



Report

Phase 1 Environmental and Geotechnical Site Assessment - Mount Gilead, Appin Road, Menangle NSW

30 AUGUST 2013

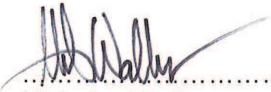
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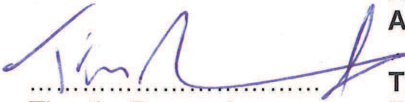
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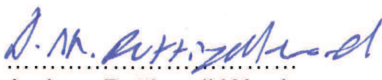
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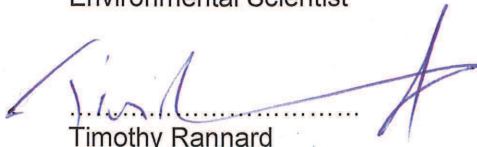
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Abbreviations

Abbreviation	Description
URS	URS Australia Pty Ltd
OMP	Old Mill Properties Pty Ltd
DPS	Development Planning Strategies Pty Ltd
EGSA	Environmental and Geotechnical Site Assessment
NSW	New South Wales
EPA	Environmental Protection Authority
ISO	International Organization for Standardization.
ASS	Acid sulphate soil
CLM Act	Contaminated Land Act 1997
POEO Act	Protection of the Environment Operations Act 1997
DP	Deposited Plan
PASS	Potential Acid Sulphate Soils (PASS)
OEH	Office of Environment and Heritage
LEP	Local Environmental Plan

Executive Summary

URS Australia Pty Ltd (URS) was engaged by Old Mill Properties Pty Ltd (OMP) to conduct a Phase 1 Environmental and Geotechnical Site Assessment (Phase 1 EGSA) of a property located in Menangle New South Wales, identified as Mount Gilead. Certificates of Title indicate that the lots have been administrated correctly and that Mt.Gilead Pty Ltd has ownership of Lots 1 & 2 in Deposited Plan 807555, Lot 59 in Deposited Plan 752042 and that S&A Dzwonnik own the rights to Lot 61 DP 752042. The historic aerial photographs show that the site has been an expanding agricultural area with only one residence on it from at least 1947.

The report presents a desktop review, site inspection and assessment that seeks to satisfy the environmental and geotechnical conditions of the Gateway determination process concerning the rezoning of these lots from Non-urban to mixed urban use. Previous URS reports were referenced to provide more in depth observations.

The site was generally found to be overlying Blacktown series soils which were dominantly overlying Ashfield Shales and occasionally sandstone including the Hawkesbury Sandstone. The soils were identified to present a low risk of potentially acid sulphate soils and yield negligible salinity risks. The topography was generally gently sloping grassed grazing land for cattle and horse across the majority of the site. Elevated land was observed to the north-west with slopes of up to $\approx 25^\circ$ and a quarry on the southern flank. The surface water features on site comprised three gullies and a number of farm dams.

The preliminary geotechnical assessment indicates that there are not significant geohazard constraints to development of the site in the gently sloping areas. Slumping was identified within the quarry and on the steeper slopes and around the northern gullies additional geotechnical and slope risk management considerations will be necessary for development in these locations.

Erosion of the soils was observed through the scouring observed at several locations around the site but the area of the scour was limited. The bedrock is expected to be able to be used. The soil is also expected to be a suitable founding layer or as an engineering fill material with some potential compaction or chemical stabilisation.

The preliminary environmental and historical reviews have not uncovered anything that might be considered unusual considering the current land use. Low levels of contamination associated with livestock can be expected but no records or anecdotal evidence of burial or dips on site exist to warrant special consideration. The previous URS 2006 report comments on a single instance of an asbestos cement pipe, but this again, is not considered unexpected on a site that has been worked since at least 1947. No asbestos was observed during this site inspection.

There is no reason to expect pasture improvement activities have compromised the Site for residential land use. There is minimal likelihood of significant chemical contamination of the Site likely to compromise development for residential land use.

Based on the observations made, URS considers the site is generally acceptable for residential land use, however conducting a Phase 2 investigation would lessen the uncertainty inherent to desktop assessments, and reduce the risk of unexpected findings during development. As the development application is progressed further, targeted geotechnical and environmental testing may be considered to support detailed design.

1 Introduction

1

Introduction

1.1 Background

URS Australia Pty Ltd (URS) was engaged by Old Mill Properties Pty Ltd (OMP) to conduct a Phase 1 Environmental and Geotechnical Site Assessment (Phase 1 EGSA) of a property located in Menangle New South Wales, identified as Mount Gilead, located on Appin Road, Menangle NSW (the site), refer to **Appendix A – Figure 1-1 Site Location**. The areas under consideration consist of Lot 59 of Deposited Plan (DP) 752042, Lot 1 and part of Lot 2 of DP 807555 owned by Mt. Gilead Pty Ltd and Lot 61 DP 752042 owned by S and A Dzwonnik, **Appendix A – Figure 1-2 Aerial Photograph**.

The site has an approximate area of 210 hectares and is displayed in **Appendix A – Figure 1-3 Site Topography**. The site's eastern boundary has a frontage to Appin Road, northern boundary abuts the Noorumba Reserve with the site's southern boundary located approximately 1500 m south. The western boundary comprises the Sydney Water Upper Canal approximately 1000 m west of Appin Road and open pasture land. The surrounding area is generally used for livestock farming (cattle grazing).

It is important to note that this Phase 1 ESA is based solely on a desktop review of available information, a site walkover reconnaissance and an investigation of applicable historic records. Intrusive Phase 2 investigations involving soil and groundwater sampling were not conducted as part of this ESA.

It is understood that OMP are project managing the development consent on behalf of Mt. Gilead Pty Ltd and that Development Planning Strategies Pty Ltd (DPS) are representing S and A Dzwonnik.

URS has undertaken two investigations in 2003 and 2006 of varying scopes. These reports cover part of the current investigation area. A limited number of excavations were undertaken in the investigation area from which a very limited number of geotechnical and environmental tests were performed that are directly relevant for this study. The observations and results taken do not represent sufficient data to draw accurate conclusion but are referenced to provide an improved understanding of the area.

1.2 Objective

It is understood by URS that the purpose of the works was to conduct a site assessment to support the submission and to satisfy the environmental and geotechnical conditions of the Gateway determination process concerning the rezoning of these lots from Non-urban to mixed urban use.

1.3 Applicable Statutes

1.3.1 NSW Legislation

The following articles of NSW legislation should be considered.

- Contaminated Land Management Act 1997 No 140
- Environmental Planning and Assessment Act 1979 No 203
- Heritage Act 1977 No 136

1 Introduction

- Noxious Weeds Act 1993 No 11
- Protection of the Environment Operations Act 1997 No 156
- Sydney Regional Environmental Plan No 20 - Hawkesbury-Nepean River (No 2 - 1997)
- Threatened Species Conservation Act 1995 No 101
- Water Act 1912 No 44
- Water Management Act 2000 No 92
- Work Health and Safety Act 2011 No 10

1.4 Standards & Best Practice Guides

This Phase 1 EGSA was conducted utilising currently accepted best practice professional standards used for Phase 1 Environmental Site Assessments in Australia, these are as follows:

- *Guidelines for Consultants Reporting on Contaminated Land*, NSW EPA, 1997
- *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*, ASTM E1527-05 (2005)
- *Guidelines for Environmental Auditing – General principles of environmental auditing*, ISO 14010:1996 (1996).
- *Australian Dangerous Goods Code (Sect.9)* (2007)

Whenever possible, supporting documentation has been provided as appendices to this report. Some documentation referenced in this report may not be presented due to copyright restrictions or cost considerations.

1.5 User Reliance

This report is for the use and benefit of, and may be relied upon by, Mt. Gilead Pty Ltd and S&A Dzwonnik in so making determinations or assessments for the purposes of land rezoning in the lots and DP's described above.

1.6 Scope of Work

The scope of work conducted by URS for this Phase 1 EGSA was in accordance to our proposal 03119346 dated 22 February 2013 and consisted of the following components:

- Review of Certificates of Title to provide details of current ownership and land use for all nominated properties.
- Review of the following documents provided by third parties:
 - Local Council (heritage register, LEPs, zonings);
 - Department of Lands (6 x aerial photographs from the year 1950 through to 2010);
 - Environment Protection Authority (EPA) - notices under CLM Act and POEO Act Environment Protection License Register;
 - NSW Office of Water (groundwater bore search within a 1 km radius); and
 - Published geological, hydrogeological, soil landscape and acid sulphate soil (ASS) risk maps.
- Site inspection – A site inspection by URS personnel of the site and surrounding areas was undertaken to provide further information, via visual inspection, of potential sources and areas of significant environmental liability. The site inspection intended to focus on the following:

1 Introduction

- Areas of operational processes including waste management, water management, existing bores, the condition of the site and buildings, as well as the presence of electrical transformers on site.
 - Areas of potential landfilling.
 - Potential impacts of neighbouring land uses.
 - Sensitivity of the receiving environment.
 - Other relevant information which could be provided by the site operator.
- Preparation of this report detailing the Phase 1 ESA findings in accordance with the NSW Environment Protection Authority publication *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, November 1997).

The scope of the Phase 1 EGSA did not include an assessment of compliance with environmental licences / permits held by the site or with other environmental regulatory requirements. The Phase 1 EGSA did not include any sampling and analysis of air, soil or groundwater, which would be required to verify the existence (or otherwise) of soil and groundwater contamination or air borne pollutants.

1.7 Personnel

The site inspection, as described above, was conducted on Friday 14 June 2013⁴ by Mr Nick Walker, Engineering Geologist and Mr Andrew Pettingell-Ward, Environmental Scientist, of URS. The site owners were present during the site inspections and access was provided by Mr. Lee Macarthur-Onslow. Other persons present were the land owner of Lot 61 DP752042, Mrs. Anna Dzwonnik, Mr. Phil Anderson of Old Mill Properties Pty Ltd and Mr. David Ronning of AgEconPlus Consulting.

Site Description

2.1 Site Definition

Table 2-1 Site Definition

Site Address	Appin Road Menangle NSW
Title Identification Details/ Legal Description	Lot 1 and part of Lot 2 of DP 807555 and Lot 59 and Lot 61 of DP 752042.
Current Ownership	Lee Macarthur-Onslow (Mt. Gilead Pty Ltd) and Mr and Mrs Dzwonnik
Current Site Use and Zoning	Site Use: Livestock grazing. Zoning: Non-urban land
Proposed Future Site Use	Residential development at time of writing
Previous ESA or Validation Reports	None known
Site Area	Approximately 210 hectares or 2.1 km ² (based on the information provided by the client)

2.2 Topography

The majority of the site consists of gently undulating rises, rounded crests and ridges with slopes generally less than 5°, refer to **Appendix A – Figure 1-2 Aerial Photograph and Figure 1-3 Site Topography**. The land is generally sloping north-west into a shallow valley at the foot of the ridged line in the north-west. The ridge line comprises a hill with steeper gradients up to 25°. There are several surface water features with a number of small farm dams on the site. The major drainage channels are;

- a steep gully to the north-west trending north
- a shallow gully to the north-east trending north
- a shallow gully to the south-west trending north-west, links to an south-westerly trending channel

The steep gully to the north-west initially comprises two shallow catchment gullies from the large hill and adjacent higher land. When these join, the gully steepens and is incised down to the bedrock in some locations and flows off site and is part of the Menangle Creek catchment.

The shallow gully to the north east of the site, channels water north from the higher ground and off the site to the north. This is also part of the Menangle Creek catchment.

The shallowly banked gully observed at the western extent of the site is part of the Woodhouse Creek catchment. The creek channels water north-west until it meets a small gully feature in the central area. At the intersection the gully direction changes to the southwest. The creek flows into a large dam and eventually out to the Nepean River.

2.3 Site Setting

The site is located within a semi-urban, semi-rural setting approximately 5 km south of the suburb of Campbelltown, NSW, along Appin Road.

The following sensitive receptors are located within 1 km of the investigation site:

2 Site Description

- The Upper Canal on the western border of the site;
- The Menangle Creek to the west of the site and an associated small unnamed creek running into the western part of Noorumba Reserve, north of the site
- Noorumba Reserve located on the site's northern boundary;
- Users of registered and unregistered groundwater bores located within 1 km of the investigation areas; and
- Employees and residents of the Kilbride Nursing Home located on the northern boundary of the site.

Land uses and properties adjacent to the site, including those across adjacent roads were obtained from the site inspection conducted by URS personnel on 14 June 2013. Identified adjacent land uses are summarised below:

Table 2-2 Adjacent Property Descriptions

Direction from site	Site Use (Nature of Activity)
North	Noorumba Reserve and the Kilbride Nursing Home
South	Beulah bio-banking site
East	Appin Road with grazing land and bushland further east
West	Grazing land

2.4 Surface Water Receptors

Surface water receptors identified within the vicinity of the investigation areas include the drainage channels on the site (mentioned in **Section 2.2**), the Sydney Water Supply Upper Canal comprising the western border of the site which is generally a concrete lined canal. Nepean Creek is approximately 500 m southwest of the southern border of the site, and the Nepean River is approximately 2.2 km west of the site. A number of farm dams have been constructed to capture surface water flows along the drainage channels on the site. Based on the relatively low elevation, rolling topography, soil conditions (discussed further in **Section 2.5**) and anecdotal evidence, these water bodies are considered to be permanent and as such are considered to be of significant habitat value.

The Menangle Creek, Woodhouse Creek and Nepean Creek are ephemerals and are generally dry in the summer months. These creeks join the Nepean River to the west. These are not considered to be permanent water bodies but they are well established creeks and are considered to be of habitat value.

2.5 Regional Lithology and Geology

2.5.1 Geology

The Wollongong-Port Hacking 1:100,000 Geological Sheet 9029-9129, 1st edition 1990, refer to **Appendix A – Figure 1.4 Geological Map** indicates that the site is underlain by the Triassic Ashfield Shale of the Wianamatta Group which in turn is unconformably deposited over the overlying the Hawkesbury Sandstone.

2 Site Description

The Ashfield Shale comprises shale, Carboniferous claystone, laminate, coal in parts with the unit becoming a laminate and dark grey siltstone to the north of the site. The Hawkesbury Sandstone is indicated to be medium to coarse grained quartz sandstone with very minor shale and laminate lenses.

In general there are only limited bedrock outcrops across this area, with shale underlying the northern portion of the site and sandstone the southern portion of the site.

2.5.2 Soils

The Wollongong-Port Hacking 1:100,000 Soil Landscapes Sheet 9029-9129, 1st edition 1990 mapping indicates the area is covered by Blacktown group soils derived from Wianamatta Shale **Appendix A – Figure 1.5 Soil Landscape**. The soils are indicated to be shallow to moderately deep (<1.5 m) Red Podzolic Soils and Brown Podzolic Soils on crests, upper slopes and well drained areas; deep (1.5m to 3.0m) Yellow Podzolic Soils and Soloths on the lower slope and in the drainage depressions and localised areas of poor drainage. It is expected that the soils derived from Wianamatta Shale will exhibit a subsoil profile of moderately reactive high plasticity clay. (Hazelton and Tille, 1990).

2.5.3 Acid Sulphate Soils

Inspection of the Acid Sulphate Soil Risk Map indicated the site was considered to present a very low risk of Potential Acid Sulphate Soils (PASS). Given the topography and lithology of the Site (stiff clays overlying weathered rock), URS considers no further assessment is required to provide an appropriate characterisation of Acid Sulphate Soil risk and that particular consideration of PASS is not necessary during development works on the site.

2.5.4 Previous Investigations

In previous intrusive investigations undertaken by URS (2006) at a limited number of locations across the site and in the adjacent areas to the site it was found that the local geology, soil profile and ASS is broadly consistent with the published literature.

The site was found to be typically underlain by shallow silty clay / clay soils overlying extremely weathered shale and sandstone.

2.6 Regional Hydrogeology

2.6.1 Groundwater Salinity

Blacktown Series soils, which occur across the study area, have the capacity for localised salinity problems (Hazelton and Tille, 1990). URS (2003) assessed the salinity associated with surface soils (0-300mm depth). All surface soil samples were non-saline. Soils of this class are expected to yield negligible salinity effects (Hazelton and Murphy, 1992).

2.6.2 Groundwater Flow Direction

Regional groundwater direction is anticipated to flow towards the Nepean River, which is generally from east to west, based on the local and regional topography. Groundwater flow direction and depth are not expected to be influenced by tidal conditions.

2 Site Description

2.6.3 Groundwater Bore Records Search

A search for registered groundwater users located within a one kilometre radius of the site was undertaken using the NSW Natural Resources Atlas on-line database (<http://www.nratlas.nsw.gov.au/>) maintained by the Department of Natural Resources, 13 June 2013.

There are no registered groundwater bores on the property.

The results indicate that there is one (1) registered groundwater bore located within a 1 kilometre radius of the investigation area. The borehole is located approximately 950 m south-west of the southern extent of the site and authorised for general use (irrigation) and stock watering purposes. It is not known if it is still in operational use. It should be noted that groundwater boreholes may act as direct conduits to the subsurface in the event of a contaminant release (e.g. fuel spill). The results of the search are summarised in Table 2-3 and presented in **Appendix A – Figure 1.6 Natural Resources Map**.

It should be noted that if additional, unregistered boreholes are encountered during any future site investigations, control measures should be implemented to prevent subsurface contamination via the borehole and expert advice should be sought to determine the appropriate course of action (i.e. well abandonment).

Table 2-3 Groundwater Bores within 1 km of the site

Location (relative to site)	GW Bore Reference	Type	Use	Final Bore Depth (m)	Geological Material Comment	Standing Water Level (m)
950 m SW	GW005316	Bore	Stock / General use	36.50m	0.00 to 0.60m - Topsoil 0.60 to 1.52m - Clay 1.52 to 36.57m - Shale	Unknown

2.7 Dangerous Substances

No search for NSW WorkCover Dangerous Goods licences was conducted to determine the potential presence (historic or otherwise) of above-ground or underground storage tanks. Anecdotal evidence provided during the site inspection is that no handling or use of dangerous goods has ever taken place at the site.

No observations were made during the site inspection (refer to **Section 3.3**) or from historic aerial photography (refer to **Section 4.3**) that would indicate the presence (historic or otherwise) of chemical storage infrastructure at the site.

Site Reconnaissance

A walkover reconnaissance of the investigation areas was undertaken by URS on 14 June 2013 to support the findings of the desktop review and identify site characteristics that may be suggestive of site contamination.

3.1 Land Uses

At the time of the inspection, the site was being used for livestock grazing. Approximately 40 head of cattle were grazing on the site, as well as the properties to the immediate west and south-west of the site. The site is surrounded by barbed-wire fences of generally good condition. An area of a large excavation was found, which was indicated by the site owner to be the location of a quarry (described as a “heritage quarry” by the site owner) in which shale type material was observed, however it was consistent with the surrounding geology.

No evidence of uncontrolled dumping of waste or spoil was observed.

3.2 Surface Water

The site contains approximately 8 stock water or farm dams which have been constructed by the site owners over the years of ownership. These are generally situated on the pre-existing natural creek lines and were observed to be supporting native bird life in the area.

Evidence of surface water contamination at the site observed during the site reconnaissance was limited to biological contamination of the drainage channel as a result of livestock manure impacted run-off. This could potentially cause algal blooms and eutrophication in the down gradient surface water receptors identified in **Section 2.4**.

3.3 Chemical Storage and Use

No chemical storage facilities or infrastructure were observed at the site during the inspection. Accordingly to the site owners no storage or use of chemicals has ever taken place at the site.

No sheep or cattle dips were observed at the site.

3.4 Soil and Groundwater Contamination

It should be noted that the release of chemicals (for instance from cattle dips, septic tanks or refuelling infrastructure) through leaks and spills can lead to the contamination of soils, surface and ground waters. Surface water and groundwater may mobilise pollutants from many different sources and may, therefore, contain a variety of contaminants. Water that becomes contaminated with pollutants from land sources can reach surface waters via runoff from rain. Polluted surface waters can filter down to groundwater and may seep slowly for long distances, and over time eventually emerge into rivers, springs or wetlands.

Contaminated water can also infiltrate land to an extent where the land itself becomes contaminated to a level that some form of remediation would be required. Soil can also be contaminated through direct discharges of pollutants, which in turn may result in water pollution if the contamination is mobilised. Water, soil and land contamination have a direct impact on human health, ecological health and land uses. During the site inspection no potential sources of surface or groundwater contamination were observed to be present.

3 Site Reconnaissance

An old asbestos pipe was observed crossing a field in the URS 2006 report “Soils, Geology and Topography Assessment”, however this may have been removed as it was not observed during the most recent inspection. There was no physical or anecdotal evidence of wide spread use or burial of asbestos on site identified during this site inspection but the possibility should not be discounted. Given the age of the property and the historic use as a farm, potential exists for finding more instances of asbestos use and/or disposal on the site.

The URS 2006 report describes surface topsoil samples collected from 30 test pit locations, 10 of these were within the site boundary. Laboratory testing for pH, conductivity, metals (As, Cd, Cr, Zn, Cu, Ni, Pb), nitrite, nitrogen and phosphorus was undertaken. No exceedances of the 1999 *National Environment Protection (Assessment of Site Contamination) Measure* (National Environment Protection Council, 1999) *Health Investigation Level (HIL) 'A' ('Standard' residential with garden / accessible soil)* or *provisional phytotoxicity investigation level (PPIL)* guideline levels for metals were noted. Nitrogen and phosphorus levels were variable (Nitrite and Nitrate, ranged from less than the laboratory limit of reporting to 564 mg/kg; Total Kjeldahl Nitrogen, ranged from 1020 to 5690 mg/kg, Total Nitrogen ranged from 1020 to 5690 mg/kg and Total Phosphorus ranged from 184 to 1510 mg/kg). These values are indicative of ongoing pasture improvement practices. Soil pH ranged between 4.8 and 7.5 and were within the expected range for the soil type and expected local agricultural practices (i.e. application of lime to naturally acidic soils).

3.5 Geotechnical observations

In general the site was found to be without significant observable geohazards. Several areas of potential hazard were however identified;

- Northern flanks of the hill
- North-western gully
- Quarry
- South-western gully
- North-eastern gully

Minor surficial slumping was observed in the topsoil horizons in the northern flank of the hill and associated with the shallow gullies in the northern area. No apparent deep seated sliding or slumping was in evidence. The general steepness of the slopes combined with the observed minor slumping would indicate that surface surcharging of the area may precipitate further movement.

The north-western gully comprised steep embankments with some areas of scoured sides and channel bed. The channel is likely to continue to cut back upstream increasing the gully. The scours and steep sides may cause minor local instabilities.

The quarry was identified on the southern flank of the higher land has some near vertical low walls of up to an estimated up to 8 m. The majority of the low walls of the quarry appear to have slumped. Rilling of fine material out of the face was observed to be forming slopes of rill material at the base of the slopes. Ravelling of minor blocks was also observed with some blocks reaching about 5m from the face. There was no structural evidence of developing instabilities or active slumping in the quarry face.

3 Site Reconnaissance

Perched water was observed to be contained within the quarry. The dominant force now acting on the quarry faces was weathering.

The south-western gully had several areas where surface water run-off appears to have scoured the top soil back to sandstone bedrock. It is likely that the soil horizon is very narrow in these areas.

The north-eastern gully shows a minor slump near the boundary combined with scour of the soils near the base of the lower farm dams. This may have been related to heavy rains over topping the dams and causing run off to scour the soil, this may have also precipitated the slumping.

In general the overall stability of the site is good with only surficial soils instabilities on the steeper northern area and minor rock fall potential localised to the quarry.

The erosion potential does not appear to be extreme but general channelization, scour and erosion are observed on the site within the soil horizons.

Site Historical Review

A review of the site history was undertaken to assess historical use of the site, and in particular to identify activities with the potential to contaminate soil and/or groundwater at the site. URS requested copies of records maintained by the following Authorities:

- The NSW EPA for information on records under the Protection of the Environment Operations Act 1997 relating to activities requiring an Environment Protection Licence or notices of pollution incidents;
- The NSW EPA for information on records under the Contaminated Land Management Act 1997 relating to contaminated sites recorded under Section 58 and the Act;
- Campbelltown City Council for information on records under the Environmental Planning and Assessment Act 1979 relating to zoning and restrictions on approved land uses and Council's knowledge of contamination under Section 149 and the Act; and
- The Land and Property Division of the NSW Department of Finance and Services for current and historic property titles and aerial photography.

4.1 Search of NSW EPA Records

4.1.1 Environmental Licences and Notices

A search of the NSW EPA on-line register (<http://www.environment.nsw.gov.au/prpoeoapp/>) was undertaken in June 2013 for licenses and /or notices issued under the Protection of the Environment Operations Act (POEO) 1997. The search indicated that the EPA has not issued any licenses or notices relating to the site or properties within 1 km of the site.

4.1.2 Contaminated Sites

A search of the NSW EPA on-line register (<http://www.environment.nsw.gov.au/prclmapp/>) was undertaken in June 2013 for contaminated land notices issued or regulated under the Contaminated Land Management Act 1997. The search indicated that the EPA holds no contaminated land records relating to the site and properties within 1 km of the site.

4.2 Campbelltown City Council Planning Information

Planning certificates under Section 149 of the Environmental Planning and Assessment Act 1979 have been provided by Campbelltown City Council, dated 13th and 14th June 2013, relating to subject land identified as:

- Lot 1 in DP 807555
- Lot 2 in DP 807555
- Lot 59 in DP 752042
- Lot 61 in DP 75042

In accordance with Section 149(2) of the Environmental Planning and Assessment Act 1979, at the date of the certificate, the following information is provided in respect of the prescribed matters to be included in a planning certificate. Site specific information considered pertinent to this report is summarised below.

- Campbelltown Local Environmental Plan (LEP) Number 209 states that the site is under Zone 1 Non-Urban – 100ha minimum;

4 Site Historical Review

- The subject land does not include or comprise 'critical habitat';
- The subject land is not in a conservation area;
- The land comprises, or has situated on it, a heritage item or draft heritage item (Lot 1 in DP 807555). This is presumed to be the old windmill and homestead in the western part of the site, which are understood to be outside the extent of the site (defined as the metropolitan development plan);
- The land is not affected by the operation of the Coastal Protection Act 1979;
- The land is within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961;
- All properties within the Campbelltown City local government area may be affected by flooding caused by overland flow or local topography;
- The subject land includes an 'Item of Environmental Heritage' (Lot 1 in DP 807555);
- The subject land is shown as bush fire prone land; and
- There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed, however Council records do not have sufficient information about previous use of this land to determine whether the land is contaminated;

Section 149 (2) and (5) records from Campbelltown City Council are attached as **Appendix D**.

4.3 Historical Aerial Photography Survey

An historical aerial photography survey was undertaken for the site, with a total of six photographs identified and reviewed. The historical aerial photographs that were reviewed spanned a period of approximately 60 years, with the most recent from 2005, to the earliest in 1947. Where possible, aerial photographs were reviewed at 10 year intervals (at the most appropriate scale) to allow for tracking of changes in use of the site and surrounding properties over time. Key observations made during the review of aerial photos are presented in **Appendix B - Historical Aerial Photographs** and summarised in **Table 4-1** as follows:

Table 4-1 Summary of Aerial Photo Information

Date	Activity	Register / Source
January 1947	The site and surrounding areas are partially cleared and appear to be utilised for grazing or crop purposes. Small stands of vegetation are present across the site with a large stand of uncleared vegetation adjacent to Appin Road in the middle section of the site. One residential dwelling is present in the middle western section of the area. The main drainage canal to the west of the site is as per its current alignment.	NSW Regional Imagery : 1947. APN 286 Camden, Run 12.
7 August 1956	The site area remains largely unchanged, the large stand of uncleared vegetation has increased in size and density.	NSW Regional Imagery: 1956. 241-5046 Camden, Run 37.

4 Site Historical Review

Date	Activity	Register / Source
1961	The site area remains largely unchanged.	NSW Regional Imagery : 1961 1045-5083 Cumberland, Run 52
2 April 1975	The site and surrounding area remains largely unchanged, with the exception of a small cleared area in the approximate centre of the site.	NSW Regional Imagery : 1975 2300-87 Wollongong, Run 3
08 October 1984	The site and surrounding area remains largely unchanged, with the exception of several cleared areas where grass or crops appear to have been planted.	NSW Regional Imagery : 1984 3411-63 Wollongong, Run 7
04 January 1994	The site area remains largely unchanged.	NSW Regional Imagery : 1994 4178-116 Wollongong, Run 4
20 December 2005	The site area remains largely unchanged. Larger areas of the site appear to have been cleared, either for grazing or crop planting and small dams onsite appear to be more frequent.	NSW Regional Imagery : 2005 4942 Wollongong, Run 4

4.4 Title Search

The site is located in the Local Government Area of Campbelltown, Parish of Menangle and County of Cumberland, being Lots 1 & 2 in Deposited Plan 807555, Lot 59 in Deposited Plan 752042 and Lot 61 DP 752042.

A summary of the findings from SAI Global Property Division Pty Ltd (2013) concerning historical title information is summarised in Table 4-2, Table 4-3 and 4-4 below. Certificates of title are presented in **Appendix C**.

Table 4-2 Summary of Land Title Information Lots 1 and 2 of DP 807555

Date	Lot Owner	Description
Circa 1890 to 12 February 1891	Edmund Bingham Woodhouse, Gentleman	Volume 959 Folio 153 from 10.2.1890 to 28.9.1911
12 February 1891 to 1 April 1910	The Australasian Investment Company Limited	Volume 959 Folio 153 from 10.2.1890 to 28.9.1911
1 April 1910 to 5 August 1920	William Henry Harris, Bachelor of Medicine	Volume 2186 Folio 173 from 28.9.1911 to 7.7.1949
5 August 1920 to 13 April 1949	John Thomas Barnett, Grazier and his Estate	Volume 2186 Folio 173 from 28.9.1911 to 7.7.1949
13 April 1949 to 18 January 1955	Sylvia Seton Raymond Macarthur Onslow, Widow	Volume 5984 Folio 177 from 7.7.1949 to 29.7.1959

4 Site Historical Review

Date	Lot Owner	Description
18 January 1955 to 15 October 1982	Denzil Macarthur Onslow, Company Director	Volume 7733 Folio 139 from 29.7.1959 to 24.1.1991
15 October 1982 to present	Mount Gilead Pty Ltd	Folios 1 & 2/807555 from 24.1.1991 to Date

Table 4-3 Summary of Land Title Information Lot 59 of DP752042

Date	Lot Owner	Description
Circa 1916 to 27 February 1920	Alexander McNaughton Bowden, Commercial Traveller	Volume 2700 Folio 173 from 23.9.1916 to 2.3.1920
27 February 1920 to 18 July 1952	Grace Farrar Tindale, Widow and George Tindale, Engineer	Volume 3025 Folio 92 from 2.3.1920 to 17.1.1966
18 July 1952 to 13 January 1966	George Tindale, Engineer	Volume 3025 Folio 92 from 2.3.1920 to 17.1.1966
13 January 1966 to 14 October 1982	Sir Denzil Macarthur Onslow, Company Director	Volume 10211 Folio 26 (now Folio 59/752042) from 17.1.1966 to Date
14 October 1982 to present	Mount Gilead Pty Ltd	Volume 10211 Folio 26 (now Folio 59/752042) from 17.1.1966 to Date

Table 4-4 Summary of Land Title Information Lot 61 DP 752042

Date	Lot Owner	Description
from circa 1918 to circa 1958	Joseph Williams, Farmer and Frances Elizabeth Williams, Spinster	Volume 2836 Folios 66 & 67 from 13.4.1918 to 24.3.1958
from circa 1958 to 27.11.1963	Margaret Williams, Spinster and Harriet Williams Spinster	Volume 7464 Folios 165 & 166 from 24.3.1958 to 7.1.1964
from 27.11.1963 to 25.8.1981	Harriet Williams and her Estate, Spinster	Volume 9609 Folio 122 from 7.1.1964 to 12.12.1972 Volume 12004 Folio 222 from 12.12.1972 to 14.4.1989
from 25.8.1981 to Date	Stefan Dzwonnik and Anna Dzwonnik	Folio 61/752042 from 14.4.1989 to Date

4 Site Historical Review

During the course of the investigation the following registered leases were noted:

1. B108307 (Lots 1 and 2) dated 17 July 1924 – Samuel Kirton (Snr), Dairy Farmer
2. C644859 (Lot 59) dated 1 January 1938 – Henry Percy Davis, Grazier
3. D42669 (Lot 59) dated 24 June 1941 – John Garton, Farmer

4.5 Summary of Site History Information

The site has been owned by private individuals and corporations from 1890 to the present. Based on historical aerial photographs, the site has been used for farming and grazing land since prior to 1954 to the present.

Various chemicals such as arsenic and organochlorine pesticides (OCPs) associated with sheep and cattle grazing activities are potential contaminants at the site from the historic use of the site for livestock grazing purposes. No evidence was available to indicate whether a livestock dip has been located on or near the site, however, records are commonly not available of the location of historical livestock dip sites.

Geotechnical Assessment of the Site

5.1 Previous investigation consideration

In a previous URS report 2006 that was performed across the majority of this site and to the west of the site. The investigation excavated 10 test pits within the foot print of the current site; refer to table 5-1. Of the samples collected from this site 2 samples were sent for geotechnical testing; refer to table 5-2.

Table 5-1 URS 2006 Soil depths

Location Test Pit No.	Depth (m) from Existing Ground Level to Shale/ Sandstone	Bedrock
01	0.8	Shale
02	1.0	Shale
03	1.0	Shale
04	1.3	Shale
05	>2.2	Not identified
06	0.8	Shale
07	2.2	Shale
08	1.4	Sandstone
09	1.7	Shale
20	1.3	shale

Table 5-2 URS 2006 relevant testing

Sample Details (Testpit – Depth)	Liquid Limit (%)	Plasticity Limit (%)	Linear Shrinkage (%)	Shrink-Swell Index	Maximum Dry Density (t/m ³)	Optimum Moisture Content (%)	Emersion Class No.
TP01-0.5m	47	24	14	1.3	1.70	19.5	6
TP05-1.0m	42	22	18	1.6	1.77	17.5	5

5.2 Geotechnical Assessment

Emerson testing of the soil samples classified them as Class 5 and 6, suggesting that the soils tested slake, and in shaken suspension, will disperse (Class 5) or flocculate (Class 6). As soils on construction sites may be disturbed while wet, there is the possibility that the soil will be dispersive. This dispersion and propensity to erosion through surface water run-off can be observed through the surface scour observed on site.

The predominantly clayey soils indicate low infiltration rates. The perched water in the quarry also indicates the mudstone bedrock also has a low infiltration rate.

5 Geotechnical Assessment of the Site

A preliminary slope risk assessment was carried out based on observations in the field and known historical data. In general, gentle slopes are found in the area except in the area in the vicinity of the northern creeks and the highland with the associated quarry. Based on the observations made on site and available data from previous investigations, soils found in the area are firm to stiff sandy or silty clay materials, with low permeability and medium to highly plastic overlying the extremely weathered rock. Bedrock depth is between 0.8 m and >2.2 m. There was no evidence for significant slope instability within the gently sloping areas. All the above information indicates the risk of slope instability in the gently sloping areas is “low”.

A cursory inspection of the steeper slopes adjacent to the creeks and the hill with the associated quarry suggests that these slopes have performed adequately. There is evidence of that the steep slopes and northern creek areas have experienced past instability in the form of slope creep movement and slumping. There is also evidence that the quarry faces have had minor block fall and are prone to weathering. The risk of slope instability in the northern creeks and the steep slopes of the highland area with the associated quarry is considered to be “moderate”.

Discussion

The preliminary environmental and historical reviews have not identified anything considered unusual with respect to the current and historic land use. Low levels of contamination associated with livestock can be expected but no records or anecdotal evidence of burial or dips on site exist to warrant special consideration. The previous URS 2006 report comments on a single instance of an asbestos cement pipe, but this again, is not considered unexpected on a site that has been worked since at least 1947. No asbestos was observed during this site inspection.

There is no reason to expect pasture improvement or agricultural activities have compromised the Site for residential land use. There is minimal likelihood of significant chemical contamination of the Site likely to compromise development for residential land use.

Environmental impacts from migration of onsite contaminants and future development of the site to adjacent receptors should be able to be adequately controlled by the use of surface drainage.

The preliminary geotechnical assessment indicates that there are no significant geohazard constraints to development of the site in the gently sloping areas. It is understood that the primary areas of development do not include the steeply sloping areas, quarry or the creeks. If development is considered in these areas, additional geotechnical and slope risk management considerations will be necessary.

It is recommended that the shallow bedrock be used as a founding medium. Where the existing soils are used as a founding layer or as an engineered fill this material should be well compacted. The soils are cohesive and potentially have low bearing strength when wet. Compaction will increase the bearing strength of the founding soil. The site should be graded and site drains should be designed to prevent ponding or channelling of water across the soil horizons.

As the soil is expansive and sensitive to moisture changes, it is recommended the soils be compacted at optimum moisture content to reduce the tendency of Blacktown soils to swell. Excessive pre-wetting of soils prior to construction may result in potentially damaging swelling taking place. Swelling potential might also be managed by chemical stabilisation, such as adding lime or gypsum, or the use of moisture barriers and waterproof membranes to keep moisture constant in the soil. Foundation systems to overcome swelling potential are discussed in AS 2870 – 1996 - Residential Slabs and Footings Construction.

Disturbance of dams, ponds and channels in the area may result in moisture condition changes. This condition needs special attention when designing footings because these factors may result in damage to the foundation of buildings.

Based on the observations made, URS considers the site is generally acceptable for residential land use, however conducting a Phase 2 investigation would lessen the uncertainty inherent to desktop assessments, and reduce the risk of unexpected findings during development. As the development application is progressed further, targeted geotechnical and environmental testing may be considered to support detailed design.

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Mt. Gilead Pty Ltd and S&A Dzwonnik.

Except as required by law, no third party may use or rely on, this Report unless otherwise agreed by URS in writing. Where such agreement is provided, URS will provide a letter of reliance to the agreed third party in the form required by URS.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this Report.

It is prepared in accordance with the scope of work and for the purpose outlined in the contract dated 3rd of July 2013.

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This Report was prepared between 25th of June and the 30th of August 2013 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

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It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.

References

Hazelton PA and Tille PJ (1990), *Soil Landscapes of the Wollongong-Port Hacking 1:100,000 Sheet 9029-9129*, Soil Conservation Service of NSW.

Hazelton PA and Tille PJ (1990), *Wollongong-Port Hacking 1:100,000 Geological Sheet 9029-9129*, 1st edition 1990

URS (2006), *Soils, Geology and Topography Assessment, Mt Gilead, via Campbelltown, NSW*.

Campbelltown (Sustainable City) Development Control Plan.

Hazelton PA and Murphy BW (2007), *Interpretation of Soil test results*. Department of Natural Resources

SAI Global Property Division Pty Ltd (2013)

AS 2870 (1996), *Residential Slabs and Footings Construction*

Appendix A Figures



Map compiled using MapInfo StreetPro Data. © 2010 MapInfo Australia Pty Ltd, URS Australia and PSMA Australia Ltd. URS Australia, MapInfo Australia or PSMA Australia do not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that these companies shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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Source: XXXXXXXX

Mt Gilead Pty Ltd
& S & A Dzwonnik

Phase 1 Environmental and Geotechnical Site Assessment

Draft
Site Location

URS

Mount Gilead, Appin Road Menangle NSW

File No: 43168007.003.wor

Drawn: STB

Approved: NW

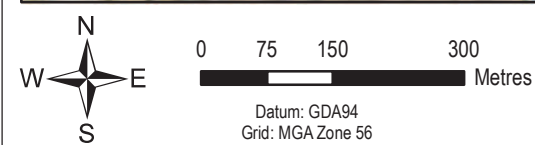
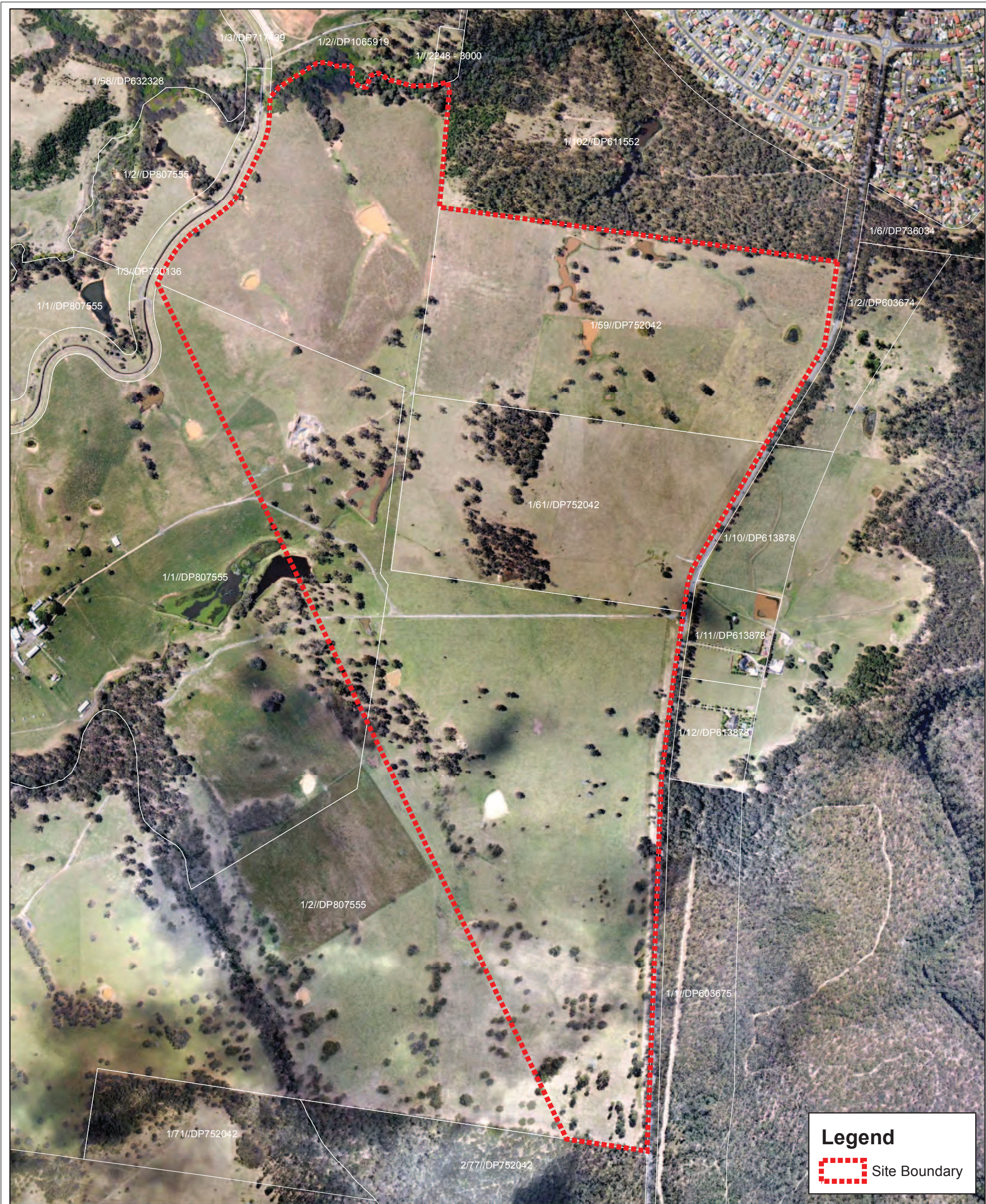
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Figure: 1.1

Rev. A

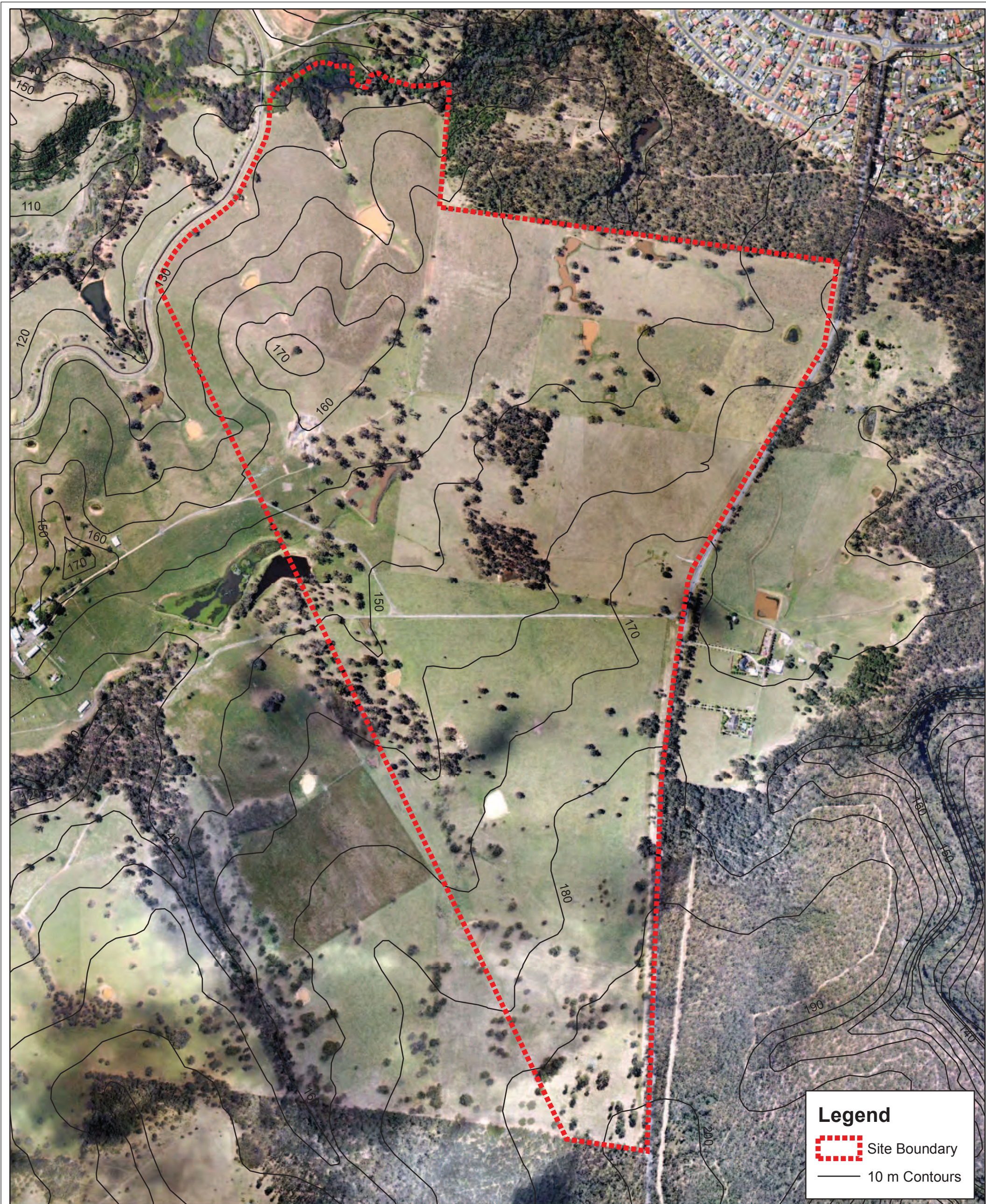
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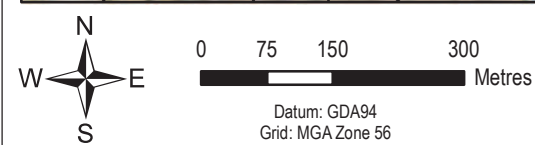


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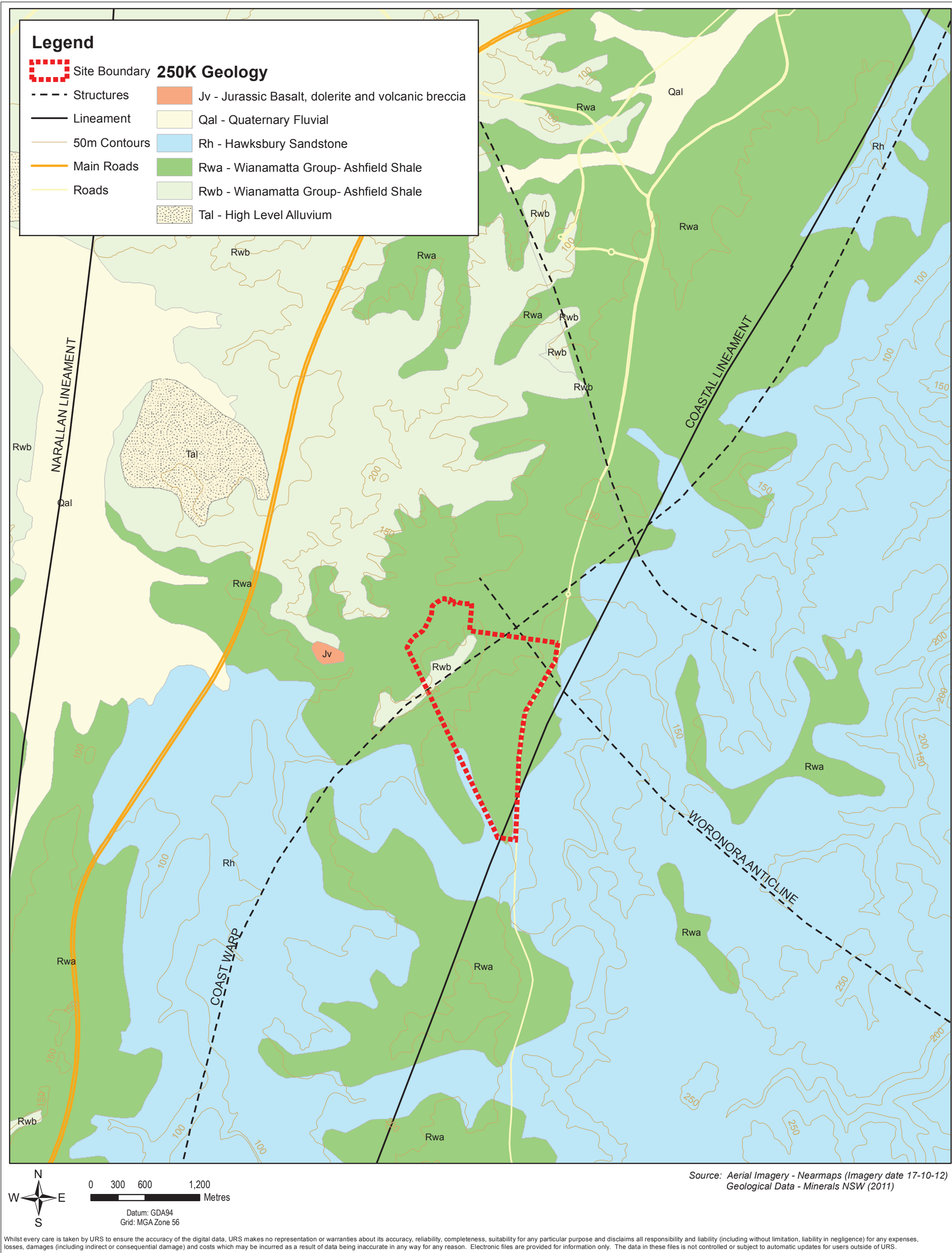
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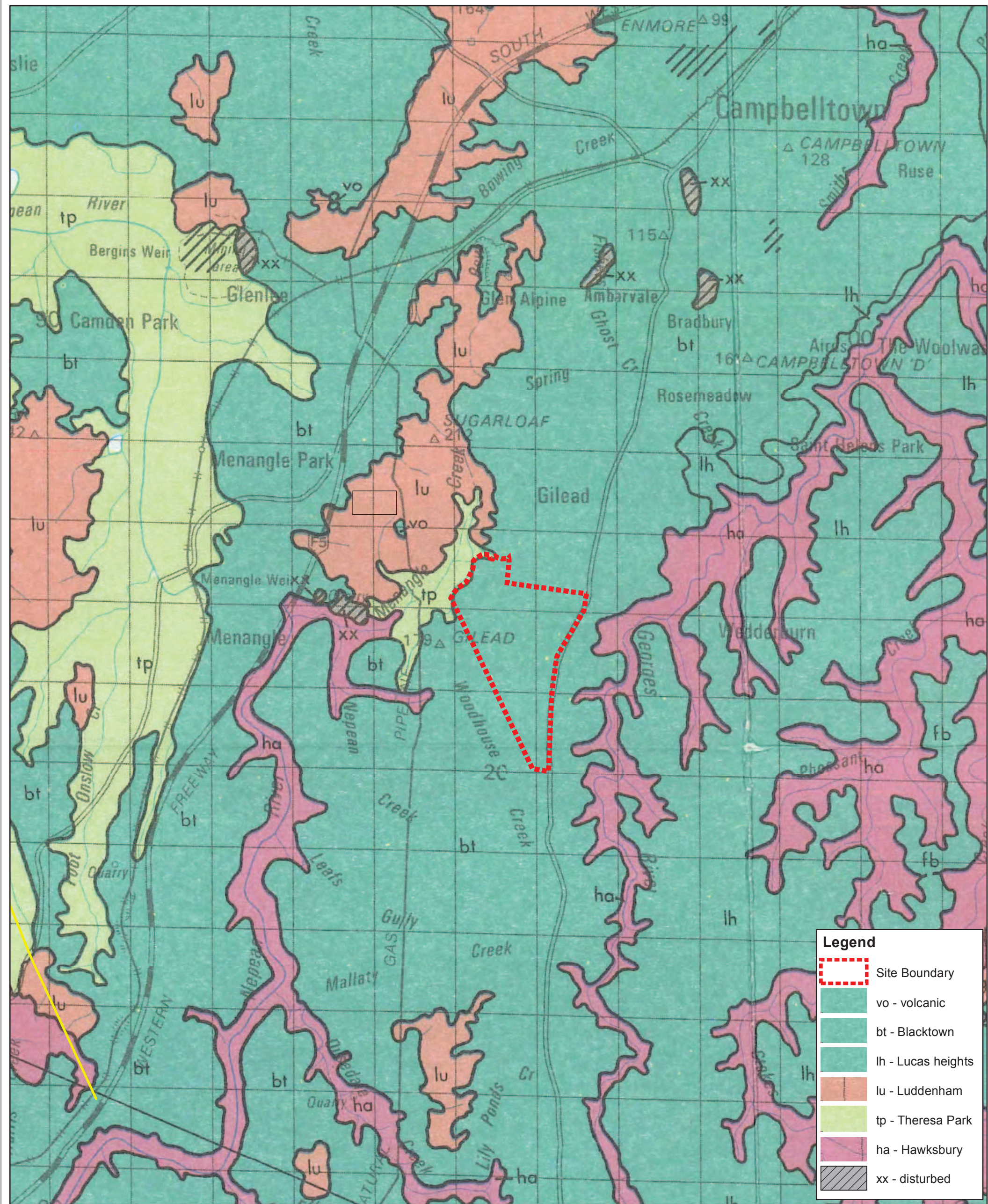


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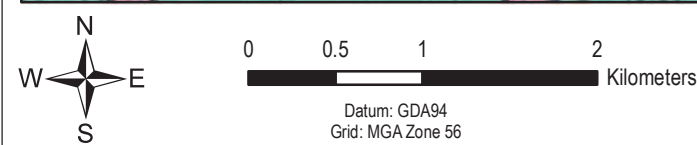
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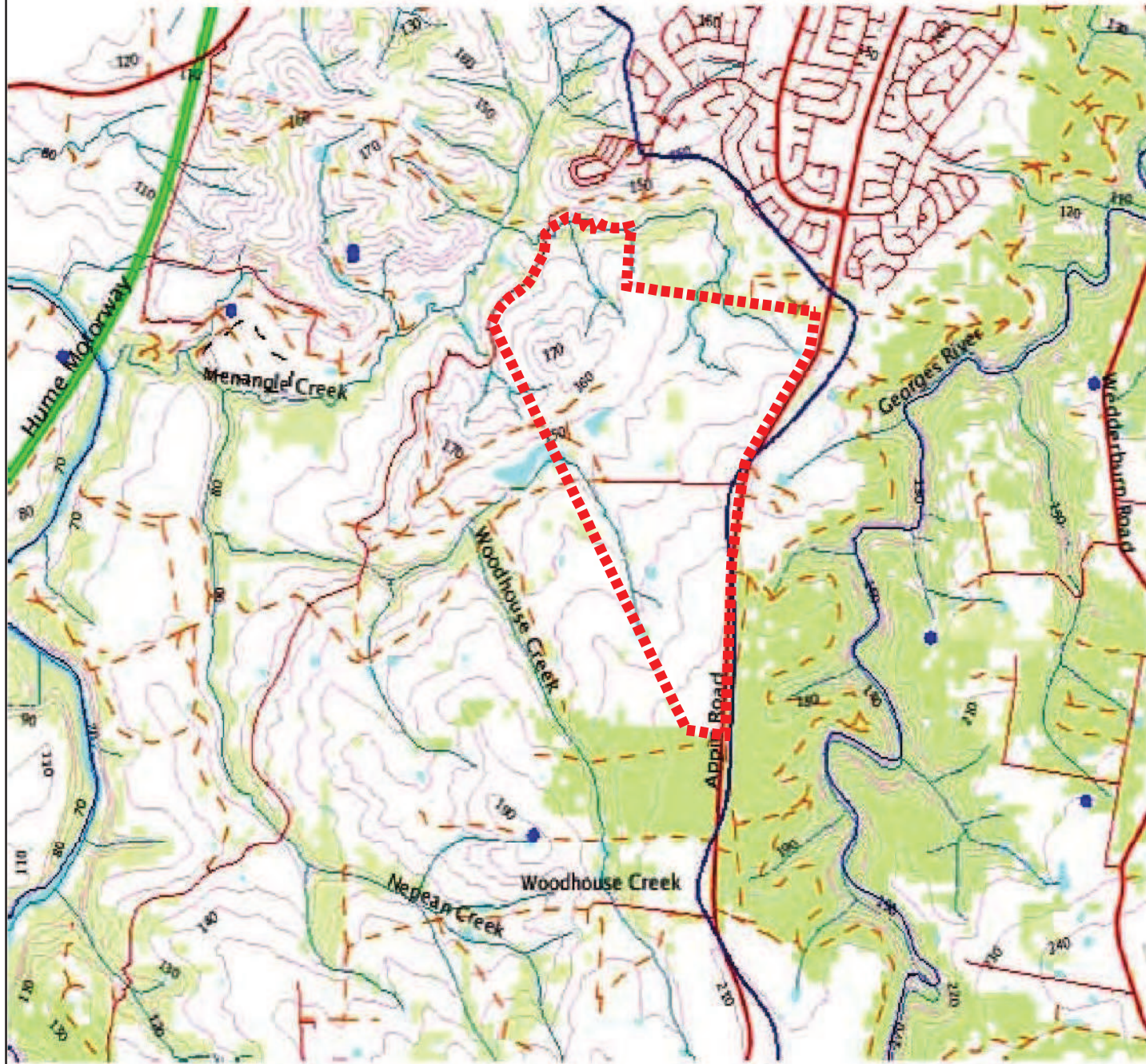
Legend

- Site Boundary
- vo - volcanic
- bt - Blacktown
- lh - Lucas heights
- lu - Luddenham
- tp - Theresa Park
- ha - Hawksbury
- xx - disturbed



Source: Soils Map - Wollongong-Port_Hacking_100K_Soil_Landscape_9029-9129_1st_edition_1985

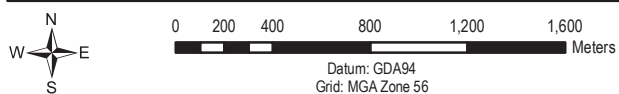
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Source: Map created with NSW Natural Resource Atlas - <http://nratlas.nsw.gov.au>, Friday, June 07, 2013.

Legend

- - - Site Boundary
- Groundwater Bores
- Major Rivers
- Primary/arterial road
- Motorway/freeway
- Contour



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Appendix B Historical Aerial Photographs

1947



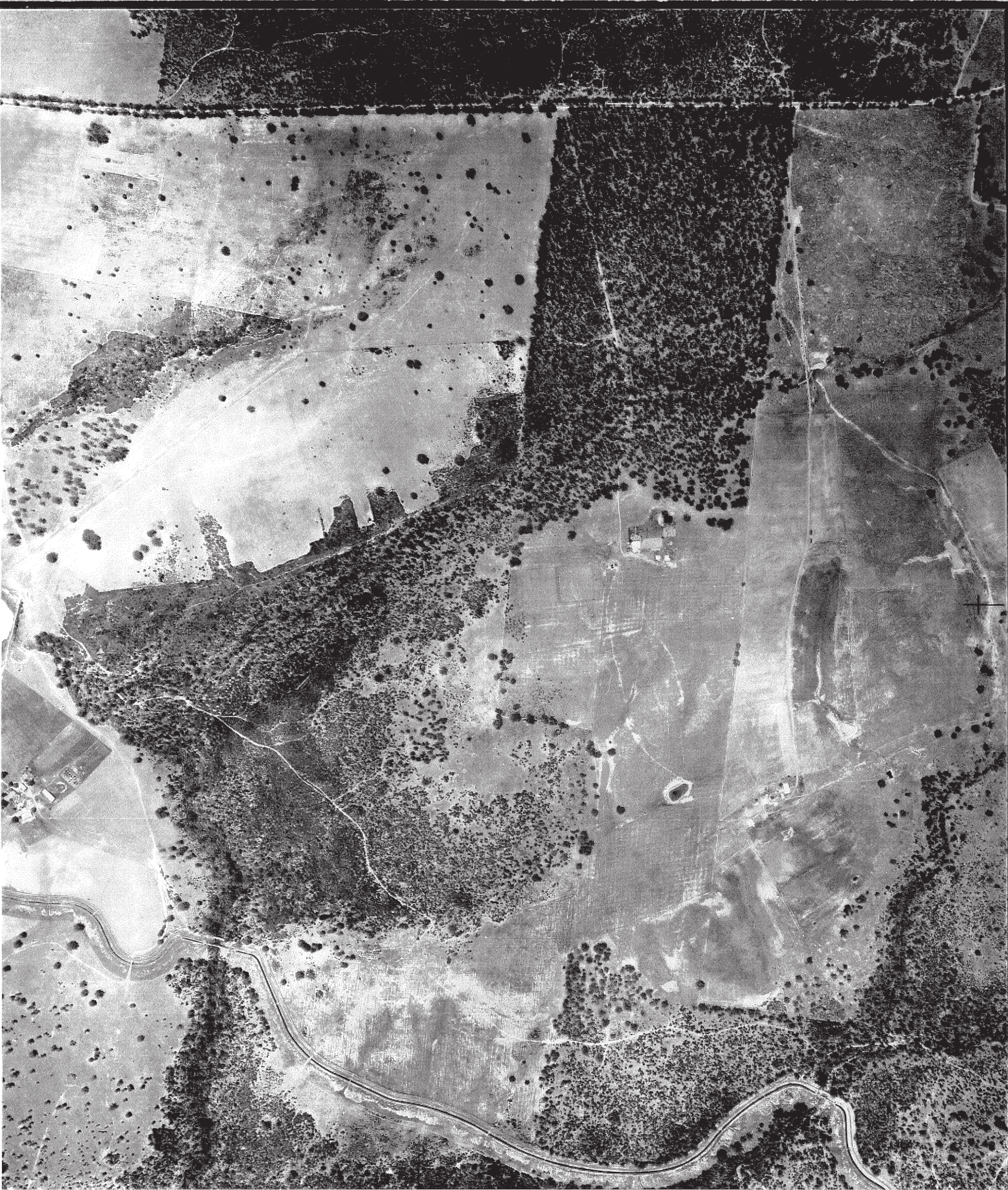
1947



1947

53-40

CAMDEN RUN 12 JAN 47 12" LENS 12200' LANDSPHOTO



1956



1956



MS 6-24-56
5026

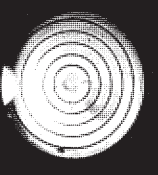
COUNTY



COUNCIL



COPYRIGHT



CAMDEN

RUN 37

78.56 115.00 MM

6400' ↑

1961



NSW
1045