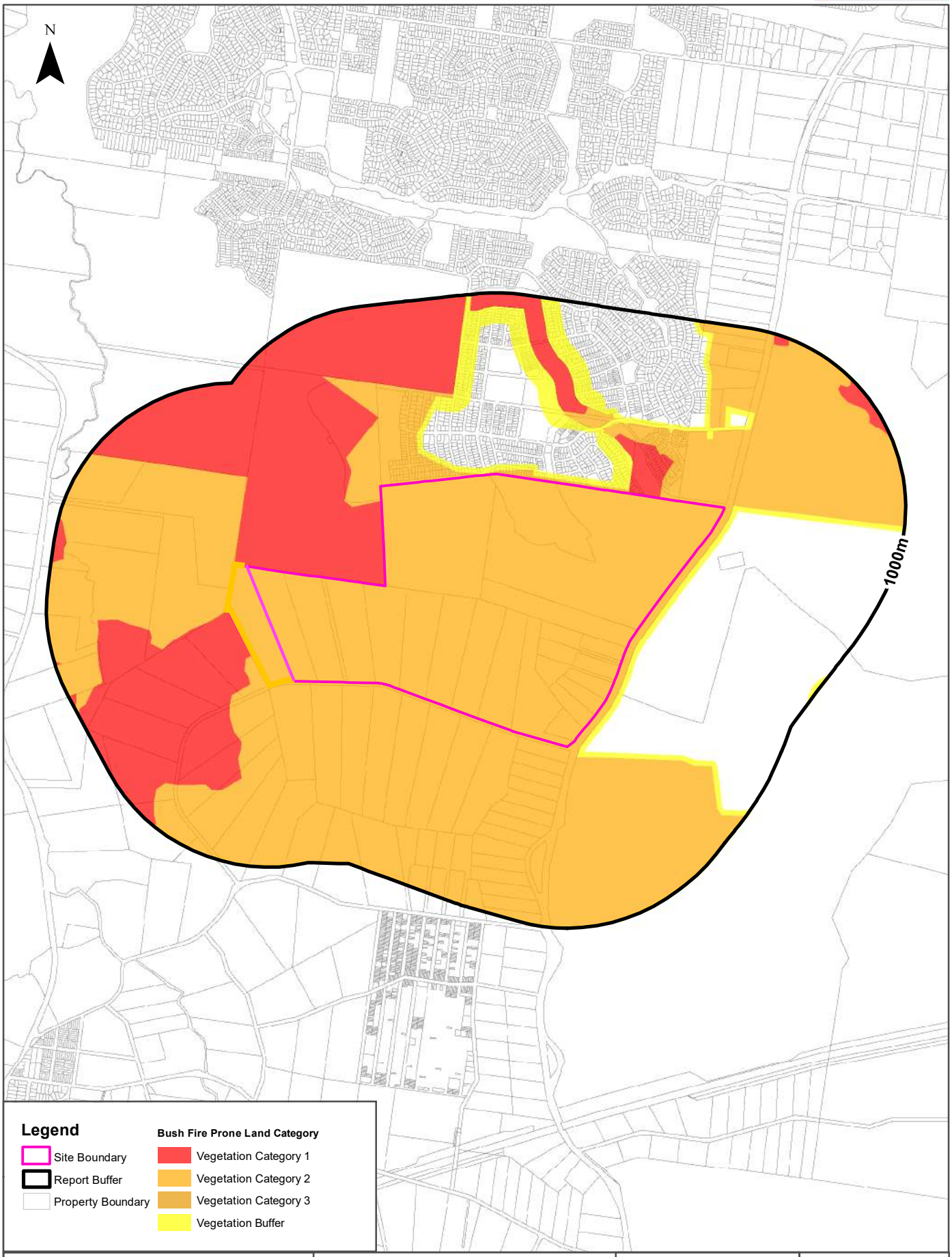
Local Heritage Items

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

Map Id	Name	Classification	Significance	LEP or Act	Published Date	Commenced Date	Currency Date	Distance	Direction
878	Scarred tree and Aboriginal artefact scatter	Item - General	Local	Penrith Local Environmental Plan 2010	25/02/2015	25/02/2015	11/08/2017	213m	North East
125	The Cottage	Item - General	State	Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	11/08/2017	939m	South West

Natural Hazards - Bush Fire Prone Land

The Northern Road, Mulgoa, NSW 2745



Natural Hazards

The Northern Road, Mulgoa, NSW 2745

Bush Fire Prone Land

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

Bush Fire Prone Land Category	Distance	Direction
Vegetation Category 1	0m	Onsite
Vegetation Category 2	0m	Onsite
Vegetation Buffer	8m	North East

Ecological Constraints - Remnant Vegetation of the Cumberland Plain

The Northern Road, Mulgoa, NSW 2745

Ecological Constraints

The Northern Road, Mulgoa, NSW 2745

Remnant Vegetation of the Cumberland Plain

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

Description	Crown Cover	Distance	Direction
10 - Shale Plains Woodland	Crown cover greater than 10%	0m	Onsite
11 - Alluvial Woodland	Crown cover greater than 10%	0m	Onsite
9 - Shale Hills Woodland	Crown cover greater than 10%	0m	Onsite
10 - Shale Plains Woodland	Crown cover less than 10%	0m	Onsite
11 - Alluvial Woodland	Crown cover less than 10%	0m	Onsite
9 - Shale Hills Woodland	Crown cover less than 10%	0m	Onsite
1 - Shale Sandstone Transition Forest (Low Sandstone Influence)	Crown cover greater than 10%	157m	West
2 - Shale Sandstone Transition Forest (High Sandstone Influence)	Crown cover greater than 10%	339m	West
1 - Shale Sandstone Transition Forest (Low Sandstone Influence)	Crown cover less than 10%	444m	West
2 - Shale Sandstone Transition Forest (High Sandstone Influence)	Crown cover less than 10%	558m	West

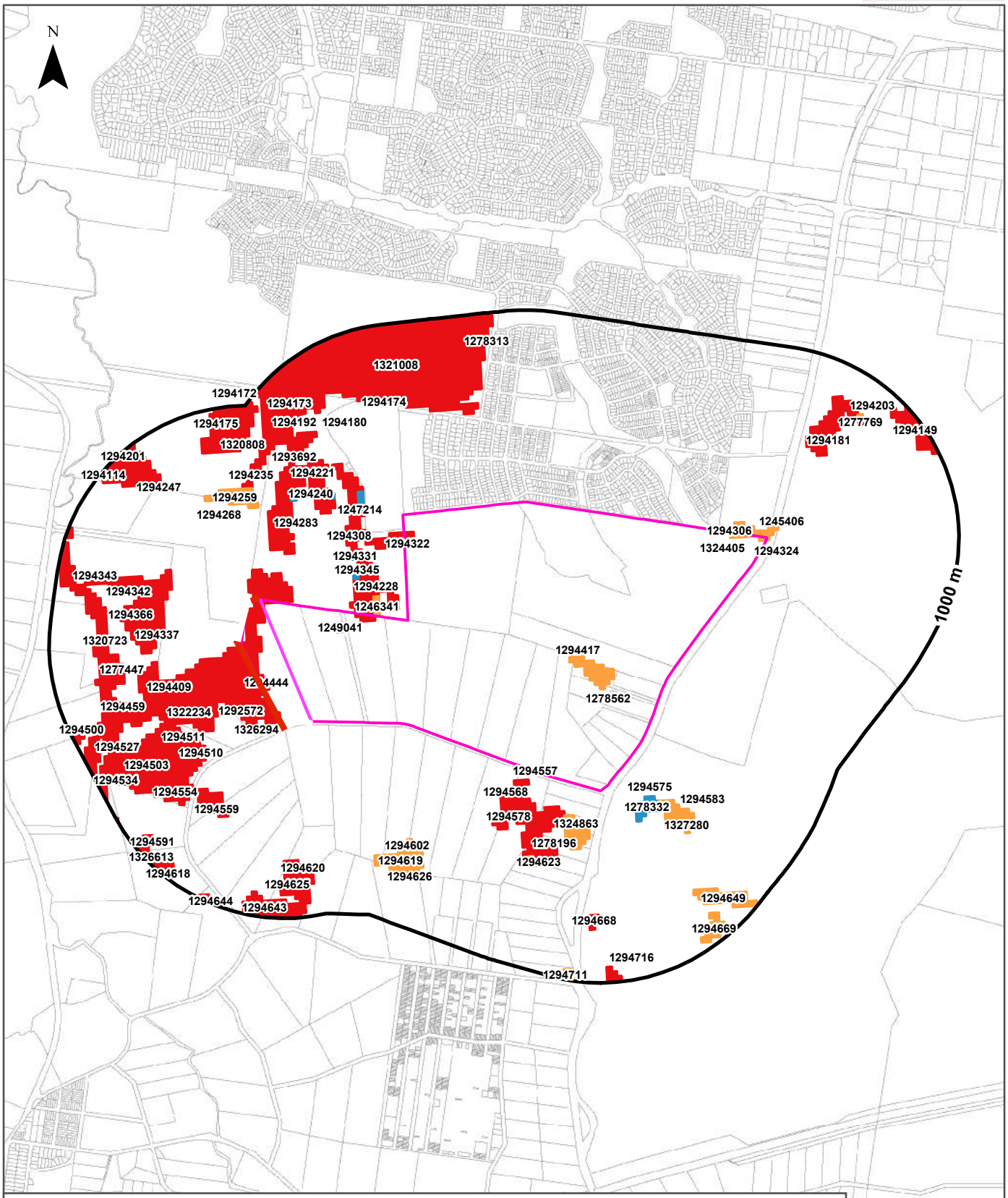
RAMSAR Wetlands

What RAMSAR Wetland areas exist within the dataset buffer?

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

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

The Northern Road, Mulgoa, NSW 2745



Legend

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

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 07 November 2017

Ecological Constraints

The Northern Road, Mulgoa, NSW 2745

Groundwater Dependent Ecosystems Atlas

Map Id	Type	GDE Potential	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
1246341	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1249041	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1278562	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294228	Terrestrial	High potential GDE - from national assessment	5	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294322	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294324	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294306	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294417	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294444	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1322234	Terrestrial	High potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1324405	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	0m
1294557	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	51m
1245406	Terrestrial	High potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	87m
1294565	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	107m
1294568	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	137m
1294578	Terrestrial	High potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	137m
1326294	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	145m
1292572	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	157m
1324863	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	160m
1294347	Terrestrial	Low potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	175m
1294409	Terrestrial	High potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	178m
1278332	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	182m
1294575	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	190m
1294478	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	192m
1294345	Terrestrial	Low potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	200m
1247214	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	204m
1294331	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	248m
1294221	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	254m
1325516	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	261m
1294308	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	274m
1278196	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	311m
1327280	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	314m

1294264	Terrestrial	Low potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	367m
1294583	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	368m
1294337	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	396m
1294510	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	400m
1294283	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	402m
1294621	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	423m
1294623	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	430m
1294259	Terrestrial	Moderate potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	466m
1294240	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	470m
1294511	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	471m
1294559	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	474m
1321008	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	486m
1294268	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	492m
1294181	Terrestrial	High potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	501m
1294266	Terrestrial	Low potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	533m
1294366	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	539m
1294249	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	541m
1294602	Terrestrial	Moderate potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	553m
1294235	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	565m
1294554	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	566m
1294503	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	574m
1294174	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	585m
1294459	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	589m
1293692	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	601m
1294619	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	602m
1294342	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	617m
1277447	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	620m
1320723	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	627m
1294668	Terrestrial	High potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	645m
1248456	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	648m
1241971	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	667m
1294626	Terrestrial	Moderate potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	680m
1294180	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	687m
1294620	Terrestrial	High potential GDE - from national assessment	7	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	700m
1294649	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	704m
1294247	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	722m
1294173	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	731m

1294192	Terrestrial	Low potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	731m
1294201	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	737m
1294343	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	749m
1294625	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	750m
1277769	Terrestrial	High potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	759m
1294175	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	765m
1294209	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	765m
1294203	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	777m
1320808	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	790m
1294527	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	809m
1278313	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	831m
1294669	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	849m
1294534	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	853m
1294643	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	872m
1294591	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	890m
1294149	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	902m
1294500	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	903m
1278547	Terrestrial	High potential GDE - from national assessment	8	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	916m
1294716	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	918m
1294114	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	923m
1294172	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	931m
1294618	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	933m
1294711	Terrestrial	Moderate potential GDE - from national assessment	6	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	939m
1326613	Terrestrial	High potential GDE - from national assessment	10	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	953m
1294644	Terrestrial	High potential GDE - from national assessment	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	959m

Ecological Constraints

The Northern Road, Mulgoa, NSW 2745

NSW BioNet Atlas

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

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Heleioporus australiacus	Giant Burrowing Frog	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	Not Sensitive	Not Listed	
Animalia	Gastropoda	Pommerhelix duralensis	Dural Woodland Snail	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petauroides volans	Greater Glider	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	Petaurus australis	Yellow-bellied Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petrogale penicillata	Brush-tailed Rock-wallaby	Endangered	Not Sensitive	Vulnerable	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Hoplocephalus bungaroides	Broad-headed Snake	Endangered	Category 2	Vulnerable	
Plantae	Flora	Ancistrachne maidenii		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus benthamii	Camden White Gum	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Boland Yellow Gum	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Hibbertia puberula		Endangered	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Hypsela sessiliflora		Not Listed	Category 3	Extinct	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Marsdenia viridiflora subsp. viridiflora	Native Pear	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Micromyrtus minutiflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Endangered	Category 3	Endangered	
Plantae	Flora	Persoonia nutans	Nodding Geebung	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pterostylis chaetophora		Vulnerable	Category 2	Not Listed	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Senna acclinis	Rainforest Cassia	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	Tetratheca glandulosa		Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

Data obtained 07/11/2017

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Appendix B

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VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

PENRITH CITY COUNCIL

Penrith Local Environmental Plan 2010

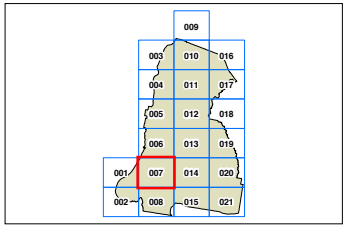
Land Zoning Map - Sheet LZN_007

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business development
- B6 Enterprise Corridor
- E1 National Parks and Nature Reserves
- E2 Environmental Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- RU4 Primary Production Small Lots
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure
- SP3 Tourist
- W1 Natural Waterways
- W2 Recreational Waterways
- DM Deferred Matter
- WSEA SEPP (Western Sydney Employment Area) 2009
- SM SREP No. 30 - St Marys

Cadastre

Cadastre 23/08/2016 © Penrith City Council



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200 0 200 400 600

Metres

Projection: GDA 1994 MGA Zone 56

Scale: 1:20,000 @ A3

Map identification number: 6350_COM_LZN_007_020_20160824

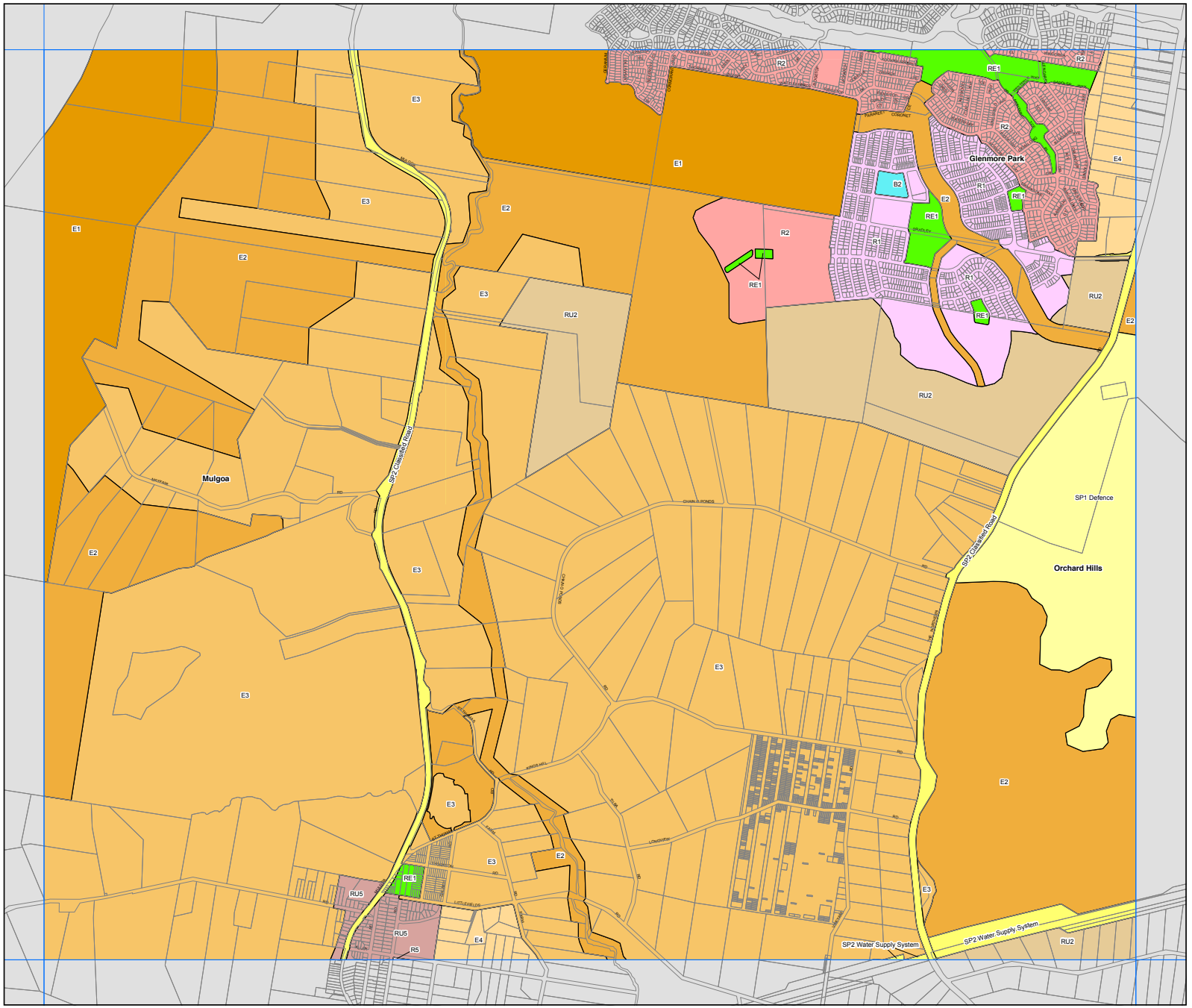

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Table 1A(1) Health investigation levels for soil contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
Metals and Inorganics				
Arsenic[2]	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead[3]	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic)[5]	40	120	80	730
Methyl mercury[4]	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	1400	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	3	4	3	40
Total PAHs[7]	300	400	300	4000
Phenols				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
Organochlorine Pesticides				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
Herbicides				
2,4,5-T	600	900	800	5000
2,4-D	900	1600	1300	9000
MCPA	600	900	800	5000

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
MCPB	600	900	800	5000
Mecoprop	600	900	800	5000
Picloram	4500	6600	5700	35000
Other Pesticides				
Atrazine	320	470	400	2500
Chlorpyrifos	160	340	250	2000
Bifenthrin	600	840	730	4500
Other Organics				
PCBs[8]	1	1	1	7
PBDE Flame Retardants (Br1–Br9)	1	2	2	10

Notes:

(1) Generic land uses are described in detail in Schedule B7 Section 3

HIL A – Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

HIL B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

HIL C – Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.

HIL D – Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

(2) Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7).

(3) Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.

(4) Methyl mercury: assessment of methyl mercury should only occur where there is evidence of its potential source. It may be associated with inorganic mercury and anaerobic microorganism activity in aquatic environments. In addition the reliability and quality of sampling/analysis should be considered.

(5) Elemental mercury: HIL does not address elemental mercury. A site-specific assessment should be considered if elemental mercury is present, or suspected to be present,

(6) Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracene	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthene	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthene	0.1	Indeno(1,2,3-c,d)pyrene	0.1

Where the B(a)P occurs in bitumen fragments it is relatively immobile and does not represent a significant health risk.

(7) Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet the relevant HSL.

(8) PCBs: HIL relates to non-dioxin-like PCBs only. Where a PCB source is known, or suspected, to be present at a site, a site-specific assessment of exposure to all PCBs (including dioxin-like PCBs) should be undertaken.

Table 1B(5) Generic EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

	Ecological Investigation Levels (mg total contaminant/kg)		
CHEMICAL	**Areas of ecological significance**	**Urban residential and public open space[1]**	**Commercial and industrial**
Arsenic[2]	40	100	160
DDT[3]	3	180	640
Naphthalene[3]	10	170	370

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.
4. Insufficient data was available to calculate ACLs for As, DDT and naphthalene. The EIL should be taken directly from Table 1B(5).

Table 1B(6) ESLs for TPH fractions F1 – F4, BTEX and benzo(a)pyrene in soil

CHEMICAL	Soil texture	ESLs (mg/kg dry soil)		
		Areas of ecological significance	Urban residential and public open space	Commercial and industrial
F1 C_6-C_{10}	*Coarse/ Fine*	125*	180*	215*
F2 >C_{10}-C_{16}		25*	120*	170*
F3 >C_{16}-C_{34}	*Coarse*	-	300	1700
	Fine	-	1300	2500
F4 >C_{34}-C_{40}	*Coarse*	-	2800	3300
	Fine	-	5600	6600
Benzene	*Coarse*	10	50	75
	Fine	10	65	95
Toluene	*Coarse*	10	85	135
	Fine	65	105	135
Ethylbenzene	*Coarse*	1.5	70	165
	Fine	40	125	185
Xylenes	*Coarse*	10	105	180
	Fine	1.6	45	95
Benzo(a)pyrene	*Coarse*	0.7	0.7	0.7
	Fine	0.7	0.7	0.7

Notes:

(1) ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.

(2) '-' indicates that insufficient data was available to derive a value.

(3) To obtain F1, subtract the sum of BTEX concentrations from C_6-C_{10} fraction and subtract naphthalene from >C_{10}-C_{16} to obtain F2.

Table 1 B(7) Management Limits for TPH fractions F1–F4 in soil

TPH fraction	Soil texture	Management Limits[1] (mg/kg dry soil)	
		Residential, parkland and public open space	Commercial and industrial
F1[2] C_6- C_{10}	*Coarse*	700	700
	Fine	800	800
F2[2] >C_{10}-C_{16}	*Coarse*	1000	1000
	Fine	1000	1000
F3 >C_{16}-C_{34}	*Coarse*	2500	3500
	Fine	3500	5000
F4 >C_{34}-C_{40}	*Coarse*	10 000	10 000
	Fine	10 000	10 000

[1] Management limits are applied after consideration of relevant ESLs and HSLs

[2] Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.