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6 November 2009

Southern Cemetery
Tuggeranong

ACT Cemeteries Authority

Site Assessment and Selection

Prepared by:
Purdon Associates Pty Ltd
3/9 McKay Street
Turner ACT 2612
ABN 20 008 610 080

Tel: 02 6257 1511
Fax: 02 6248 8347
Email: purdons@purdon.com.au
Web: www.purdon.com.au

In association with
David Hogg Pty Ltd

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1. INTRODUCTION

1.1 Background

The ACT Public Cemeteries Authority (Authority) has identified the need for a new cemetery to meet the future needs of the ACT and especially people living in the southern areas of the city.

The Authority has been developing a proposal for a southern cemetery for a number of years and has identified land in Tuggeranong, to the south of Mugga Lane and west of the Monaro Highway, as a suitable location. This area is close to Woden, Weston Creek, Tuggeranong and South Canberra as well as to main transport routes.

The overall study area has an area of approximately 325 hectares (ha). An area of 40-50ha is required for the Authority to meet future needs of the ACT in this locality.

There are currently three cemeteries in the ACT: one in Gungahlin, one in Woden, and a small cemetery in Hall. The Woden cemetery, which is currently the only southern facility, is predicted to reach capacity in approximately ten years. There is also a private crematorium in Mitchell.

Cemeteries in the ACT offer the community a range of options. These include:

- Conventional headstone burials
- Lawn burials
- Garden burials (family estates
- Mausoleum (above ground crypts)
- Memorials for cremated remains.

While there is a strong need for the services that cemeteries in the ACT have traditionally offered, there is also growing interest in alternative services such as natural burial.

Many modern-day cemeteries, nationally and internationally, also include crematoria services. There are approximately 90 crematoria in Australia, one for every 245,000 population, but only one in the ACT.

The full range of burial and crematorium services are to be considered as part of the development of a new southern cemetery for the ACT.

The Authority has previously considered a number of potential locations for a southern cemetery including:

- North Tuggeranong - corner of Monaro Highway and Isabella Drive
- North Tuggeranong - southern side of the intersection of Mugga Lane and Long Gully Road
- South-east Woden – opposite the existing Mugga quarry
- South Tuggeranong – between the Tuggeranong Town Centre and the Murrumbidgee River.

The area located near Mugga Lane and Long Gully Road has been identified by the Authority as the most suitable to proceed with further evaluation.

1.2 Purpose

The purpose of this report is to outline the key environmental attributes, planning provisions and opportunities and constraints applying to the study area to determine the most suitable site within the study area for establishment of a cemetery.

The selection of a site of 40-50ha within the overall study area will enable concept site planning and further detailed assessment to occur.

1.3 Location

The study area is located to the north-east of Tuggeranong and south-east of Woden as shown in Figure 1.

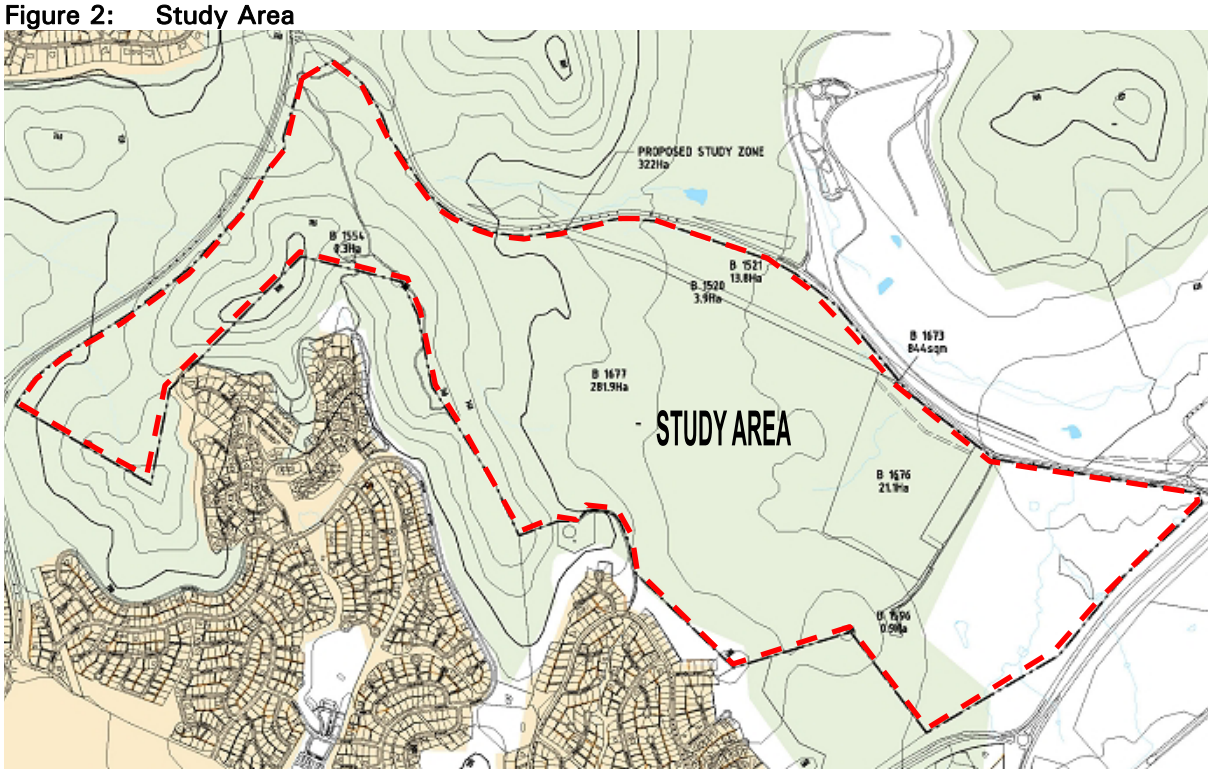
The study area is a large parcel of 325ha fronting Mugga Lane, Monaro Highway, Long Gully Road and Erindale Drive. The study area is west of the Hume industrial estate and north of the residential suburbs of Macarthur, Gilmore and Fadden. It is east of Wanniassa and Farrer and south of Isaacs and the Mugga Lane Resource Management Centre.

Figure 2 further illustrates the Study Area.

Figure 1: Locality

Source: ACTMAPi

Figure 2: Study Area



Source – Actmapi

1.4 Public Consultation

The Authority commissioned a program of community consultation on the proposed southern cemetery over a period of nine weeks, from 30 March to 29 May 2009. The consultations included a community survey (conducted via a telephone survey of 1,000 ACT residents plus numerous stakeholder and community meetings), plus displays at public libraries, advertisements in the media and information on-line on TAMS website.

The consultations included information on all location options (as discussed in Section 1.1 above, and was based on the site located near Mugga Lane and Long Gully Road as being the preferred siting option.

The four potential cemetery locations plus the preferred location are shown in Figure 3

The details of the consultation are provided in the *ACT Cemeteries Authority Consultation Report 27 August 2009* (refer Attachment A).

The following are extracts of the key outcomes from the consultation process identified in the Consultation report:

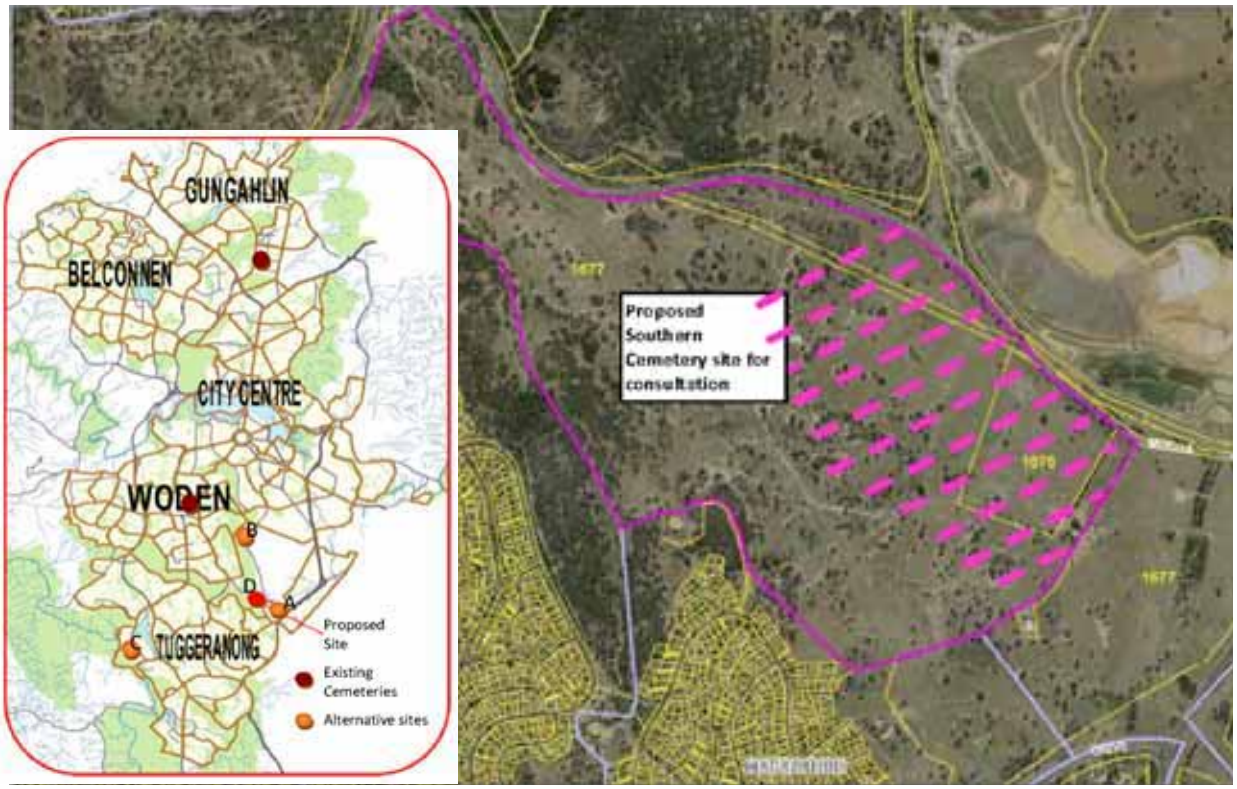
- *The majority of people consulted were supportive of the need for a cemetery in south Canberra but there is a need to present further data to confirm the demand for a new development.*
- *The types of burial services that would be offered at a new cemetery raised considerable interest, especially from particular community groups.*
- *An increasing interest in natural burials, as is evident in other parts of Australia and internationally.*
- *The community expressed a preference for a comprehensive service to be offered at a new cemetery. This means that cremation services would be considered as part of a new development. However, issues to do with environmental impact will need to be*

further explored and communicated. The co-location of a crematorium on the same site as a new cemetery development was a contentious issue for some community groups. Further, the demand for cremation services in this market requires further examination, including the impact on the existing privately owned crematorium.

- *There was a wide variety of views expressed about the site that has been identified as the preferred location. In particular, people living close to the identified site have requested more detailed information on the impact of the development on residents, the environment, the existing natural wildlife corridor, the horses currently under agistment on the site and also the impact of being in close proximity to the Mugga Lane Resource Management Centre.*
- *The preferred site will have to be subjected to detailed assessment for Aboriginal sites*
- *More detailed information was requested on the other sites that have been considered and the siting assessment process. During the consultations, the community took the opportunity to make suggestions as to other areas in Canberra that could be considered for a southern cemetery*.

In response to the outcomes from the consultations, this report considers the whole of the area shown in Figure 3 plus the area shown as Site A. These two localities are referred to as the "study area" for the purposes of this report.

Figure 3: ACT Cemeteries Authority – Southern Cemetery Preferred Location



Source: ACT Cemeteries Authority (Consultation Report August 2009)

2. CEMETERY DEVELOPMENT REQUIREMENTS

A number of selection criteria have been identified by both ACT Cemeteries Authority and the consultant team to assist with the evaluation of sites.

2.1 Site Selection Criteria

There are several key assessment criteria relevant to locating a suitable site for a potential new cemetery for the ACT including:

- Minimum site of 40 hectares
- Consistency with relevant legislation
- Suitable land zoning under the Territory Plan
- consistent with (and/or separation from) surrounding land uses
- Flat-gently undulating site
- Outside 100 year flood zone
- Low water tables (ideally minimum three metres)
- Able to withstand rigorous mass soil movement
- Consistent subsoil not containing large areas of rock
- Proximity to main roads
- Access to public transport
- Able to accommodate separate or large exit/entrance
- Large traffic capacity/access to accommodate large cortege
- Access to services (water, electricity and gas)
- Capacity to accommodate Buffer zones within site layout (e.g. minimum 20 metre buffer around burial areas)
- No contamination
- No heritage and/or cultural adverse implications
- No ecological adverse implications.

3. SITE ASSESSMENT – STATUTORY PLANNING

3.1 National Capital Plan

The National Capital Plan General Policy Plan identifies the study area as being within 2 Land Use Policy areas:

- Broadacre Areas and
- Hills Ridges and Buffer areas.

The extent of this land is shown on Figure 4.

Part of the study area is also classified as Designated Land. (Refer Figure 6).

In relation to Broadacre areas the relevant planning policies include building, site and landscape development to be sympathetic to and not be discordant with the landscape setting of the National Capital. Broadacre Areas act as buffers between towns, provide sites for uses which require large land areas or may benefit from or best be located within a non-urban setting, and provide a landbank for future urban uses.

A cemetery is defined as a "Public Utility – Municipal Service" under the National Capital Plan. Development for a cemetery within the part of the study area under the Broadacre Land Use Policy would be consistent with the NCP planning policies.

The remaining parts of the study area are within the Hills, Ridges and Buffer Spaces within the National Capital Open Space system. The principles for this land use area aim to retain these areas as substantially undeveloped in order to protect the symbolic role and landscape character of the hills as the scenic backdrop to the Parliamentary Zone and other areas.

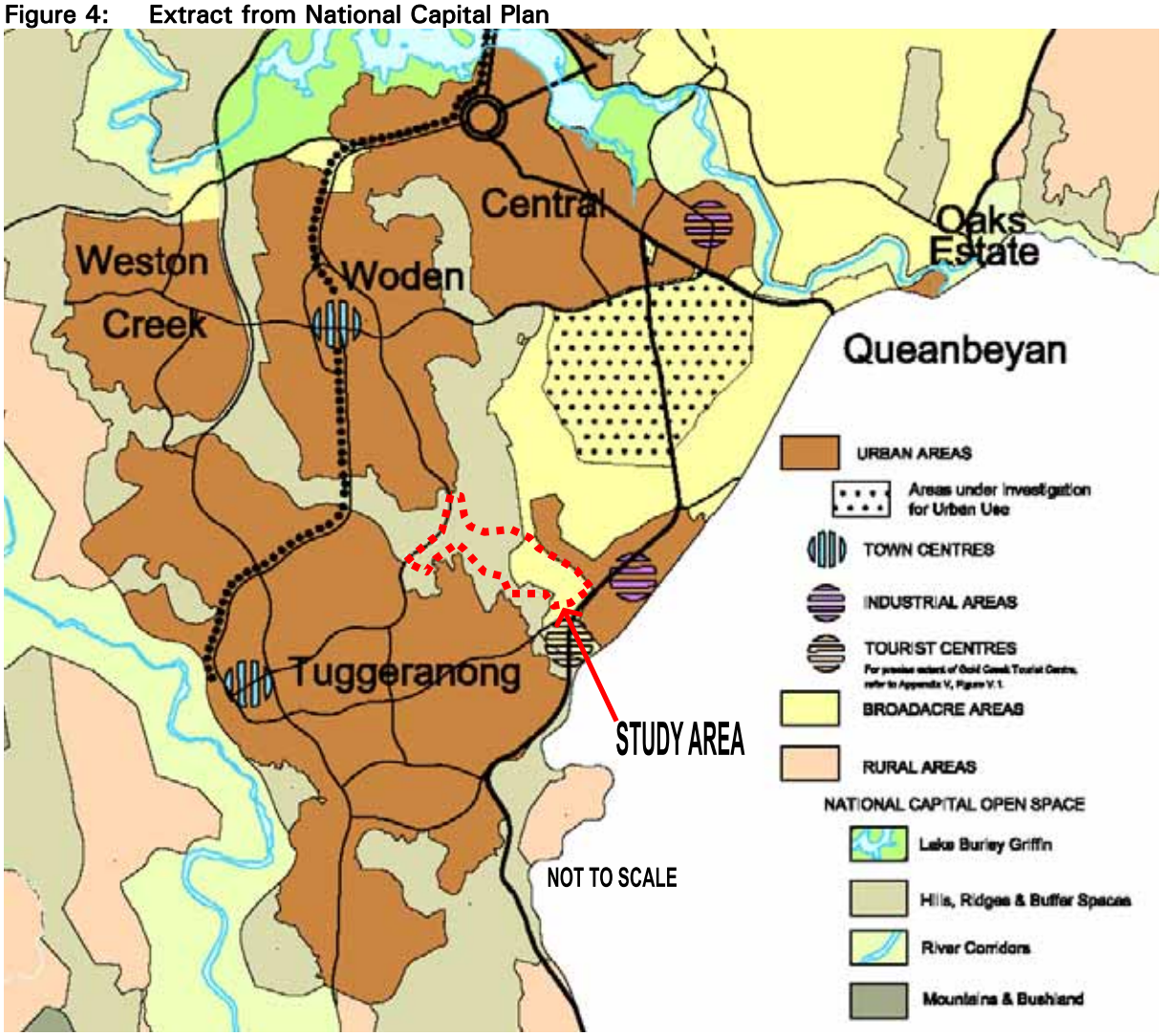
Although various categories of land use are permitted in the Hills Ridges and Buffer area, none of these would permit a cemetery to be developed in this area.

Under the National Capital Plan, Special Requirements apply on all land (not including Designated Areas) which fronts Approach Routes as defined in the National Capital Plan and is not more than 200 metres from their centre line. Part of the study area fronts Monaro Highway which is a defined Approach Route. Any proposed development must conform to a Development Control Plan (DCP) agreed to by the National Capital Authority which seeks to enhance the surrounding predominantly rural character and landscape outside the urban areas. If this part of the study area was chosen, a DCP would be required by NCA prior to development.

It is noted there is DCP over the Mugga Lane Resource Management area (DCP No. 171/09/0001 – Hume West Industrial Area Part Section 23, Sections 25, 26 and 27 Hume) which, in part, requires screen planting along Mugga Lane and within the Mugga Lane recycling facility to enhance screening from the Monaro Highway.

The ACT Government has also requested the National Capital Authority prepare a Draft DCP for Blocks 2 & 3 Section 8 and Block 7 Section 21 Hume to facilitate future industrial development (these sites are to the east of the study area adjacent to the Monaro Highway). Accordingly, the National Capital Authority proposes to introduce Draft DCP No. 171/09/0002 and it is currently being considered.

Figure 4: Extract from National Capital Plan



Source: National Capital Authority

3.2 Spatial Plan

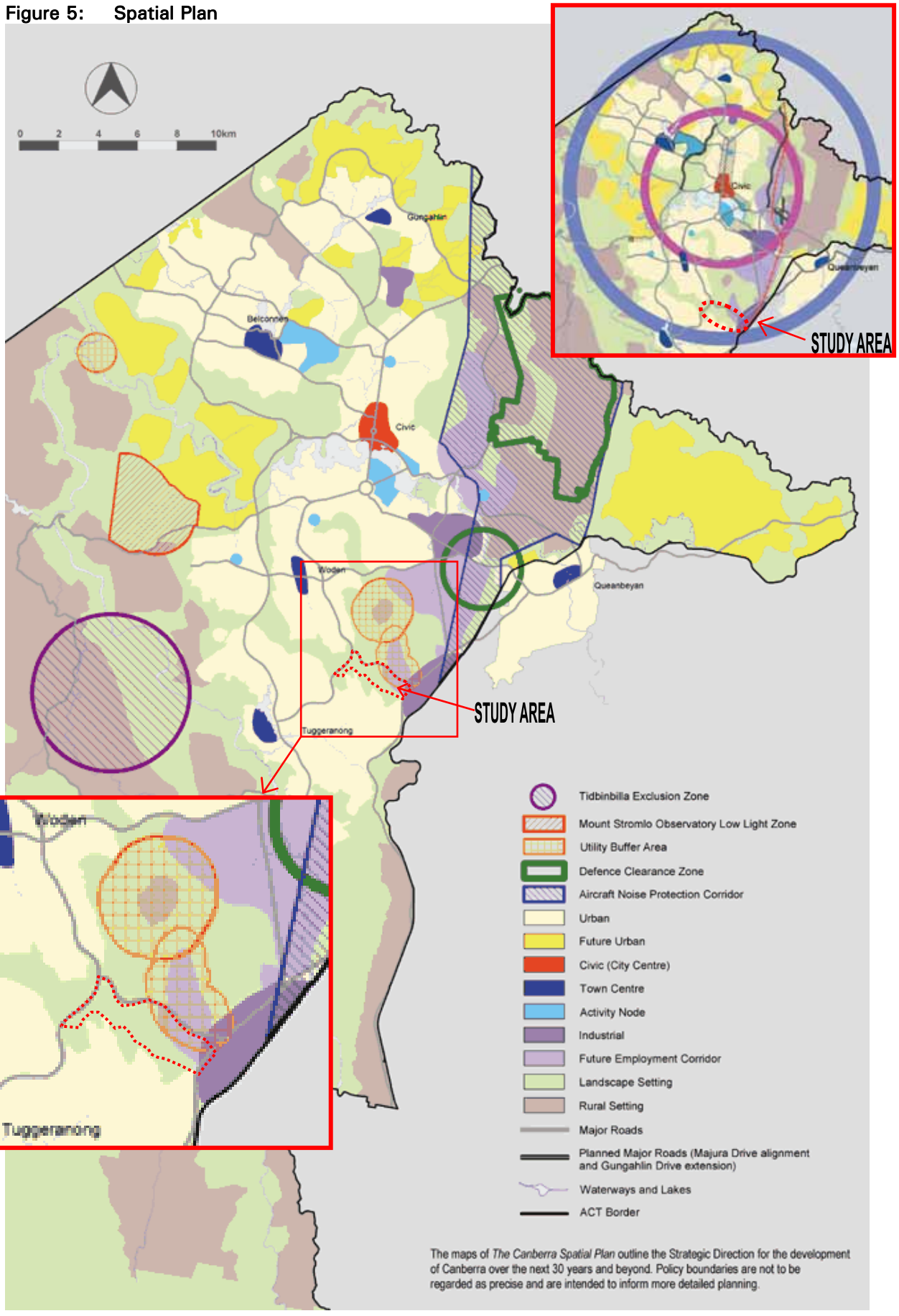
The Canberra Spatial Plan (2004) outlines a strategic direction for growth. (Refer Figure 5). The Plan identifies a north-south employment corridor on the eastern side of the city that extends from the Majura Valley through Symonston and the Jerrabomberra Valley.

This corridor is identified for growth of industrial, broadacre commercial, tourism, recreation and transport related activities over the medium to longer term.

The Spatial Plan illustrates part of the study area within the "Future Employment Corridor" area with a "Utility Buffer Area" overlay. The intention of this is to ensure safety to the public and minimise health and amenity impacts from utilities required as part of the urban infrastructure and utility buffer areas have been included.

The Plan identifies the need to undertake further investigations to identify potential land for industrial and related employment purposes in the corridor. The ACT Planning and Land Authority (ACTPLA) is currently undertaking an Eastern Broadacre Planning Study which includes part of the study area (in the south-eastern corner of the study area). The aim of the study is to look at ways to create an employment corridor as an identified action in the Spatial Plan.

Figure 5: Spatial Plan



3.3 Territory Plan

Only part of the study area is subject to the provisions of the Territory Plan. This involves the eastern part of the site (refer Figure 6) which is within a Non-Urban NUZ1 Broadacre Zone. The western part of the site is Designated Land and subject to the National Capital Plan (refer Section3.1)

The objectives of the Broadacre zone are to:

a) *Make provision in a predominantly rural landscape setting for a range of uses which require larger sites and/or a location outside urban areas*

b) *Make provision for activities requiring clearance zones or protection from conflicting development*

c) *Ensure that development does not adversely impact or visually intrude on the landscape and environmental quality of the locality*

d) *Ensure, where appropriate, that development and the use of land does not undermine the future use of land which may be required for urban and other purposes.*

The Territory Plan defines a cemetery as "*the use of land for the interment or the cremation of the dead including any funeral parlour or chapel erected on such land and used in connection with the cemetery*".

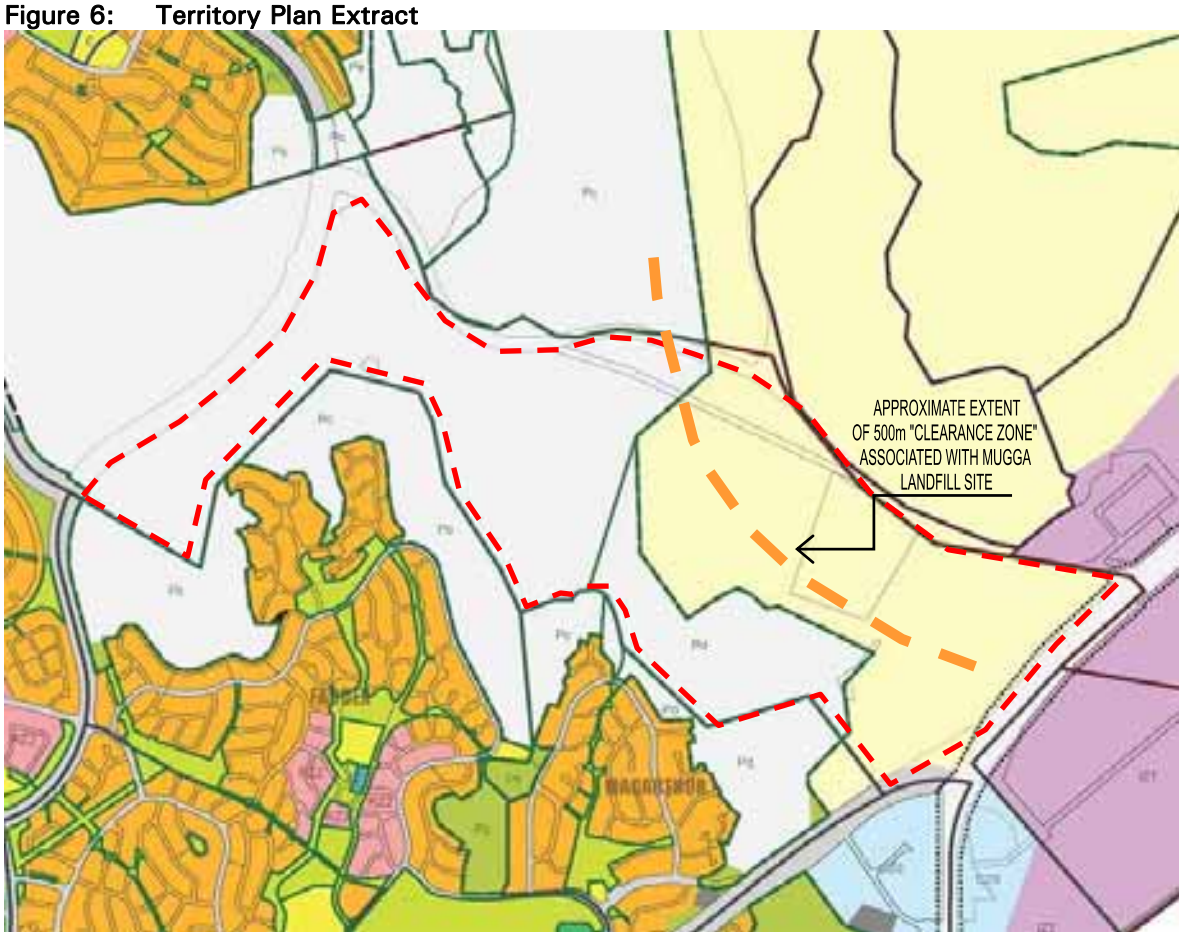
A cemetery is a permissible use in the Broadacre Zone. The Territory Plan defines a crematorium as a cemetery and therefore the planning provisions that apply to a cemetery also apply to a crematorium.

The minimum assessment track for development applications would be the Merit Track. However, there are a number of 'triggers' which could cause the development to be considered under the Impact Track, involving the need to prepare an Environmental Impact Statement (EIS). These triggers include:

- the Minister for Planning could declare the development to be assessable under the provisions of Section 123 of the Planning and Development Act 2007
- the Minister for Health may declare the need for an EIS under the Public Health Act
- if the proposal encroaches into the areas reserved either as a special purpose reserve or other reserve
- the clearing of more than 0.5ha of native vegetation

There is also a "pd" Overlay provision on the Territory Plan map over part of Block 1677 Tuggeranong. This overlay indicates this area is a special purpose reserve in which any proposed development would require the approval from the ACT Conservator for Flora and Fauna. Even if this area was excluded from the final site selected, confirmation would be required from the Conservator that this reserve would not be affected by any proposed cemetery use.

Figure 6: Territory Plan Extract



Legend:

- Designated Areas
- Residential - RZ1 – Suburban
- Industrial - IZ1 - General Industrial
- Industrial - IZ2 - Industrial Mixed Use
- Non Urban - NUZ1 - Broadacre
- Study Area
- Overlay – Pd Special Purpose Reserve
- Overlay – Pc Nature Reserve Overlay
- ..... DCP Required

3.4 Planning Controls and Assessment

Part 12 "Overlays" of the Territory Plan sets out requirements for specific uses, such as Mugga Lane Land Fill and establishes "Clearance Zone" Policies. This clearance zone potentially affects the subject site in that no new residential or community use will be permitted within 500m of the boundaries of this area (refer Figure 6). This is due to the intent to restrict the environmental impact of the existing Mugga Lane, such as the spread of odours and wind blown particles, conflicting with more sensitive land uses.

The Territory Plan includes a range of definitions for various land uses and many of these are grouped to create an "umbrella" term (e.g. Community Use includes Child Care; Educational Use; Health Facility and the like).

A Cemetery is specifically defined as the *use of land for the interment or the cremation of the dead including any funeral parlour or chapel erected on such land and used in connection with the cemetery*. The definition is not grouped with the Community Use umbrella term under the Territory Plan and therefore is not defined as a Community Use. On this basis, the Clearance Zone restriction does not apply. Notwithstanding this, a cemetery could be affected by odours and wind blown particles in the same manner as community uses. Even though the Clearance zone, technically does not apply, the

principles would still be relevant in considering the potential impacts at detailed design stage.

The Territory Plan also outlines the development provisions applying to the site and for the subject site. These are set out in the *Non-Urban Zones Development Code*. This Code outlines the relevant planning, design and environmental controls that apply to development.

In addition several General Codes apply to the site including the *Parking and Vehicular Access General Code*, the *Access and Mobility General Code* and the *Planning for Bushfire Risk Mitigation Code*. Relevant matters raised in these Codes must be addressed as part of a Development Application to be submitted to the ACTPLA for determination for formal use of the site as a cemetery.

3.4.1 Merit Track

Any future development of the site would require development approval from ACTPLA. As outlined in Section 3.3 above, the proposed cemetery is likely to be assessed in the Merit Track.

The Territory Plan states that development proposals in the merit track have the option to comply with the rules or criteria, unless the rule is mandatory. Where it is proposed to meet the criteria, the onus is on the applicant to demonstrate, by supporting plans and written documentation, that the proposed development satisfies the criteria and therefore the intent of the element.

Under the Merit Track, development applications have to be publicly notified and are subject to third party appeal unless 'called-in' by the Minister. The Planning and Development Act requires that several matters be taken into account including:

- the zone objectives
- the suitability of the land for the proposed use
- representations received during the public notification period
- the probable impact of the development, including the nature, extent and significance of probable environmental impacts
- a plan of management where the land is public land.

These matters would have to be addressed in preparing a development application.

Development Code Provisions

The Codes under the Territory Plan are divided into three parts: Zone specific controls, general development controls and site specific controls. There are no site specific controls that apply to the proposed site and therefore this part of the Code is not considered further.

The two remaining parts of the Code are divided into elements that describe the matters that have to be considered as part of a development application. The elements are restrictions on use, building and site controls, built form, parking and site access, amenity, environment and services.

The main provisions that would apply to the proposed site include:

- any development application would have to be accompanied by an Assessment of Environmental Effects that addressed a range of issues including traffic generation, impact on the amenity of the surrounding area, visual impact on the hills and buffer areas, impact on the existing rural character, impact on water supply and impact of

earthworks and/or rehabilitation works on soil stability and quality. ACTPLA could specify additional matters and/or additional matters, for example bushfire risk, would be identified during this site selection process.

- The Code prescribes a mandatory rule that subdivision is only permitted where it is part of a development application for another assessable development and/or it is demonstrated that any residual block can accommodate another assessable development designed in accordance with the relevant section of this Code. Therefore since only part of the study area is to be used for the cemetery, an application to subdivide the study area and realign the boundaries would have to be accompanied by a DA for a cemetery use. This issue is considered in more detail below.
- Many of the trees on the site will be defined as protected trees and if it is proposed to remove any of these any development application would have to be accompanied by a Tree Management Plan.
- There are no specific height or setback rules although buildings have to be essential for the permitted use and form part of an integrated development and also have to be compatible with the surrounding landscape.

Based on the review of the planning provisions of the Development Code the main issues to be addressed are the environmental effects of the proposal and the potential need to subdivide the site in advance of development proceeding on the selected site.

Views towards Queanbeyan from the central part of the study area

3.5 Commonwealth Legislation

3.5.1 ACT (Planning and Land Management) Act 1988.

The relevant Commonwealth Government legislation is the *Australian Capital Territory (Planning and Land Management) Act 1988*. This legislation would apply if development is proposed on Designated Land, in which a works approval application would need to be submitted to the National Capital Authority for determination for any works proposed on designated land.

3.5.2 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Commonwealth Government's main environmental legislation. It provides the framework to protect national and internationally significant flora, fauna, ecological communities and heritage sites and places and conserve Australian biodiversity.

Approval is required from the Commonwealth Minister for the Environment, Heritage and the Arts for a certain actions or action that could have a significant impact on the environment. A significant impact is an impact which is important, notable, or of consequence, having regard to its context or intensity.

It is likely a referral will be required as an area of endangered habitat (i.e. Yellow Box – Red Gum Grassy Woodland) is potentially affected. (refer Section 5.2 and Attachment B)

3.6 Previous Studies

3.6.1 Eastern Broadacre Planning Study

ACTPLA is currently investigating opportunities to create an "employment corridor" in the eastern area of the ACT (from Majura to Hume). Much of this area is currently zoned Broadacre under the Territory Plan and, as such, ACTPLA is undertaking an Eastern Broadacre Planning Study. The Eastern Broadacre study encompasses part of the study area for the cemetery site. ACTPLA intends to report the study to Government in the latter part of 2009 with community consultation to follow.

Several other technical studies and plans have been undertaken in recent years to inform the Eastern Broadacre study, such as the *Southern Broadacre Planning Study (2005)* and the *Hume Industrial Planning Study (2007).* ACTPLA have not publicly released the Southern Broadacre Planning Study. However a copy of the Hume Industrial Planning Study has been provided and a summary is provided below.

3.6.2 Hume Industrial Planning Study September 2007

ACTPLA commissioned GHD consultants to prepare the Hume Industrial Planning Study and a final report was prepared for ACTPLA in September 2007. The aim of the study was to provide a flexible industrial land use strategy for Hume and the surrounding area of the ACT. Part of the geographical study area is encompassed by part of the study area the subject of this report.

An outcome of the Hume study was to prepare three concept plans which show subdivision patterns and land uses for the area. Whilst not specifically focusing on a cemetery use, the three concept plans illustrate proposed locations for a potential cemetery site, including Option 3 which illustrates a proposed cemetery over part of the study area for this study brief. Key recommendations of the GHD brief were to continue liaisons with ACT NOWaste about their plans for the landfill, update flooding maps for the area, undertake appropriate traffic and infrastructure studies and undertake further geotechnical studies.

3.6.3 Environmental Impact Statement

Site specific investigations within part of the study area were undertaken, firstly as part of a "Preliminary Assessment" in June 2008 by CBRE for a proposed Data Centre and subsequently as part of an EIS by GHD in November 2008. These investigations focussed on only a small part of the study area being Block 1676 (formerly described as Block 1671).

The investigations included:

- Greenhouse Gas Assessment
- Flora and Fauna Reports
- Indigenous Heritage Reports
- Noise Reports
- Air Quality and Plume Rise Assessment
- Visual Assessment
- Traffic Reports
- Bushfire Assessment
- Contaminated Land Searches
- Geotechnical Report

In addition an Engineering Site Investigation was undertaken by Bill Guy & Partners for the LDA in 2007 for part of the former Block 1610 (later re-subdivided to be Block 1671 and then 1676)

3.6.4 Other Guidelines

The Australian Cemeteries and Crematoria Association Guidelines recommend that a crematorium be sited at least 200 metres away from residential uses.

Existing driveway, looking towards Long Gully Road, with landfill embankment behind

4. SITE ASSESSMENT – PHYSICAL ATTRIBUTES

This section describes the main 'physical' features of the study area.

4.1 Study Area / Land Tenure

The study area comprises the land shown in Table 1.

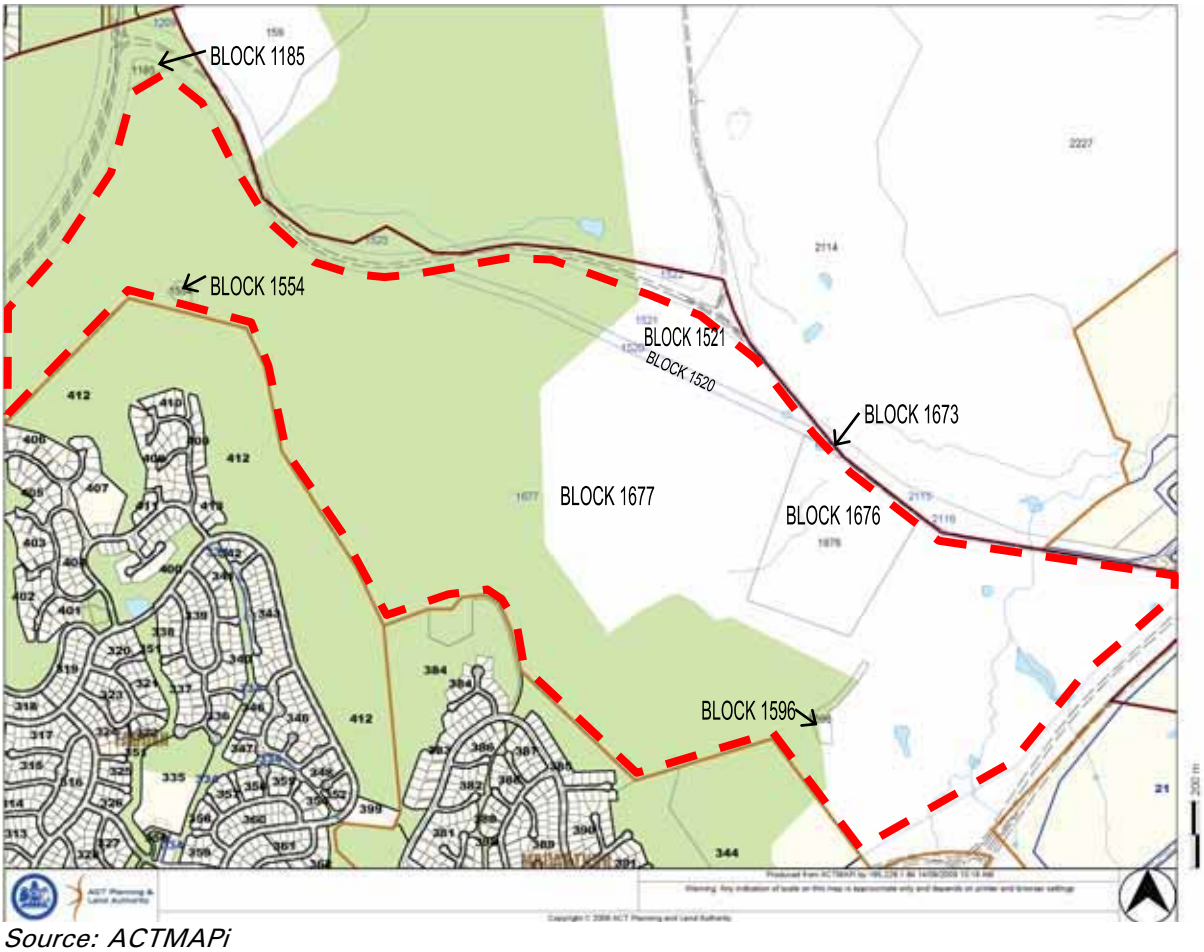
Table 1: Land Tenure with Study Area

Block	Area (m^2)	'Custodian'
1677	2,856,156 (285.6ha)	TAMS/Environment (Vacant Land)
1676	173,940 (17.4ha)	TAMS/Environment (Vacant Land)
1673	844 (0.08ha)	TAMS/Environment (Public Places)
1520	38,832 (3.8ha)	TAMS/Environment (Vacant Land)
1521	138,048 (13.0ha)	TAMS/Environment (Vacant Land)

The study area does not include the following:

- Block 1596 which is used as an ACT Health facility of 8,851m^2
- Block 1554 which is a water supply reservoir site of 3,528m^2
- Block 1185 which is a water supply reservoir site of 5,455m^2

Figure 7: Cadastral plan



Source: ACTMAPi

4.2 Land Use

The subject site is currently vacant unleased Territory Land. Specifically, the north-western part of Block 1677 comprises a nature reserve and the south-eastern part of Block 1677 is used for horse agistment purposes. Blocks 1676, 1673, 1520 and 1521 are also used for horse agistment.

The horse agistments are managed by the Department of Territory and Municipal Services (TaMS) and are held under a licence agreement by *Capital Weed Control P/L*.

There are no structures on the site apart from high voltage electricity lines traversing the block in an east-west and north-south direction and some horse-holding yards and dressage ring located near the main driveway off Mugga Lane.

Surrounding land uses include:

- Mugga Landfill (Resource Management Centre), including Methane plant and Materials Recycling estate to the north
- Canberra Nature Park to the west
- Suburbs of Macarthur and Fadden to the south
- Hume Industrial area to the east
- Rose Cottage tourist facility and Macarthur Horse Paddocks to the south-east
- Isaacs Ridge and pine forest to the north-east

Horse facilities (Dressage Ring) looking towards Mugga Landfill site

4.3 Topography and Drainage

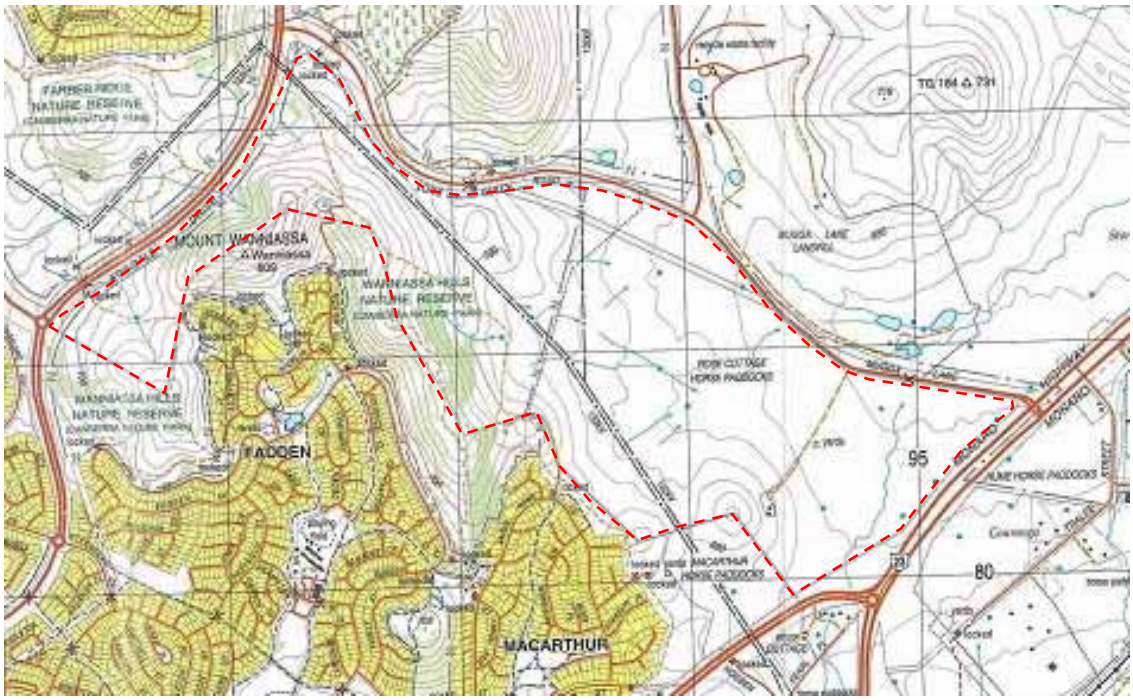
The eastern part of the study area is mostly gently undulating topography with surface slopes between about 1° and 2°. A small hill is present in the south-east part of the site, with slopes up to 15°. The western part of the study area is quite steep with slopes commonly exceeding 20%.

There are several small dams located on the site. A small creek runs through the area, running north towards Woden Creek.

In relation to flood levels, information from the GHD Draft Environmental Impact Statement November 2008 over the former Block 1671 Tuggeranong for the proposed Canberra Technology City proposal indicates that the site is at an elevation above the 1 in 100 year flood level event.

The site is above the flood level for both Jerrabomberra Creek and Dog Trap Creek (aka Woden Creek) which is approximately 250metres from the subject site. The GHD report further notes that while not documented, localised flooding on Block 1676 Tuggeranong had occurred in 2006 as a result of a large hail storm event which blocked drainage lines and caused water to flood the low points of the site.

Figure 8: Topography, Drainage and Land Use



Source: 1:25,000 Topographic Map – NSM Land & Property Information

4.4 Soils & Geotechnical Conditions

ACT Geotechnical Engineers carried out a preliminary geotechnical investigation in 2005 in the locality on the NW side of the Monaro Highway, between Mugga Lane and Isabella Drive (previously described as Block 1610).

The 2005 study referenced the 1:50,000 *Canberra, Queanbeyan & Environs Geology Map* which indicates the site to be covered by Quaternary age alluvial deposits associated with Woden Creek and its tributaries underlain by Silurian age Deakin Volcanics bedrock which includes green-grey, purple and cream rhyolite, agglomerate, purple tuff, tuffaceous sandstone, ryhodacite and rhyodacitic crystal tuff. (Based on previous nearby investigations, bedrock could be deeper than 10m on the alluvial plain).

The information in the 2005 geotechnical report was of a preliminary nature and further detailed geotechnical investigation is required to establish specific site conditions and determine the necessary final design parameters and construction recommendations.

Further assessments were undertaken, firstly as part of a "Preliminary Assessment" in June 2008 by CBRE for a proposed Data Centre and subsequently as part of an EIS by GHD in November 2008. These further geotechnical investigations by ACT geotechnical Engineers P/L focussed on only a small part of the study area being Block 1676 (formerly described as Block 1671).

The ACT Geotechnical Engineers Geotechnical Report of January 2008 included in the CBRE Preliminary Assessment indicates the following geotechnical conditions (refer Table 2).

Table 2: Soil Conditions

Soil Depth	Geological Profile
0m - 0.5m	Top Soil/Slope Wash Silty Sand
0.5m-3m/10m	Alluvial Sandy Clay, Gravelly Sandy Clay, Sandy Silty Clay, Clayey Sand, Gravelly Clayey Sand, Silty Clayey Sand and Sand. Very stiff to hard and medium dense to dense. May be weakly to moderately cemented in parts.
Below 3m/10m	Volanic bedrock, weak to strong. Bedrock may be present at 1m/2m depth in the vicinity of the knoll, as indicated by outcrops in the area.

In addition, the GHD Draft Environmental Impact Statement November 2008 over Block 1671 Tuggeranong indicates that soils over the subject site comprise Williamsdale soil landscape with the potential for some Burra.

In relation to Williamsdale soil, it is moderately deep, moderately well drained Yellow Chromosols. It is hard setting, erodible, dispersible and acidic topsoil.

In relation to Burra, it is shallow (<60cm), well drained Rudusols and Tenosols on crests and upper slopes. The sub soils have low permeability and has sheet erosion risk. The GHD report further notes that the soil landscapes represented on site pose an erosion hazard.

Rocky outcrops in the central part of the study area

4.5 Groundwater

The ACT Geotechnical Engineers report January 2008 indicates that permanent ground water is expected at 7m/8m below existing surface levels. Groundwater was not encountered during the ACT Geotechnical Engineers field investigations in 2008, although the presence of some iron-staining indicates seasonal groundwater seepages do occur.

Temporary perched seepages could be encountered at shallower depth within the more pervious alluvium, especially after rain. Groundwater levels would need to be established during a more specific geotechnical investigation of the site.

4.6 Engineering Services

The immediate study area is not serviced by a reticulated water or sewerage supply. However, it is understood the adjacent Mugga Resource Management Centre is serviced by reticulated water and sewer. It is envisaged that connection to the main supply serving Mugga Resource Management Centre would be possible for the study site.

Easements

There are two major 11Kv high voltage electricity easements traversing the study area. One is a twin pole line extending in a south-east to north-west direction across the study area from the Gilmore zone substation to Erindale Drive (refer Figure 8). The second is a single pole line connecting with the above double pole line near the centre of the study area and extending directly northward. (refer Figure 8). The power supply to the future cemetery is likely to be from these lines with the installation of a substation.

Additional low voltage overhead lines are located within northern part of the study area generally running adjacent to Mugga Lane in a north-west to south-east direction.

High Voltage Powerlines traversing the site

Utility Services

A water main is located along the northern side of Mugga Lane and extends into the study area generally along the path of Block 1520 (refer Figure 7).

A sewer rising main extends from the Hume industrial estate parallel to Mugga Lane adjacent to, but outside, the northern boundary of the study area. This rising main deviates northward near the main vehicular entry to the study area.

There are telecommunications lines generally parallel to Mugga Lane with connections entering the study area (to service other nearby facilities).

Commonwealth optic fibre networks are also located across the study area, however, exact locations have not been able top be determined at this stage. Further investigation to determine exact locations would be required at detailed design stage.

4.7 Traffic, Transport and Access

Traffic

The study area lies adjacent to the Monaro Highway (east boundary) which acts as a major thoroughfare from the southern side to the northern side of Canberra. The Monaro Highway is also used as a link road between regional south east NSW areas, such as from Cooma to Queanbeyan.

There are two intersections located on Mugga Lane, one being a 'seagull' arrangement at the Mugga Lane/Monaro Highway junction and the second a roundabout located at the Mugga Lane/John Cory Road junction point. There is also a major roundabout located to the south east of Block 1677 on the corner of Isabella Drive and Monaro Highway.

Whilst a detailed traffic report has not been undertaken as part of the scope of this report it is not anticipated a cemetery use will have an adverse impact on existing or future traffic conditions of the area.

In relation to parking, the Parking and Vehicular Access General Code contained within the Territory Plan requires an individual assessment to be undertaken for a cemetery use in a Broadacre Land Use zone. It is anticipated all parking requirements will be accommodated on site.

Public Transport

There is currently no bus services that access the study area. A review of the Action Bus network map routes indicates Routes 768, 769 and 788 operate along the Monaro Highway (from Tuggeranong to the City via Russell) but these are express services.

The adjacent suburbs of Fadden, Macarthur and Hume are serviced by the bus network. A bus service operates to the nearby Alexander Maconochie Correctional Centre from Woden and the Geoscience Australia site in Narrabundah Lane from the City.

Vehicular Access

The existing access driveway into the study area is from Mugga Lane which in turn intersects with the Monaro Highway at the eastern edge of the study area.

The driveway also provides access to Block 1596 Tuggeranong (ACT Health facility), however this block does not directly front Mugga Lane and appears to be land locked. In the event that development proceeds over the study area, ongoing access to Block 1596 will need to be resolved.

Given the nature of the proposed cemetery land use, it may also be appropriate to secure a new access off Mugga Lane exclusively for cemetery use.

Existing gravel entry roadway (with the bitumen section leading to the Health Facility site)

5. SITE ASSESSMENT – ENVIRONMENTAL ATTRIBUTES

5.1 Heritage

A search of the ACT Heritage database indicates that Blocks 1676 & 1677 within the study area are not listed on the ACT heritage Register. However, it is understood that a number of block descriptors have been previously used for land within the study area including Blocks 1671, 1672, 1555, 1519, 1182 and 1610. As such, the heritage search included these previously used block descriptors in addition to the current block descriptors within the study area.

Block 1610 is listed (registered) in the ACT heritage Register as part of a much larger area incorporating many other rural blocks in the Tuggeranong District and the Murrumbidgee River Corridor where aboriginal sites/artefacts have been identified. While Block 1610 no longer appears on ACT cadastral plans, it is understood that it covered approximately the same area that Block 1676 and 1677 now cover.

Previous heritage studies have been undertaken over the former Block 1671 Tuggeranong as part of the Environment Impact Statement prepared by GHD Pty Ltd November 2008 in regard to the then proposed Canberra Technology City development proposal. The GHD report identified the presence of a number of Aboriginal heritage sites in the area including three flaked stone artefacts within the study area.

Further heritage studies will need to be undertaken based on the evidence provided in the GHD report relation to presence of Aboriginal Heritage artefacts in the study area.

5.2 Flora and Fauna

David Hogg P/L ecological consultants were engaged to undertake an assessment of the ecological characteristics of the study area to inform the site selection process for the optimum location for the cemetery within the study area. (refer Attachment B).

The assessment analysed information on the site, in terms of original vegetation, land use history and site criteria relevant to the proposal. The current ecological characteristics were used as a basis for assessment including:

- vegetation condition based on classifications outlined in the *ACT Lowland Woodland Conservation Strategy*, and current vegetation condition data compiled by the Research and Planning Section (TAMS)
- strategic value the area for wildlife habitat and movement
- value of the site for threatened species and ecological communities
- relative ecological constraints within various parts of the study area
- implications in relation to the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act), and the ACT Planning and Development Act (P & D Act)
- opportunities for ecological enhancements or offsets to compensate for unavoidable adverse impacts

The study area was divided into two parts for the purposes of the ecological assessment reflecting current land uses, with the western part located within Wanniassa Hills Nature Reserve and the eastern part within broadacre land which is currently used as horse agistment paddocks.

Each area was further divided into sections based on similarities in vegetation characteristics.

The study area contains remnants of dry sclerophyll forest in the most elevated regions, shrubby box woodland on the middle slopes in rocky terrain and yellow box – red gum grassy woodland on the lower slopes and hills. The condition of the existing vegetation is related to land use history and varies considerably across the study area. The least disturbed areas are generally located within the western part of the study area and contain remnant vegetation in the best overall condition. The eastern part of the study area has undergone a higher level of previous modification and contains vegetation in poor native condition.

The low-lying part of the study area, mostly located in the eastern part, contains remnant yellow box – red gum woodland, listed as endangered under the *NC Act* and critically endangered under the *EPBC Act*. The woodland occurs in a moderately modified condition.

The forest and woodland areas and the patches of scattered trees provide important habitat for woodland birds. These areas are a component part of a broad wildlife movement corridor facilitating animal movement across the southern Canberra suburbs and into New South Wales.

The ecological assessment concludes that the development of the proposed cemetery is feasible with little adverse impact on ecological values, provided that development is generally limited to the low-lying areas located within the eastern part of the study area. The retention of trees in those areas where trees remain scattered or in small stands would support the preservation of ecological values within the more disturbed areas.

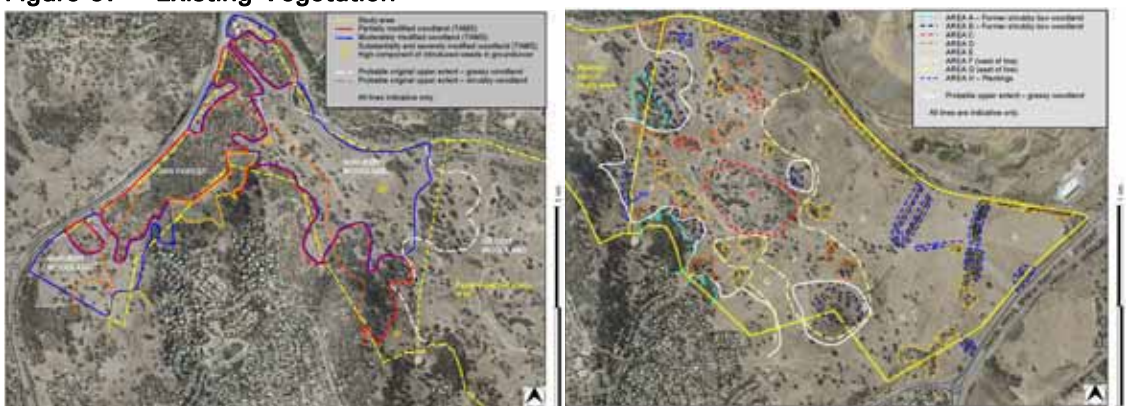
Some limited impacts on box – gum woodland and native vegetation may result from the proposal and, therefore, require action under the *EPBC Act* and the *P&D Act*, but this would depend on the detailed design of any development.

Opportunities exist within the study area for ecological enhancement, potentially as an offset for unavoidable impacts, but would be beneficial in any case to enhance visual and user amenity values.

A more detailed analysis under favourable seasonal conditions is desirable in higher quality areas subject to proposed development. Potential offsets and ecological enhancement is possible and should be integrated with the design of the overall project.

Scattered woodland trees near Long Gully Road

Figure 9: Existing Vegetation



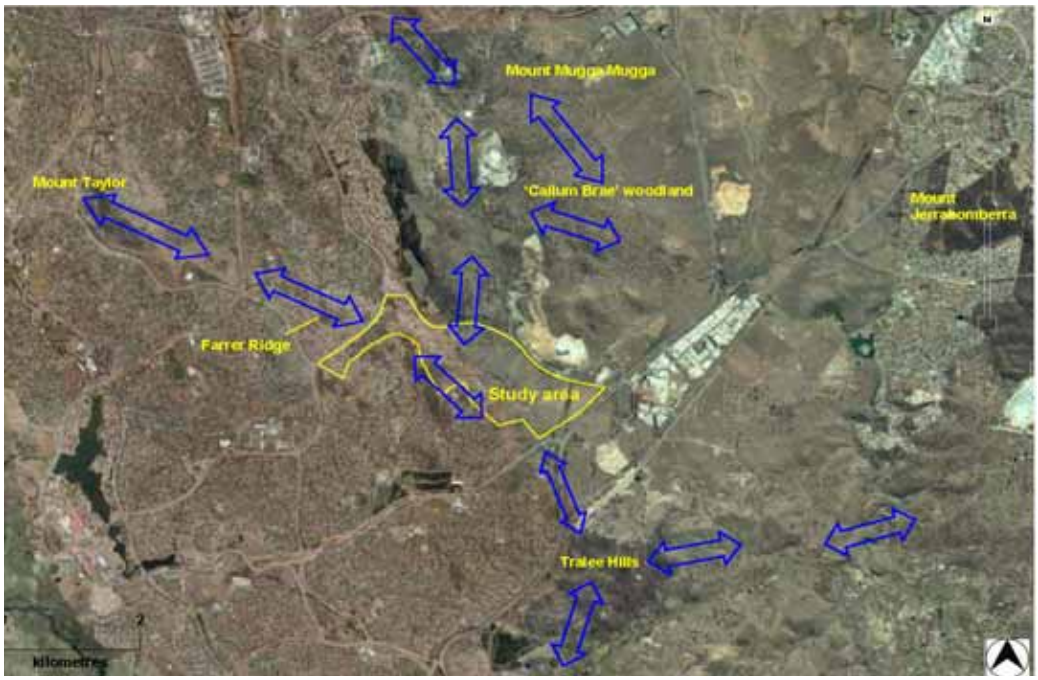
Source: David Hogg P/L

5.2.1 Strategic Value for Wildlife Movement

Action Plan No. 27 indicates the study area is a part of a habitat connectivity corridor that links the Majura Valley (and North Canberra) via Callum Brae with the Rob Roy Range in a north – south direction, and links the forested ranges in New South Wales with the Lower Molonglo region in an east – west direction. A previous study of the Hume West area confirms the importance of the current study area as a part of a wildlife movement corridor of regional importance.

The ecological assessment confirms a potential wildlife movement corridor of between 500m and 1.5km in width located across the study area in a broad sweeping curve, from the south-east corner along the southern boundary to the north-west corner (Figure 10). Small stands of trees (both naturally occurring and planted), scattered paddock trees within severely and substantially modified woodland areas and larger patches of moderately and partially modified woodland all form components of this corridor. The north-eastern corner of the study area contains a lower number of trees and would have a lower level of constraint in relation to this criterion.

Figure 10: Potential Wildlife Movement Corridors



Source: David Hogg P/L

5.2.2 Threatened Species

Threatened species are listed under both the ACT *Nature Conservation* Act (*NC Act*) and the Commonwealth *EPBC Act*, with some species appearing on one list and others appearing on both lists.

The ecological assessment used the *EPBC Act Protected Matters Report* to generate a list of threatened ecological communities and species that are likely to occur or may occur within a 2 km radius of the study area. These are provided in

Table 3: Threatened Species potentially within Study Area

Common Name	Scientific Name	Status	
		NC Act	*EPBC Act*
Woodland Birds			
White-winged triller	*Lalage sueurii*	vulnerable	
Brown treecreeper	*Climacteris picumnus*	vulnerable	
Swift parrot	*Lathamus discolor*	vulnerable	endangered
Hooded robin	*Melanodryas cucullata*	vulnerable	
Regent honeyeater	*Xanthomyza phrygia*	endangered	endangered
Painted honeyeater	*Grantiella picta*	vulnerable	
Reptiles			
Pink-tailed worm lizard	*Aprasia parapulchella*	vulnerable	vulnerable

The partially modified and moderately modified woodland areas, particularly those located within Wanniassa Hills Nature Reserve and the larger patches of woodland within the eastern part, are the areas most likely to support threatened bird species, should they occur within the study area. These areas have a relatively high ecological value in terms of the provision of potential habitat for listed bird species.

The probability that the listed bird species nest or breed within the areas containing substantially and severely modified woodland (open grassy areas or areas containing scattered trees) is very low. Such areas may be utilised as foraging or perching habitat, at least temporarily, and therefore have a relatively low value as potential habitat.

Although the pink-tailed worm lizard has not been recorded from the study area, it has been located in rocky areas located to the west and north of the study area. Potential habitat for this species, albeit of poor quality, occurs on the rocky hill slopes within Wanniassa Hills Nature Reserve. This species is unlikely to occur in the eastern part, particularly in areas most likely to be identified as suitable for the proposed cemetery, i.e. consistent subsoil not containing large areas of rock. Overall, the study area has a low value as potential habitat for the pink-tailed worm lizard.

5.2.3 Threatened Ecological Communities

Threatened ecological communities listed in the protected matters report or under ACT legislation with potential to occur within the study area include:

- natural temperate grassland and
- woodland communities.

There is no evidence to suggest that the natural temperate grassland ecological community occurs within the study area.

A large part of the eastern part of the study site could fall within the *EPBC Act* criteria for box – gum woodland, with smaller patches considered to meet *NC Act* criteria for yellow box – red gum woodland. Development within these areas has a higher level of constraint in relation to these criteria than development beyond this area.

5.2.4 Potential Ecological Constraints

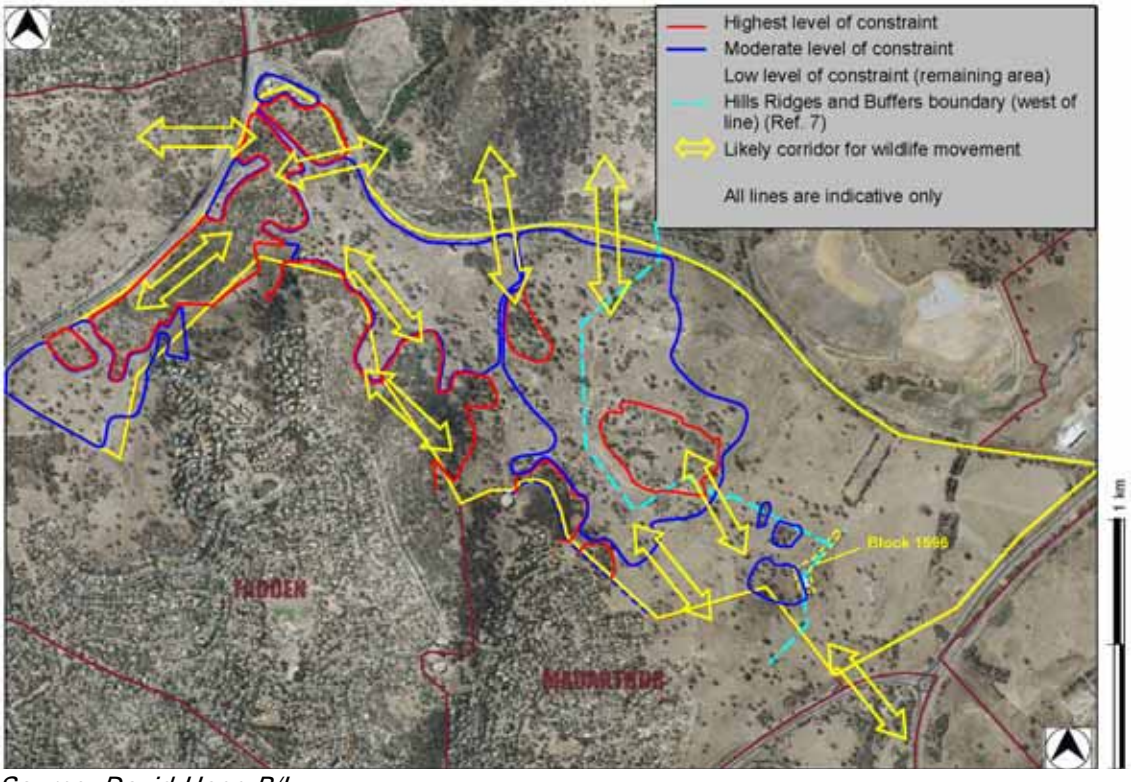
The David Hogg P/L report (Attachment B) identified a number of potential ecological constraints associated with various parts of the study area based on the type, condition, threatened status and habitat potential of the existing vegetation within the study area (refer Figure 11).

This indicates that the areas with the highest level of constraints tend to be located towards the west of the study area, predominantly but not entirely within Wanniassa Hills Nature Reserve, while the areas with the lowest level of constraint lie towards the eastern end. This assessment is based solely on ecological characteristics, not on existing Territory Plan land use boundaries, although the majority of the areas of high or moderate levels of constraint fall within the Hills Ridge and Buffers land use.

Figure 11 also indicates the likely preferred corridors for bird movement, which reflect woodland quality and tree density, and tend to follow the areas of high to moderate level of constraint. These corridors are indicative only and have not been confirmed by field observations. The movement of other types of wildlife is less predictable. Kangaroos, for example, are likely to move through the whole of the study area, depending on seasonal conditions and the time of day.

As a general conclusion, the ecological constraints will tend to be least in the lower, more open parts of the study, but this would not necessarily mitigate against sensitive development in other areas where constraints are greater. The latter areas may require more specific ecological assessment at the detailed planning stage.

Figure 11: Potential Ecological Constraints



Source: David Hogg P/L

5.3 Environment Action Plans

There is a legal requirement to submit a referral under the *EPBC Act* if a proposed action will have, or is likely to have, a significant impact on a matter of national environmental significance (e.g. a threatened species or ecological community, or a migratory species listed under the Act).

While the identification of significant impacts as part of a referral forms the basis for determining whether a proposal is a controlled action under the *EPBC Act*, it is common practice in the ACT to submit a referral even if a listed species or community is affected to only a minor extent, directly or indirectly. This is a precautionary approach which avoids the risk of a proposal being delayed at a later stage in the approvals process. The advice below with respect to referrals is based on such a precautionary approach.

A more comprehensive review of the potential impact of the proposal on matters listed under the *EPBC Act* is recommended once planning for the proposed development has progressed.

5.3.1 Threatened Species

The western part of the study area contains potential habitat for the swift parrot and regent honeyeater (see Section 7.1), both listed as endangered under the *EPBC Act*. Potential habitat of low quality for the pink-tailed worm lizard, listed as vulnerable, is located on rocky hill slopes within the study area, generally within Wanniassa Hills Nature Reserve. The eastern part of the study area contains low quality habitat for these species.

Development that results in the removal of a large number of trees, in particular within the areas identified as partially or moderately modified has some potential to impact on habitat for woodland birds. Development in the north-eastern part of the study area or that does not involve the removal of a substantial number of woodland trees is unlikely to impact on such habitat. In any event, woodland located in nature reserves at Wanniassa Hills, Callum Brae and Mount Mugga Mugga is likely to provide more important and higher quality habitat than the study area.

The proposal is unlikely to impact significantly on the pink-tailed worm lizard given that potential habitat within the area is of low quality and is in areas generally unsuitable for the proposal. The pink-tailed worm lizard has a widespread distribution in the Molonglo and Murrumbidgee river valleys, as well as areas within NSW. The proposal would have no impact on these areas.

Any impacts on potential habitat for listed woodland birds or the pink-tailed worm lizard that would probably result from the proposed use of part of the area as a cemetery are unlikely to be significant.

5.3.2 Threatened Ecological Communities

The eastern part of the study area contains the listed critically endangered community, White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. The probable extent of the community is discussed in Section 7.3.2 and indicated in Figure 8.1. A referral under the Act is recommended in relation to this community, should the development be likely to impact on this area.

5.3.3 Implications under the ACT Planning and Development Act

The relevant ecological conditions under Schedule 4 Part 4.3 of the ACT *Planning and Development Act 2007* (*P&D Act*) that would trigger the requirement for an Environmental Impact Statement (EIS) are as follows:

- proposal that is likely to adversely impact on the conservation status of:
  (a) a species or ecological community that is endangered; or
  (b) a species that is vulnerable
- proposal involving the clearing of more than 0.5 ha of native vegetation

Native vegetation is defined under Section 73 of the *Nature Conservation Act* as vegetation indigenous to the area including trees, understorey plants, and groundcover, as well as plants occurring in a wetland or stream.

The species or ecological communities that are listed as endangered or vulnerable under the *NC Act* and that are known to occur or have some potential to occur within the study area include:

- yellow box – red gum grassy woodland
- woodland birds; and
- pink-tailed worm lizard.

Potential impacts on threatened woodland birds and the pink-tailed worm lizard are unlikely to be significant, mostly due to the poor quality of potential habitat and the low probability that these species occur within the area most likely to be impacted by the proposal.

In 2004, it was estimated that approximately 10,865ha of yellow box – red gum grassy woodland occurs within the ACT. The part of the study area that has been assessed (in this report) as containing the woodland community is less than 30 ha, or about 0.28 percent of the community within the ACT. As most of that woodland area would probably remain unaffected, any impacts of the proposal are unlikely to be significant.

The conservation status of threatened species and ecological communities is unlikely to be adversely impacted on by the proposal. Consequently, these matters are not considered in themselves to trigger an EIS, but should be discussed in any EIS prepared as a result of another trigger. This should be reviewed as the planning for the site progresses.

It is widely accepted that indigenous vegetation is that which is native to a given region or ecosystem. Woodland communities are identified by the characteristic flora and fauna species, i.e. in part by the native vegetation contained within the woodland. In the ACT, woodlands are further classified according to the level of modification that has occurred within the vegetation structure using pre-1750 unmodified woodland as a baseline.

In the absence of useful guidance within the *P&D Act*, David Hogg P/L has recently developed a methodology for identifying native vegetation for the purposes of applying the *P&D Act*. The guidelines in relation to the assessment of woodland are applied to each area, as described below.

The areas identified as severely and substantially modified woodland contain a limited diversity and abundance of persistent and disturbance tolerant native grass species, combined with a high proportion of introduced pasture species and weeds. Grazing over a prolonged period, in addition to pasture improvement, has diminished the potential for the areas to retain a native seed bank that would promote the recovery of the original vegetation once grazing pressure was removed. In general, the diversity of native species is low, ecological functionality is reduced, and resilience to weeds and other disturbance is limited. According to the methodology these areas would not be considered as native. The existing trees are widely spaced, the regeneration is limited and the groundcover is described as native pasture.

The areas assessed as moderately modified lowland woodland contain vegetation that resembles the original woodland community, at least to some extent. These areas would be considered to contain native vegetation. The understorey is dominated by native grasses and, in some areas, contains a moderate diversity of native forbs.

The areas assessed as partially modified lowland woodland contain vegetation that resembles the original woodland community and would be considered to contain native vegetation. The understorey is dominated by native grasses, shrubs and forbs, although may contain patches of introduced grasses and weeds.

The study has identified a potential area containing box – gum woodland, listed as threatened ecological community under the *EPBC Act*. This area, presented on Figure 8.1, would meet the criteria for inclusion as native vegetation, although the boundary of this area would be subject to further surveys in more suitable seasonal conditions. The area as indicated is most likely to be greater than the actual extent of this community as it was subject to a precautionary approach.

Should the total area of native vegetation to be cleared be greater than 0.5 ha, the preparation of an EIS to address this issue would be required under the *P&D Act*. This should be reviewed as the planning for the site progresses.

5.3.4 Opportunities for Ecological Enhancement

A change in land use within the study area could offer the opportunity to maintain or improve the area's existing environmental values. Such measures may be implemented to offset unavoidable impacts in areas of ecological value, or simply to enhance the ecological quality of parts of the area which are not required for development. Examples of such ecological enhancement are as follows:

- Plantings of additional native eucalypts in the Hills, Ridges and Buffers area (the southern and western parts of the eastern part) to improve habitat connectivity. Species selected would be site-specific and could include yellow box, apple box and Blakely's red gum in the lower areas and red box and bundy on the upper slopes. This would be subject to being compatible with the use and management of that land. New plantations would need to be protected against grazing (horses, rabbits and kangaroos).
- In addition to tree planting, the planting of suitable understorey species could enhance the quality of the area as bird habitat and as a wildlife movement corridor.
- A targeted weed strategy could be implemented for the control of St John's wort, great mullein and Paterson's curse (among others).

The ecological enhancement of parts of the study area (or adjacent land) could become important in addressing the requirements of the *EPBC Act*, which currently places strong emphasis on the provision of offsets in situations where adverse impacts on matters of national environmental significance (in this case, box – gum woodland) are unavoidable. While avoiding such impacts is normally a preferred outcome, if this is not practicable, the provision of biodiversity offsets needs to be addressed in the planning and design of the project.

A more detailed assessment under favourable seasonal conditions is desirable as background to considering opportunities for ecological enhancement, irrespective of whether or not these are implemented as offsets. The preferred time for undertaking that assessment would be late spring or early summer when native forbs are most readily detectable and identifiable. It would be desirable for such work to proceed in parallel with the identification of development options in order to focus on areas where ecological enhancement would be compatible with development.

5.4 Bushfire Risk

The Planning for Bushfire Risk Mitigation General Code states that a *Bushfire Prone Area* for the ACT was declared through the "*Building Regulations* and came into effect on 1 September 2004". Under the declaration, all parts of the ACT outside the defined urban area have been declared bushfire prone.

The subject study area is within the bushfire prone areas and bushfire abatement zone, and in general development is required to meet the provisions of the *Building Code of Australia* (BCA) and AS 3959. However, bushfire protection provisions in the BCA apply to residential dwellings and accommodation buildings – it does not apply to non-residential buildings or to non-habitable buildings or other structures.

Additionally, the ACT Emergency Services Agency has an ACT Strategic Bushfire Management Plan which aims to reduce the occurrence and impact of bushfire through risk reduction, readiness, response, and recovery across all agencies and land tenures.

The physical characteristics of the study area relating to bushfire risk include:

- The topography of the study area is characterised by undulating slopes from the south and southwest to the northeast.
- The gradients of slopes range from approximately one to three degrees, with gradients to eight degrees on hills in the south of the study area.
- Vegetation cover is characterised by grass pasture with scattered mature trees.
- Areas in the east of the study area have been used for horse agistment;
- To the north of the study area is the Mugga Lane Landfill.

The 2008 GHD EIS for part of the study area (Block 1677) concluded that potential impact of bushfire on the site is minimal, however there is potential for bushfire and these impacts and mitigation measures need to be carefully considered.

During the detailed design phase consultation with ACT Emergency Services Authority should be undertaken incorporating the following principles:

- Infrastructure , roadways, street furniture, landscaping and tree planting to comply with Fire Brigade Standards
- Water supplies and hydrants for fire fighting purposes be strategically located as agreed by ActewAGL and the ACT Fire Brigade
- An *Asset Protection Zone* with emergency access be provided.

Views thorough woodlands in upper parts of study area to stockpiles within Landfill site

5.5 Waste Management

Waste generation from the site would need to be carried out in accordance with the requirements of the Department of Territorial and Municipal Services (TaMS) and a waste management plan will be required as part of any DA to ACTPLA for a proposal to use the study area site for use as a cemetery. This is not seen as a constraint to development within the study area.

5.6 Contamination

A search of the ACT Government Register of contaminated sites has been undertaken for the study area. The search indicates that records held by the Environment Protection Unit (EPU) indicate that neither Blocks 1676 or 1677 is recorded on the Register of contaminated sites.

However, the search does not categorically rule out the possibility of contamination on either block and independent tests should be undertaken at detailed design stage.

The site will have to be assessed in accordance with the *ACT 1995 Strategic Plan – Contaminated Sites Management*, which details that contaminated land assessments undertaken in the early planning stages. The issue of site contamination should be included in any assessment of a site for proposed change in land use particularly greenfields development to sure that the site is suitable for the proposed and permitted uses. The site assessment report is to be submitted to the Environment Protection Unit for review and endorsement prior to the development works commencing or to be incorporated in the development plans for the site consistent with the requirements of the Strategic Plan.

5.7 Noise

Potential noise emissions from the site would be regulated by the requirements set out in the *Environmental Protection Act 1997* and *Environmental Protection Regulation 2005*.

An Acoustic Assessment was prepared by Bassett Consulting Engineers in May 2008 as part of the GHD EIS for Block 1676 to assess the potential acoustic impacts of the proposed natural gas co-generation facility and data centre campus.

The assessment concluded that Residences in the north of Macarthur are generally protected from noise by elevated terrain with some exceptions along Jackie Howie Crescent and Bracker Place.

The main noise generating activity from the site would be during construction of the cemetery. This is not considered to be a significant constraint to development within the study area.

Noise levels impacting on the site would be greatest along the Monaro Highway frontage and some noise could be expected from the Mugga Resource Management Centre.

5.8 Visual Assessment

Landscape character of the general study area within which the proposed development is to be located is characterised by the following elements:

- low lying topography in the east rising in the west to peaks including Mount Wanniassa
- predominantly native vegetation but some areas in the east are predominately cleared grazing paddocks

- water elements including the upper reaches of Jerrabomberra Creek, and minor drainage lines
- large tracts of vacant undeveloped land
- high and low voltage powerlines through the site
- distant views of surrounding hills from parts of the site
- views into parts of the site especially from sections of Monaro Highway, Mugga Lane and Long Gully Road

The nearest existing dwellings to the study area are in the established suburbs of Macarthur and Fadden to the south of the study area, but mostly on the southern side of the ridgeline and therefore not within the viewshed of the study area.

The landscape character will be affected in a number of ways by development of a new cemetery. These are outlined in relation to views from the site and views into the site as outlined below.

Views from Site

The main view northward from much of the eastern part of the study area is directly into the earth fill embankment of the Mugga Landfill Facility. (refer photos below). The main eastern views are across the Monaro Highway to Hume and through the Jerrabomberra Valley to Queanbeyan.

The landfill methane capture plant is located immediately adjacent to the existing entry to the study area. The Hume industrial estate including the Recycling Facility is within the north-eastern viewshed.

Views into Site

The site can be directly viewed from the Monaro highway and Mugga Lane. It is likely that the future view shed from the highway will be limited by landscaping.

Views from higher parts of the site to Queanbeyan across Hume

Existing methane gas facility adjacent to entry roadway


Views of the landfill embankment adjacent to the site

Level area in the eastern part of the study area, with Tralee Hills (NSW in background

View from Mugga Lane (roundabout)

View from Monaro Hwy (intersection Mugga Ln)

View from Long Gully Rd

View from Mugga Ln/Long Gully Rd intersection

5.9 Opportunities and Constraints

5.9.1 Opportunities

The overall study area offers several opportunities for use as a cemetery which include:

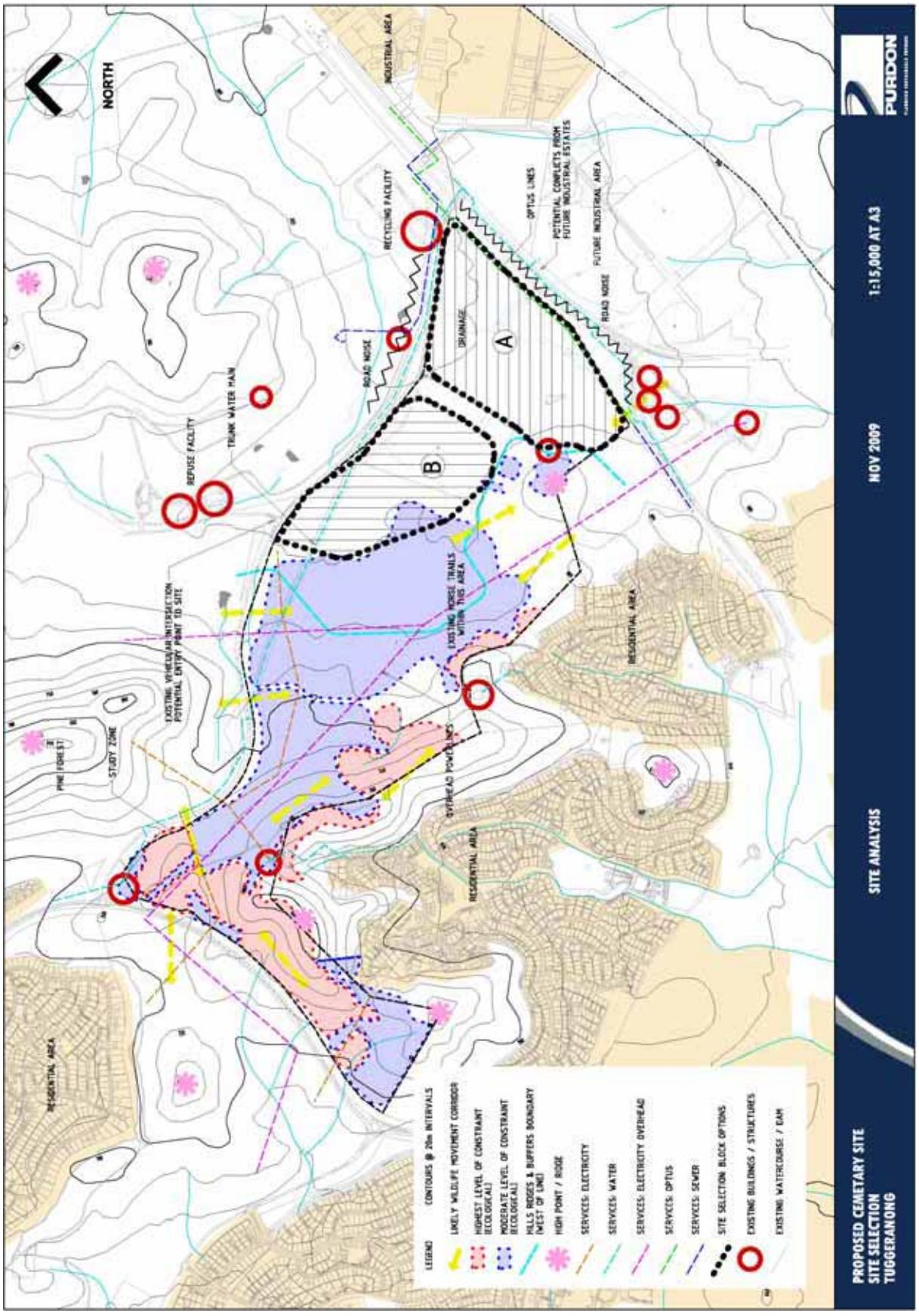
- Land is un-leased Territory land subject to licence for horse agistment
- Block 1676 and part of Block 1677 Tuggeranong immediately adjoining Block 1676 is zoned under the Territory Plan as Non-urban Zone 1 Broadacre. A cemetery is permissible within this land use zone subject to Territory Plan requirements
- The subject sites are close to major roads (e.g. Monaro Highway)
- The site is relatively flat with part of the study area having a small knoll on the site
- There is no record of contamination over the subject site
- The site is not within the 1 in 100 flood level
- Low water table
- The geology and rock formation of the site is generally favourable although bedrock may be encountered near the knoll area
- Access for vehicles available on the study area frontage
- Large areas of space available for parking
- Setback of approximately 750 metres to nearby residential areas
- Available space to achieve 20 m buffer around burial areas
- Potential to locate dams to achieve water runoff
- Minimum site of 40 hectares achievable
- Able to withstand large movement of soil subject to favourable geotechnical reports.

5.9.2 Constraints

The constraints within the overall study area include:

- Part of the study area is largely "Designated Land" under the National Capital Plan. The land is partly within the Broadacre area and the Hills, Ridges and Buffer area and a cemetery is not a permissible use within the Hills Ridges and Buffer areas
- Part of the study area has a large area of environmental value in terms of flora and fauna and part of area is special reserve under the Territory Plan as well as the Wanniassa Hills Nature Reserve
- Territory Plan (Part 12 overlays) states no new residential or community use permitted with 500m of the boundary of the Mugga Lane Landfill. The Territory Plan does not define cemetery as a community use
- No public transport directly available (i.e. buses do not stop at subject site)
- Connections to electricity, sewer, water, gas lines required
- Some small gullies and dams evident in the eastern area of Block 1677
- Views towards the Mugga Resource Management facility and Methane Plant (views may be mitigated over the medium term due to re-vegetation on the landfill site)time
- A general perception that the area has an industrial 'atmosphere'

Figure 12: Site Analysis – Overall Study Area



6. SITE OPTIONS

This Section considers the range of options for siting a cemetery within the study area.

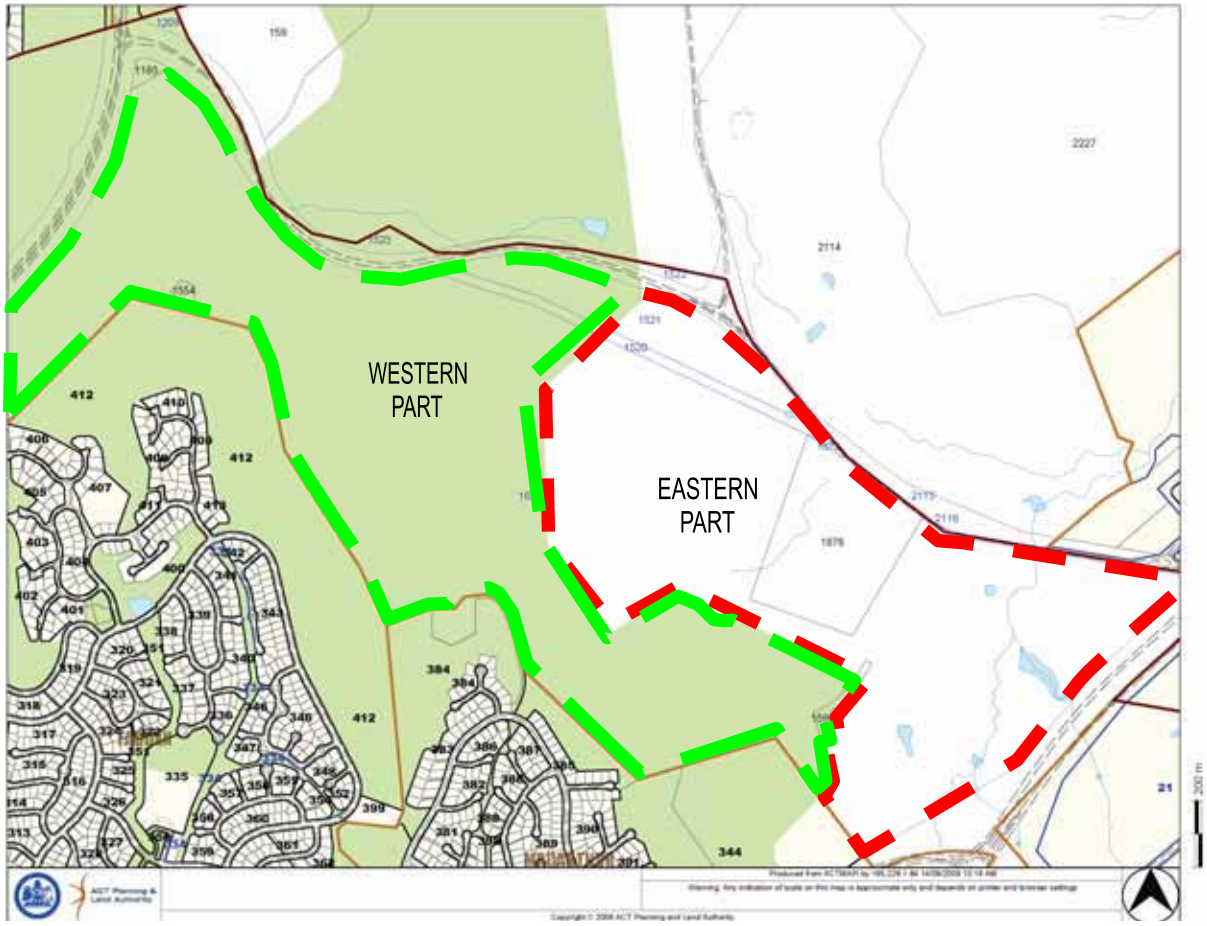
6.1 General options

The study area is divided into two distinct areas: the western part of the site located within reserves (including Nature Reserves) and Designated Land under the National Capital Plan; and the Eastern part which is unleased Territory Land within the Broadacre zone.

These areas are shown in Figure 13.

It is considered that the constraints to carrying out development within the western part of the study area are insurmountable and, as such the assessment for site selection has been contained to the eastern part of the study area (refer 6.2 below).

Figure 13: Study Area – General Site Options

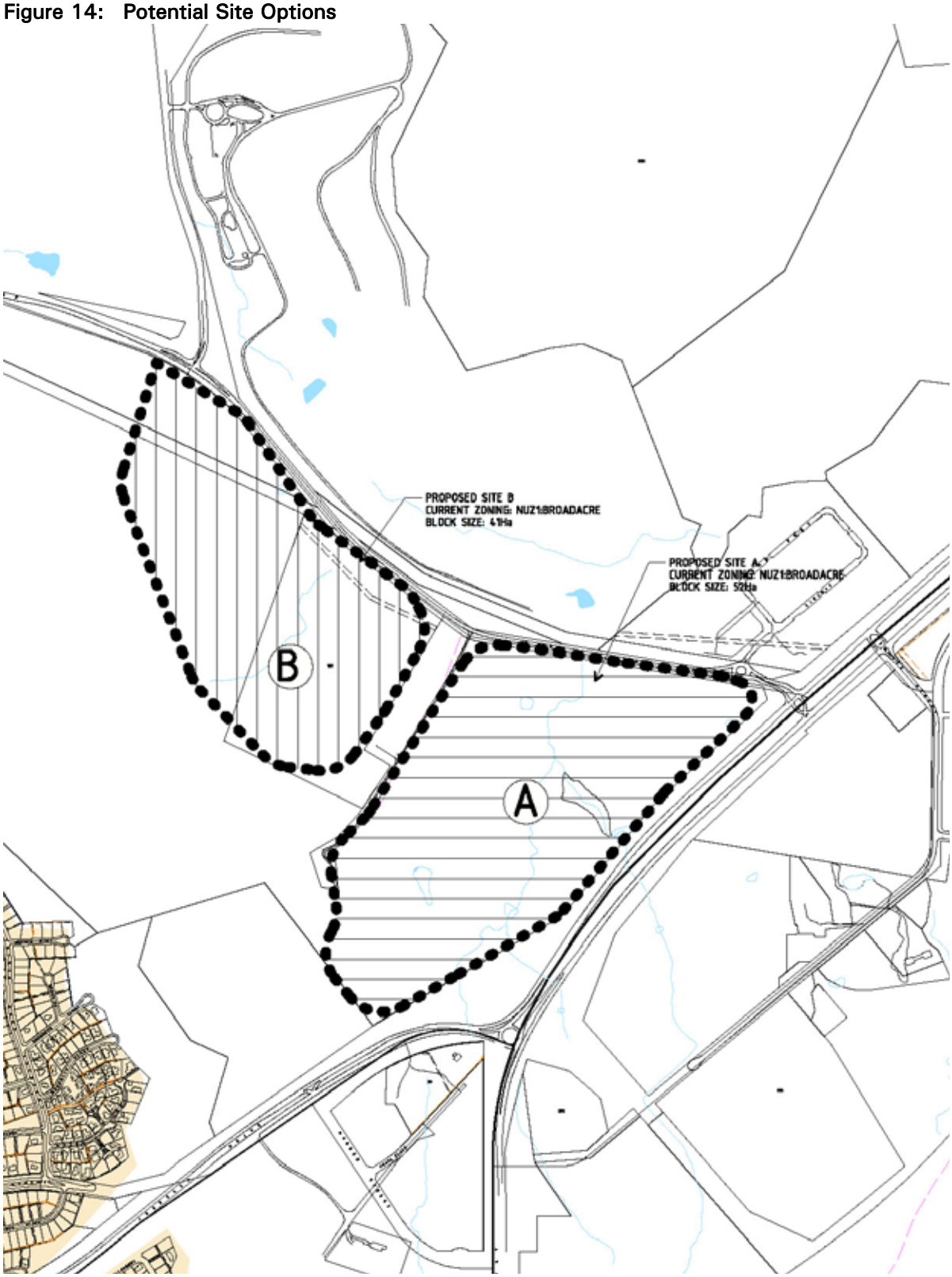


Source: ACTMAPi

6.2 Specific Options

Within the eastern part of the site there are effectively two distinct options available for consideration both of which provide sufficient land (40ha) for use as a cemetery including ancillary uses. (Refer Figure 14).

Figure 14: Potential Site Options



6.2.1 Site Option A

This option is located in the most eastern part of the study area. It is bounded by the Monaro Highway to the east and Mugga Lane to the north. The western boundary generally corresponds with the existing access roadway into the horse yards and ACT Health facility.

The site is traversed by a watercourse, sometimes referred to as Woden Creek, being a tributary of Jerrabomberra Creek. This creek is partly lined with native tree plantings. However, most of the site is cleared level grazing land. The Methane plant and associated landfill is opposite the northern boundary as is the Materials Recycling facility. The land to the east, across the Monaro Highway forms the southern extent of the Hume Industrial estate. Land to the south is the Macarthur Horse Paddocks and, across Isabella Drive, Rose Cottage tourist facility.

The site meets or exceeds all of the selection criteria (refer Sections 2.1 and 6.3) for the proposed cemetery use. The development of a cemetery is permissible under the Territory Plan. A separate access off Mugga Lane and/or Monaro Highway would be desirable.

Opportunities

Site A is considered to offer the following opportunities:

- Minimum site area of 40 hectares achievable
- Site is un-leased Territory land
- Cemetery is permissible use under Territory Plan
- The site is relatively flat
- Access for vehicles available on the study area frontage
- Separation of approximately 500 metres to nearby residential areas
- Potential to use water course as a feature within the site

Constraints

The constraints relating to Site A is considered to include:

- Potential opportunity cost in relation to the potential of the land to be used for other higher order economic purposes
- Possible flooding from existing water course
- Possible aboriginal heritage artefacts
- No public transport directly available (i.e. buses do not stop at subject site)
- Connections to electricity, sewer, water, gas lines required
- Views towards the Mugga Resource Management facility, Methane Plant (views may be mitigated over the medium term due to re-vegetation on the landfill site)
- A general perception that the area has an industrial 'atmosphere'

Alternative arrangements will be required for the existing equestrian facilities, including fenced trails and a new site access may be required to avoid the ACT Health facility

Figure 15: Potential Site A (East)

6.2.2 Site Option B

This option is located in the central part of the area identified for potential site options. It is bounded by Mugga Lane to the north and the existing access roadway into the horse yards and ACT Health facility to the east. The southern boundary corresponds with the Wanniassa Hills Nature Reserve boundary.

The site is traversed by a minor watercourse from the higher parts of the site in the south-west to Mugga Lane. However, most of the site is cleared grazing land. The Methane plant and associated landfill is opposite the northern boundary.

The site meets or exceeds all of the selection criteria (refer Sections 2.1 and 6.3) for the proposed cemetery use. The development of a cemetery is permissible under the Territory Plan.

Opportunities

Site B is considered to offer the following opportunities:

- Minimum site area of 40 hectares achievable
- Site is un-leased Territory land
- Cemetery is permissible use under Territory Plan
- The site is relatively flat but provides some variation in topographic relief
- The site is not within the 1 in 100 flood level
- Minor water course and existing dams could be a site feature
- Access for vehicles available on the study area frontage
- Separation of approximately 500 metres to nearby residential areas
- Potential to use water course as a feature within the site

Constraints

The constraints relating to Site B is considered to include:

- New access, separate from existing access to horse yards and health facility, required
- Potential opportunity cost in relation to the potential of the land to be used for other higher order economic purposes
- Possible aboriginal heritage artefacts
- High voltage overhead powerlines traverse the site near southern boundary
- Large scattered surface rocks suggest potential geotechnical issues
- No public transport directly available (i.e. buses do not stop at subject site)
- Connections to electricity, sewer, water, gas lines required
- Views towards the Mugga Resource Management facility and Methane Plant (views may be mitigated over the medium term due to re-vegetation on the landfill site)
- A general perception that the area has an industrial 'atmosphere'
- Possible implications relating to Mugga Landfill Clearance Zone
- Alternative arrangements will be required for the existing equestrian facilities, including fenced trails and a new site access may be required to avoid the ACT Health facility

Figure 16: Potential Site B

6.3 Assessment against Criteria

An assessment against the Authority's criteria for a new site is provided in Table 4 assuming equal weighting of all assessment criteria. Table 4 demonstrates that the two site options generally perform well in an overall assessment.

Table 4: Site Selection Assessment

Criteria	Option A	Option B
Site Area (min 40ha)	✓✓✓	✓✓✓
Land Tenure (availability: e.g. short term licence/lease)	✓✓	✓✓
Current Land Use (minimise displacement)	✓✓	✓✓
Surrounding land uses (consistent with and/or separation from)	✓✓	✓
Opportunity Cost (minimal competing uses)	✓	✓✓
Legislation (consistent with EPBC Act)	✓✓✓	✓✓
Zoning (permissible use under Territory Plan)	✓✓✓	✓✓✓
Zoning -(permissible use under National Capital Plan	✓✓✓	✓✓✓
Access (ease of entry, adequate road capacity)	✓✓	✓✓
Main roads (close proximity to)	✓✓✓	✓✓
Public transport (potential for bus services)	✓✓	✓✓
Flood Free (outside 100 year flood zone)	✓	✓✓✓
Topography (flat-gently undulating site)	✓✓✓	✓✓
Low water tables (ideally minimum three metres).	✓	✓✓
Soils (able to withstand mass soil movement)	✓✓	✓✓
Geotech (consistent subsoil without large areas of rock)	✓	✓
Services (access to water, electricity and gas)	✓✓	✓✓
Contamination (no, or manageable, contamination)	✓✓	✓✓
Heritage (no, or manageable, constraints)	✓	✓
Environment (no, or manageable, ecological constraints)	✓✓	✓✓

Legend	
✓	= just meets criteria
✓✓	= meets criteria
✓✓✓	= easily meets or exceeds criteria

6.3.1 Comparative Site Assessment

Option A

- Visible site from Monaro Highway
- Large flat area for burials
- Water course
- Potential for access from Monaro Highway to avoid negative image of of site, methane plant and waste recycling centre
- Highest opportunity cost for other uses eg industrial
- Requires DCP by NCA

Option B

- Variety of elevation
- Includes remnant vegetation on higher ground
- Contains water course
- Large area for burials
- Potential disturbance to existing horse paddocks and trails (could be relocated)
- May require new site access from Mugga Lane to avoid Act Health facility
- Subject to potential future alternative land uses on adjacent sites to east and west (could be managed by inclusion of restrictive planning controls to ensure compatible uses)
- Access to site past recycling centre, methane gas plant and edge of tip (some of these elements could be screened by landscape in medium term but are outside the control of the Authority)
- No DCP by NCA required

7. CONCLUSIONS

In conclusion, a desktop analysis of the planning requirements and a site inspection the study area indicates the eastern part of the study area as identified by the ACT cemeteries Authority appears suitable for potential use as a cemetery subject to further detailed studies, including a further geotechnical assessment, heritage study and detailed site planning (Master Plan) being undertaken.

The sites identified in this report have the capacity to accommodate a new southern cemetery for the ACT. The opportunity cost for other uses on Site B is lower (i.e. previous studies by ACTPLA have identified the land as 'urban suitable', for industrial or employment generating purposes). The sites, especially Site B require will necessitate identifying alternative arrangements for the existing equestrian facilities, including fenced trails and may require a new site access to avoid the ACT Health facility.

On balance both sites would be acceptable with the final choice being determined by land availability and opportunity cost.

7.1 Implementation

The following actions would be required to assist the ACT Cemeteries Authority finalise a decision on a cemetery site within the identified study area:

- Discussions with Chief Minster's Department/LDA and ACTPLA regarding site availability and opportunity cost
- Discussions with Roads ACT about potential for new site access off Monaro Highway and Mugga Lane
- Resolution of new location for horse agistment and trails, particularly if site B is the preferred site
- Indicative master planning for each site
- Exploratory geotechnical investigations
- Aboriginal heritage investigations

Once a site has been selected, it will be necessary to prepare a detailed master plan, EPBC referral and related studies leading to lodgement of a Development Application for assessment and approval by ACTPLA.

Purdon Associates

November 2009

Attachments

Attachment A: Consultation Report – ACT Cemeteries Authority

Attachment B: Ecological Assessment – David Hogg P/L

Attachment C: Infrastructure Services Plans

Attachment A

Consultation Report

ACT Cemeteries Authority

Canberra Cemeteries

ACT Public Cemeteries Authority

PROPOSED SOUTHERN CEMETERY IN THE ACT

Consultation Report

ACT Public Cemeteries Authority

27 August 2009

Comments on the Consultation Report are welcome and may be submitted for two (2) weeks after the date of publication to:

Re: Proposed Southern Cemetery Consultation Report
Community Engagement and Communications
Department of Territory and Municipal Services
GPO Box 158
Canberra City ACT 2601

Enquiries about this publication can be directed to Canberra Connect by phoning **13 22 81**

Website: **www.canberracemeteries.com.au**

Table of Contents

Foreword from the ACT Public Cemeteries Authority

The ACT Public Cemeteries Authority is responsible for all earth burials in the ACT. It maintains three cemeteries in the Canberra region, located at Woden, Gungahlin and Hall. The Authority takes great pride in its ability to deliver to the community well cared for burial grounds and high quality services.

It is with this in mind, that we have identified the need for a new cemetery to service the needs of the community in Canberra and the Capital Region well into the future. Based on our estimations, the Woden Cemetery, located in the south of Canberra, is likely to reach capacity within eight years. At this time a new cemetery will be needed to service southern Canberra.

As a new cemetery takes a significant amount of time to plan and construct, it is important that discussions begin now so that decisions can be made well ahead of the time when a new cemetery for the ACT is needed. It is important that as a community we address the need for a new cemetery in the ACT.

On 6 February 2009, the ACT Government agreed to a proposal from the Authority to explore the options in determining a site for a new cemetery in the ACT. The Authority engaged project consultants to undertake a community consultation program to gauge public opinion on the development of a new southern cemetery, its location and the services the community would want a cemetery to provide.

This Consultation Report details the outcomes of the consultation that was conducted over the nine week period from 30 March to 29 May 2009. Consequently, this report is intended to be a record of the issues that the community would like addressed in future consultations on this proposed development. We greatly appreciate the consideration and input given to this proposal so far. We will now proceed with investigating and resolving as many of the issues raised as is possible at this stage of development to ensure the community and the government can make informed decisions. We intend releasing additional information in a forthcoming discussion paper for public comment.

Thank you for your consideration of this Consultation Report and we look forward to receiving your feedback.

Mr Robert Smeaton
Chairman
ACT Public Cemeteries Authority

Introduction

The ACT Public Cemeteries Authority

The ACT Public Cemeteries Authority (the Authority) is responsible for all earth burials in the ACT. It maintains three cemeteries in the Canberra region, located in Woden, Gungahlin and Hall.

The Authority's stated mission is:

> *To provide a caring and sensitive service to the community, catering for the needs of the community.*

The Authority is governed by a Board of Directors. The daily operations are managed by a Chief Executive Officer, supported by enthusiastic and well qualified staff. Together they provide the community of Canberra and the Capital Region with high quality earth burial services.

Background

There are currently three operating cemeteries in the ACT – Gungahlin Cemetery, Woden Cemetery and a smaller cemetery in Hall. The Woden Cemetery, located in the south of Canberra, is filling up. There are approximately 1500 burial allotments remaining at Woden and the average number of allotments occupied each year is 200. Once the Woden Cemetery is at capacity, a new cemetery will be needed to provide services for south Canberra.

Based on this information, the ACT Public Cemeteries Authority has identified the need for a new cemetery to cater for the future needs of the ACT. As a new cemetery takes a significant amount of time to plan and construct, it is important that discussions begin now so that decisions can be made well ahead of the time when a new cemetery for the ACT is needed.

Cemeteries in the ACT currently offer the community a range of options. There is growing interest in natural burials. The possibility that a new cemetery would include a crematorium was also canvassed with the community. All of these options are open for discussion for potential inclusion in a new southern cemetery.

Location of a new cemetery

The ACT Public Cemeteries Authority and the ACT Government have considered a number of potential cemetery sites for a southern cemetery. The sites that have been previously considered include:

- Part of Block 1677 (corner of Monaro Highway and Isabella Drive) - Map site A
- Part of Block 154 Jerrabomberra (on the western side of Mugga Lane, midway between Hindmarsh Drive and Long Gully Road) – map site B
- Greenway (west of Rowland Crescent between the Murrumbidgee River and the Town Centre) – map site C
- Block 1676 and parts of Block 1677 Tuggeranong District (southern side of the intersection of Mugga Lane and Long Gully Road) – map site D

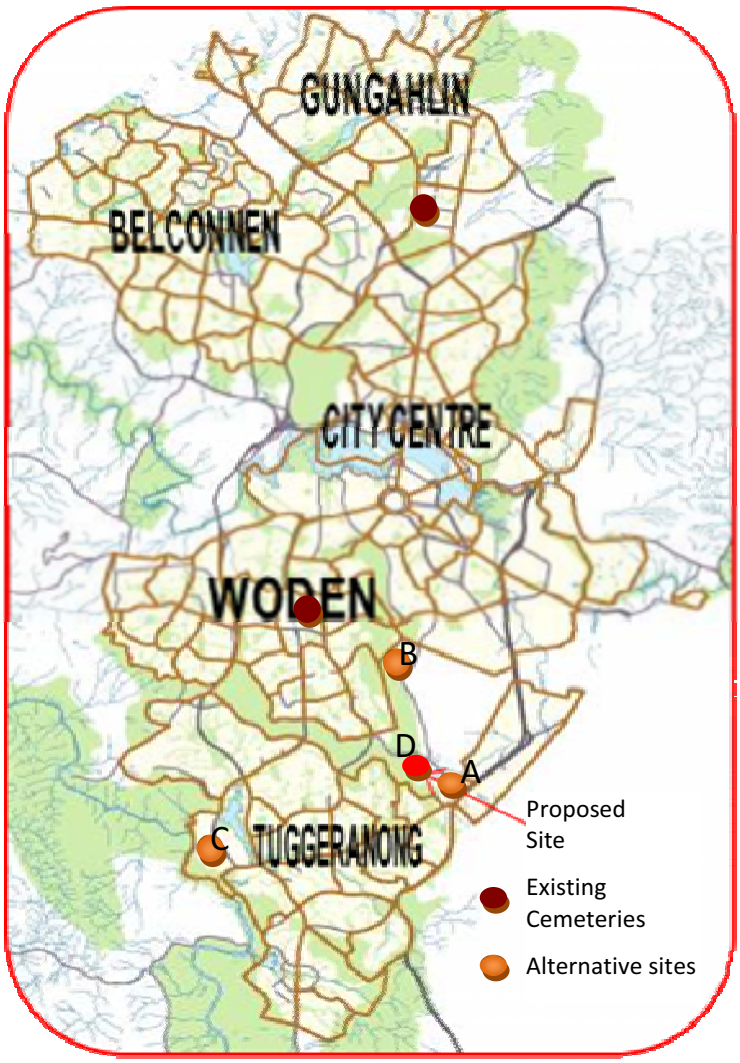
The site located near Mugga Lane and Long Gully Road has been identified by the ACT Public Cemeteries Authority as the most suitable, as assessed against siting criteria, to proceed with further evaluation.

Siting criteria for a cemetery development includes:

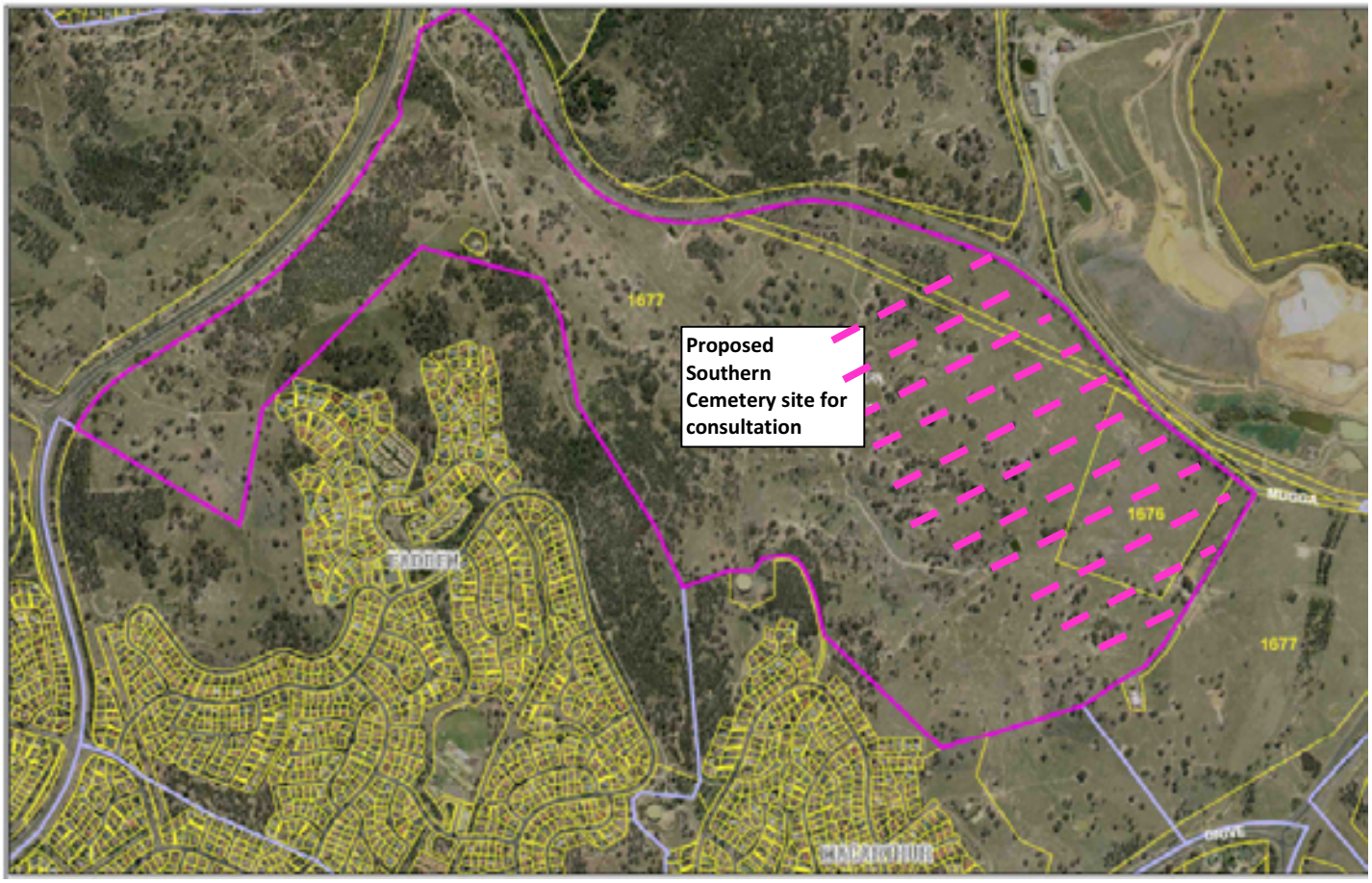
- Suitable land classification under the Territory Plan (Broad acre)
- Proximity to main roads
- Able to accommodate separate or large exit/entrance
- Minimum site of 40 hectares
- Topography (predominately flat)
- Buffer zone (minimum 20 metre buffer around burial areas)
- Large traffic capacity/access to accommodate large cortege
- Consistent subsoil not containing large areas of rock
- Able to withstand rigorous mass soil movement
- Outside 100 year flood zone
- Low water tables desirable (ideally minimum three metres)
- Access to services (water, electricity and gas)
- Access to public transport
- Access to water and potential for capturing runoff in dams

Map 1 below identifies where the proposed site is situated in southern Canberra and in relation to the existing cemeteries. Map 2 outlines the boundaries on the proposed site (Block 1676 and parts of Block 1677 Tuggeranong District) and the area that is most suitable for a cemetery development.

MAP 1


GUNGAHLIN
BELCONNEN
CITY CENTRE
WODEN
B
D
A
C
TUGGERANONG
Proposed Site
Existing Cemeteries
Alternative sites

MAP 2: Block 1676 and parts of Block 1677 Tuggeranong District (southern side of the intersection of Mugga Lane and Long Gully Road)



Planning processes for a cemetery

All proposed developments are assessed by the ACT Planning and Land Authority (ACTPLA) in accordance with the *Planning and Development Act 2007* and the Territory Plan. The Authority will explore the requirements of these processes further if the community supports proceeding with the proposed southern cemetery development. For more information on the development assessment process visit www.actpla.act.gov.au.

A series of fact sheets was developed to support the consultation program. For further information, please refer to Fact Sheets titled *Frequently Asked Questions*, *Natural Burials*, *Crematoria Services* and *Alternative Sites* at Appendix A.

The Purpose of this Report

This report has been prepared by the ACT Public Cemeteries Authority to contribute to public discussion about a proposal put forward to develop a new southern cemetery in the ACT. Under the guidance of the Minister for Territory and Municipal Services, the Authority seeks to engage our community in the many decisions that will need to be made prior to any development beginning.

The Authority listened carefully through the consultation. The Consultation Report outlines the issues raised, which represent community views on the proposal, and those issues which may need further investigation. Broadly speaking, the outcome of the consultation shows that the community understands why a new cemetery in a southern location is under consideration. The services that will be offered in any new cemetery, such as natural burial and cremation, are matters on which the community would like further input. The location of a new cemetery and the site selection process are also of great interest to the community.

The comments received during the consultation period will assist the Authority in making recommendations to the ACT Government on whether and how to proceed with the proposed southern cemetery development.

The Community Response

The Authority and the government take seriously the need to engage the community on issues of important civic infrastructure. Consequently, the Authority commissioned a program of community consultation, which included:

- A three phase community survey (conducted via a telephone survey of 1,000 ACT residents and made available online and in hard copy)
- Numerous stakeholder and community meetings

During the initial consultation phase, the Authority aimed to:

- inform the Canberra community, and particularly residents in the south of Canberra, about the proposal to develop a new southern cemetery in the ACT;
- provide appropriate information about issues that relate to the development of a new cemetery;
- facilitate initial public discussion; and
- identify issues and concerns that the community felt needed further consideration or investigation.

The Proposed Southern Cemetery community consultation program ran for nine weeks, from 30 March to 29 May 2009.

There is general support for a new cemetery in southern Canberra. Only a small proportion of those consulted indicated that they did not support the development of a new cemetery (see Key Findings page 13).

Based on the information collected throughout the consultation process, key outcomes were:

- The majority of people consulted were supportive of the need for a cemetery in south Canberra but there is a need to present further data to confirm the demand for a new development.
- The types of burial services that would be offered at a new cemetery raised considerable interest, especially from particular community groups.
- An increasing interest in natural burials, as is evident in other parts of Australia and internationally.
- The community expressed a preference for a comprehensive service to be offered at a new cemetery. This means that cremation services would be considered as part of a new development. However, issues to do with environmental impact will need to be further explored and communicated. The co-location of a crematorium on the same site as a new cemetery development was a contentious issue for some community groups. Further, the demand for cremation services in this market requires further examination, including the impact on the existing privately owned crematorium.
- There was a wide variety of views expressed about the site that has been identified as the preferred location. In particular, people living close to the identified site have requested more detailed information on the impact of the development on residents, the environment, the existing natural wildlife corridor, the horses currently under agistment on the site and also the impact of being in close proximity to the Mugga Lane Resource Management Centre.
- The preferred site will have to be subjected to detailed assessment for Aboriginal sites
- More detailed information was requested on the other sites that have been considered and the siting assessment process. During the consultations, the community took the opportunity to make suggestions as to other areas in Canberra that could be considered for a southern cemetery.

The Consultation Program

Consultation tools

The objectives of the initial consultation phase were to:

- inform the Canberra community, and particularly residents in the south of Canberra, about the proposal to develop a new southern cemetery in the ACT;
- provide appropriate information about the issues that may relate to the development of a new cemetery;
- facilitate initial public discussion; and
- identify any issues and concerns that the community felt needed further consideration or investigation.

The Proposed Southern Cemetery community consultation program ran for nine weeks, from 30 March to 29 May 2009.

A variety of consultation tools were used to ensure the Canberra community had multiple opportunities to input into the consultation process. This initial consultation phase included:

- An independently run random telephone survey of 1,000 Canberra residents.
- Community survey completed by 1196 people – this survey was available online and in hard copy from all ACT Government Canberra Connect Shopfronts and ACT Public Libraries.
- A letterbox drop to every resident in six suburbs and the majority of residents in another two suburbs in southern Canberra, which comprised a letter outlining the consultation program, a fact sheet and the hard copy survey.
- Community information displays and drop-in consultation sessions – held at Tuggeranong, Woden and Dickson Libraries.
- Community information meeting held on 13 May 2009 at the Southern Cross Club Tuggeranong.
- Targeted stakeholder briefings and meetings held from February and throughout the entire consultation period. Approximately 30 groups participated in these briefings. Various stakeholder groups also distributed information in their newsletters. A consultation list is available at Appendix C.
- A focus group with representatives of the funeral industry.
- Canberra Connect provided an immediate contact point for anyone requiring further information about the proposal or consultation program.
- Advertising, media releases and editorial in local media to promote consultation opportunities, including in the ACT Government's Community Noticeboard and

Public Notice advertisement in The Canberra Times (Saturday editions), as well as radio grabs on Canberra's two leading FM radio stations.

- Websites – the Department of Territory and Municipal Services (TAMS) website (www.tams.act.gov.au) provided up to date information on the consultation opportunities. Links to that site were also posted on the Canberra Cemeteries website (www.canberracemeteries.com.au), the ACT Government portal in the 'Hot Topics' section and the Community Noticeboard (www.act.gov.au), and the Department of Disability, Housing and Community Services' website in the Engagement section (www.dhcs.act.gov.au/engagement).

Key Findings

Community Survey – via telephone

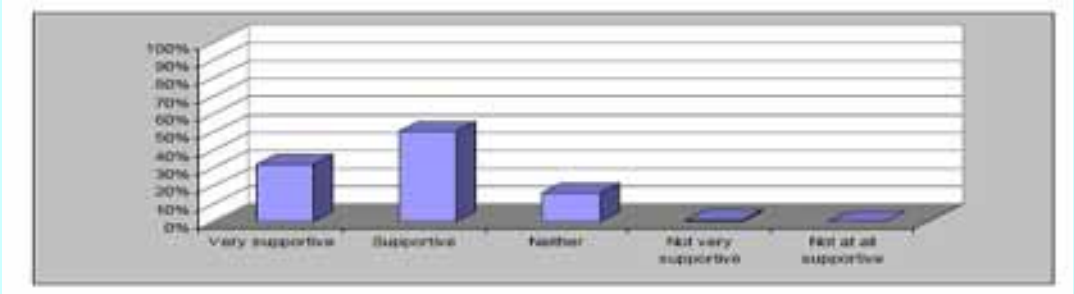
The telephone survey was conducted during May. One thousand Canberra residents were interviewed. This sample size and the random selection of respondents, is considered to be statistically valid and provides a sound basis for gauging community opinion. The questionnaire used is at Appendix B.

Overall, the research has highlighted a very high level of support for the development of a new southern cemetery. The survey confirmed community interest in the inclusion of a crematorium in a new cemetery development.

Support for the development of the new southern cemetery

- Over 80 percent of respondents expressed support for the development of the cemetery. Only 1 percent of respondents indicated that they did not support the development of a new southern cemetery.

Results Table 1: How supportive would you say you are of a new southern cemetery being developed?



Knowledge of suitable sites for a new southern cemetery

- 11 percent of respondents were able to suggest sites that they felt were suitable for the development of the new cemetery. Suggested sites included Mugga Lane (53 percent), Hume (29 percent) and Tuggeranong (18 percent).

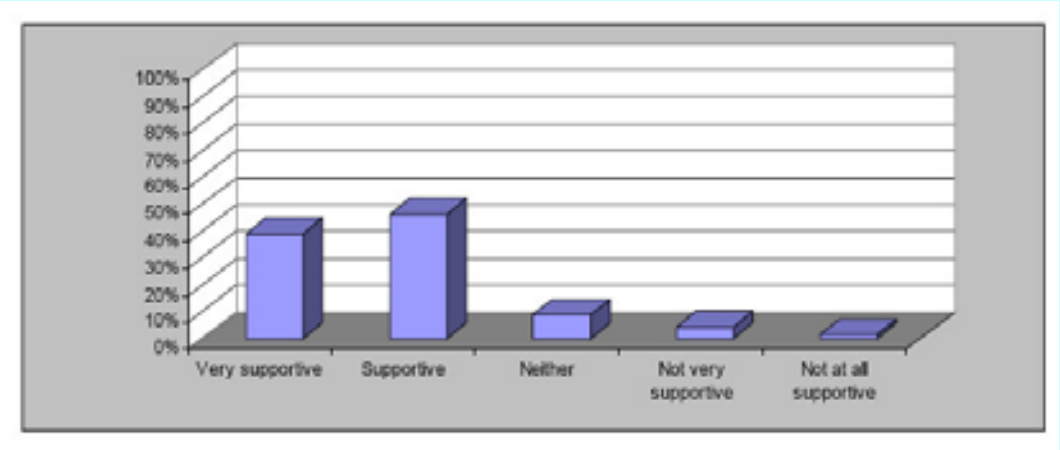
Specific types of burial that the cemetery should cater for

- 32 percent of respondents indicated that there were specific types of burial that the new southern cemetery should cater for. Of those respondents, 45 percent suggested that the cemetery should cater for `cremation', whilst 29 percent suggested `natural/eco burial' options.

Support for the development of a new crematorium

- Support for the development of a new crematorium was also very high – 85 percent of respondents expressed support for a new crematorium and 92 percent stated that the proposed crematorium should be placed on the same site as the new cemetery.
- 6 percent of respondents indicated they were not supportive of a new crematorium. The primary reasons given related to not believing in cremation (2 percent of the total sample), environmental concerns (1 percent of the total sample) and a belief that the existing facilities should be adequate (1 percent of the total sample).

Results Table 2: How supportive would you say you are of a new crematorium being developed?



Support of Fadden, Gowrie, Macarthur and Monash residents (Postcode 2904)

These suburbs are within close proximity to the proposed site. Overall, respondents from the postcode area 2904 were supportive of the proposed cemetery.

Whilst the sample size of the random telephone survey was only 64 responses, the results still indicate high levels of support for the development of a new southern cemetery as well as the development of a new crematorium. This is reflected in the following outcomes:

- 79 percent of respondents from within the postcode area 2904 were `very supportive' or `supportive' of a new southern cemetery being developed.
- Only 3 percent of respondents indicated that they did not support the development of a new southern cemetery.

- 78 percent of respondents 'very supportive' and 'supportive' of a new crematorium being developed. 11 percent of respondents indicated that they did not support the development of a new crematorium.
- 89 percent of respondents from the postcode area 2904 were supportive of the proposed crematorium being placed on the same site as the new cemetery, 6 percent were unsure and 5 percent stated that it should not be on the same site.

The full report on the telephone survey is available online at www.tams.gov.au.

Community survey - online and hard copy

The Community Survey was available online and in hard copy from 31 March to 29 May 2009. A total of 1196 people responded to the survey.

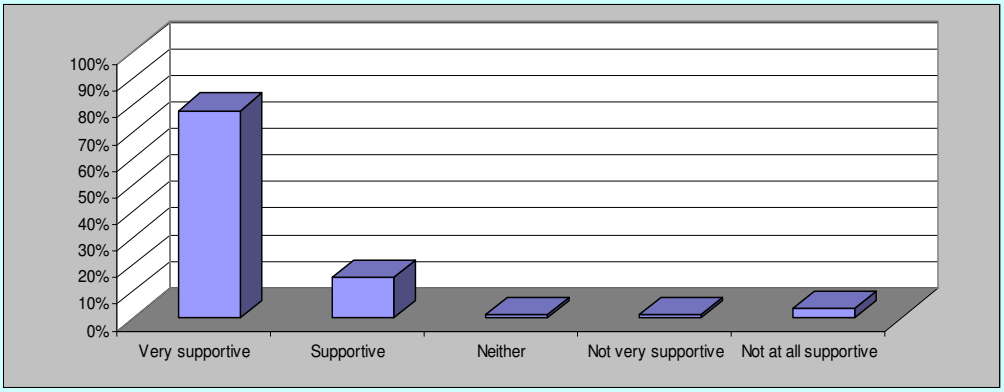
The samples of both the online and hard copy surveys were 'self selected', meaning that the results are open to selection bias, and therefore not necessarily statistically valid. A review of the individual responses indicates that the sample for this research is strongly weighted to the Islamic Community within the ACT. This bias should be recognised when reviewing the outcomes of this research.

Overall, the research has highlighted a very high level of support for the development of a new southern cemetery and moderately high support for the crematorium.

Support for the development of the new southern cemetery

- 78 percent of respondents stated that they were 'very supportive', 15 percent 'supportive' and 1 percent were 'neutral - neither supportive nor unsupportive'.
- Only 5 percent of respondents indicated that they did not support the development of a new southern cemetery.

Results Table 3: How supportive would you say you are of a new southern cemetery being developed?



Knowledge of suitable sites for a new cemetery

- 18 percent of respondents were able to suggest sites that they felt were suitable for the development of the new cemetery. Suggested sites were 'Hume, Monaro

Highway and Long Gully/Mugga Lane area' (65 percent) and Tuggeranong (16 percent).

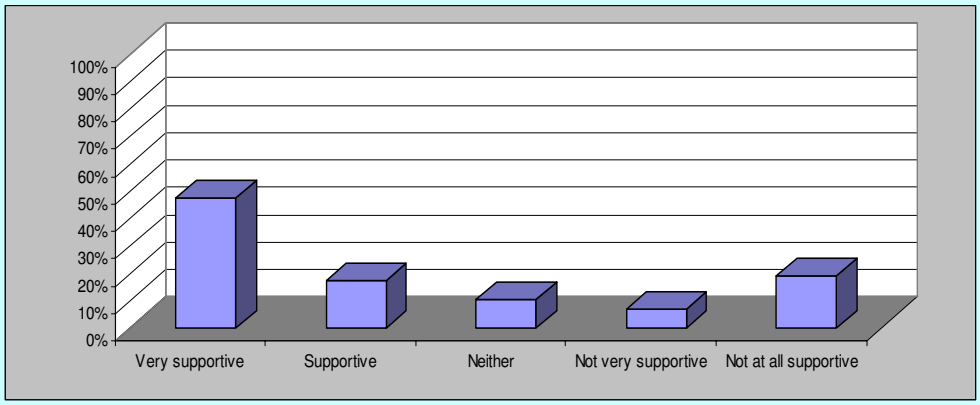
Specific types of burial that the cemetery should cater for

- 81 percent of respondents indicated that there were specific types of burial that the new southern cemetery should cater for. Of those that indicated specific burial types, 62 percent suggested that the cemetery should cater for `Islamic/Muslim burials' and 20 percent suggested `natural burials'.

Support for the development of a new crematorium

- Support for the development of a new crematorium was moderately high - 64 percent of respondents expressed support, whilst 26 percent indicated that they were not supportive of a new crematorium.

Results Table 4: How supportive would you say you are of a new crematorium being developed?



- Of the respondents who were unsupportive of the development, the primary reasons given related to it being `against my religion/beliefs' and `energy use/environmental concerns'.
- Respondents' attitudes to the location of the crematorium were mixed, with 35 percent stating that the crematorium should be placed on the same site as the new cemetery, 43 percent disagreed and 22 percent were unsure.

Importantly, of the respondents who stated that the cemetery and crematorium should not be on the same site, over half (54 percent) stated that this was because `there should be separate and distinct areas for cremations and burial, as is the case in Gungahlin'.

Support of Fadden, Gowrie, Macarthur and Monash residents (Postcode 2904)

These suburbs are the closest suburbs to the proposed site. Overall, respondents from the postcode area 2904 were supportive of the proposed cemetery.

- 81 percent of respondents from within the postcode area 2904 supported the proposal and 15 percent of respondents indicated that they did not support the development of a new southern cemetery.

Results Table 5: How supportive would you say you are of a new southern cemetery being developed?

Overall

	Count	Column N %
Very supportive	924	78.0%
Supportive	181	15.3%
Neither	17	1.4%
Not very supportive	17	1.4%
Not at all supportive	45	3.8%
Total	1184	100.0%

Fadden, Gowrie, Macarthur and Monash residents

	Count	Column N %
Very supportive	54	52.4%
Supportive	30	29.1%
Neither	4	3.9%
Not very supportive	4	3.9%
Not at all supportive	11	10.7%
Total	103	100.0%

- 54 percent of respondents from within the postcode area 2904 were supportive of a new crematorium being developed, 13 percent were neutral and 33 percent indicated that they were not supportive of a new crematorium.
- 52 percent of respondents from the postcode area 2904 stated that the proposed crematorium should be placed on the same site as the new cemetery, 19 percent were unsure and 30 percent stated that it should not be on the same site. Importantly, of the respondents who stated that the cemetery and crematorium should not be on the same site, 60 percent stated that this was because 'there should be separate and distinct areas for cremations and burial, as is the case in Gungahlin'.

Results Table 6: How supportive would you say you are of a new crematorium being developed?

Overall

	Count	Column N %
Very supportive	460	47.3%
Supportive	168	17.3%
Neither	97	10.0%
Not very supportive	64	6.6%
Not at all supportive	183	18.8%
Total	972	100.0%

Fadden, Gowrie, Macarthur and Monash residents

	Count	Column N %
Very supportive	31	33.7%
Supportive	19	20.7%
Neither	12	13.0%
Not very supportive	6	6.5%
Not at all supportive	24	26.1%
Total	92	100.0%

The full report for the community surveys completed online and in hard copy are available online at www.tams.gov.au.

Issues raised during the consultation program

During the community consultation program, significant issues were raised that require further examination and ongoing community engagement. The issues raised were centred around four key themes:

1. Services to be offered at a new cemetery
2. Crematorium services
3. Location and site criteria
4. The proposed site
5. Aboriginal community

The following table provides a summary of all the issues raised grouped against the five key themes that have emerged.

Services to be offered
• The community would like an indicative timeframe for when natural burial would become an option • Education is needed about natural burial as a burial option • Some faith groups have specific needs, such as the provision of preparation/wash room facilities in any new development • The provision of a non denominational chapel and after service reception area was a high priority for many people, as was an outdoor service area • Maintaining a variety of choices of burial services and areas, as is the case at the existing cemetery, was another high priority for many people • A new development is expected to be a well maintained and manicured environment with a natural look. However, issues concerning water requirements were expressed • More detailed data is required to confirm the demand and need for another cemetery in Canberra. Other options were raised to address demand (such as introducing limited tenure and investigating any new methods or technologies that are being used around the world). The viability of a new cemetery and confirmation of who would manage the facilities was also raised.
Crematorium services
• Several concerns have been raised concerning the development of a new crematorium, and particularly if developed on a site close to residential areas. The main issues raised were: o confirmation that appropriate environmental studies will be done to satisfy concerns and ensure informed decisions are made as to the level of cremation pollution (atmospheric and ground), the cumulative effect and dispersion of emissions presented comparative to other emitters, the smell and visual impact o clarification of the operating hours – i.e. confirmation that it would not

operate 24 hours a day and over weekends
    - confirmation of the demand for another crematorium in the current market and that other options were considered to address need
    - cremation is prohibited in some faiths

Location and site criteria

- More detailed information was requested on the four sites considered and the assessment process that was undertaken.
- Confirmation that any new development would be subject to the full planning provisions (i.e. a Development Application and an independent Environmental Impact Statement)?
- Access to public transport and accessibility for disabled people was a priority for the site selected
- Clarification sought over whether other sites could be considered as natural burial grounds
- Concern was expressed about the water levels that would be required to maintain a new development and if that was sustainable in the future

The Proposed Site

- Several concerns were raised in relation to the site that has been identified as the preferred location for a new southern cemetery. These issues include:
    - the visual impacts, particularly for neighbouring suburbs
    - the impact of transport options to ensure accessibility and usability to the site
    - clarification was sought over the amount of land that is required, and that adequate buffer zones have been factored in to cater for future needs. The impact of future industrial build-up in the area on both a new cemetery and residents was also of concern
    - the appropriate treatment and protection of the natural wildlife corridor was a priority for the community
    - the proposed site will result in the potential loss of 21 hectares of horse agistment paddocks and horse riding trails
    - clarification was sought over the number of roads that will be needed to service users and the impact to the land
    - confirmation was sought that a full examination would be conducted of the suitability and sustainability of the proposed site, particularly with regards to heritage and conservation, flooding, wind direction, plume, soil quality and the impact of being located adjacent to the Mugga Way Resource Management Centre
    - clarification sought over timeframes if development proceeds
    - clarification was sought of the process of consultation (linked into the Government's published engagement policy)

Aboriginal community

- The preferred site will have to be subjected to detailed assessment of Aboriginal sites
- Consultation with Aboriginal organisations is continuing

Next Steps

It is important to remember that no decisions have been made regarding a proposed new southern cemetery development in south Canberra.

The ACT Public Cemeteries Authority encourages the Canberra community to submit comments in relation to the proposed cemetery development in southern Canberra and this Consultation Report. All comments can be submitted in writing to:

Re: Proposed Southern Cemetery Consultation Report
Community Engagement and Communications
Department of Territory and Municipal Services
GPO Box 158
CANBERRA ACT 2601

Inquiries can be made by telephoning Canberra Connect on 13 22 81.

Written comments on the preliminary consultation report close **Friday 11 September 2009**. A discussion paper covering community feedback, the suitability of the proposed site on Mugga Lane, and an environmental assessment of proposed facilities will be released for public comment in late 2009.

Thank you for your consideration of this issue and we welcome your comments.

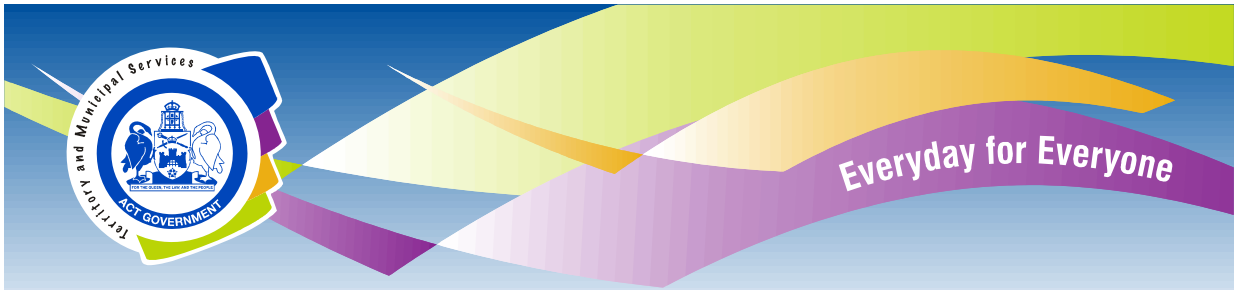
Appendix A – Fact Sheets used to support consultation

Fact Sheet 1: Frequently Asked Questions

Fact Sheet 2: Frequently Asked Questions – Natural Burials

Fact Sheet 3: Frequently Asked Questions – Crematoria Services

Fact Sheet 4: Frequently Asked Questions – Alternative Sites



Proposal for a new southern cemetery in the ACT
Frequently Asked Questions

The ACT Public Cemeteries Authority has identified the need for a new cemetery to cater for the future needs of the ACT. On 6 February 2009, the ACT Government agreed to a proposal from the Authority to explore the options in determining a site for a new cemetery in the ACT. The ACT Government and project consultants are now undertaking a community consultation program to gauge public opinion on the development of a new cemetery, its location and the services the community would want a cemetery to provide.

Why is there a need for a new cemetery in the ACT?
A new cemetery takes a significant amount of time to plan and construct. It is important that discussions begin now so that decisions can be made well ahead of the time when a new cemetery for the ACT is needed.

There are currently three cemeteries in the ACT – Gungahlin Cemetery, Woden Cemetery and a smaller cemetery in Hall. The Woden Cemetery, located in the south of Canberra, is filling up. There are approximately 1500 burial allotments remaining and the average number of allotments occupied each year is 200. This means all available allotments are likely to be filled within eight years.
Once the Woden Cemetery is at capacity, a new cemetery will be needed to service southern Canberra.

What services could be offered if a new cemetery is developed?
Cemeteries in the ACT offer the community a range of options. These include:

- Conventional headstone burials – a traditional option featuring granite, marble or concrete headstones and bases
- Lawn burials – feature bronze plaques on granite or concrete bases on the grave at ground level and raised headstones
- Garden burials (family estates) – allotments sold in pairs - up to four around a central garden
- Mausoleum (above ground crypts) – Mausoleums are buildings with spaces or burial chambers for coffins, usually above ground
- Memorials for cremated remains – Ashes can be placed in family graves, specially designed walls, under and around trees or in specially designated garden beds.

While there is a strong need for the services that cemeteries in the ACT have traditionally offered, there is also growing interest in alternate services such as natural burial (see 'Frequently Asked Questions – Natural Burials' fact sheet).

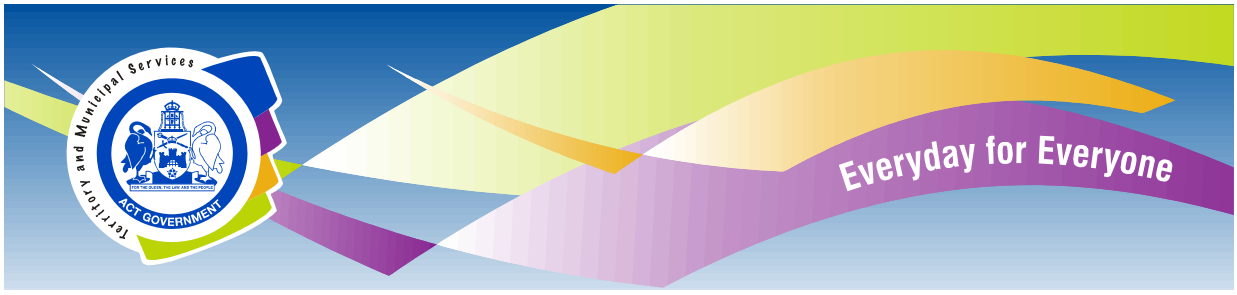
Many modern-day cemeteries, nationally and internationally, also include crematoria services. There are approximately 90 crematoria in Australia, one for every 245,000 population, but only one in the ACT.

All of these options are open for discussion and for potential inclusion in a new southern cemetery.

Where would a new cemetery be located?
As Woden Cemetery is soon to reach full capacity a new cemetery would ideally be located in southern Canberra. While a number of sites in southern Canberra have been considered for a new cemetery in the ACT, one site has been assessed as the most suitable. This site is located on the southern side of the intersection of Mugga Lane and Long Gully Road (encompassing Block 1676 and parts of Block 1677 Tuggeranong District).

Why was the current site chosen as the preferred option?
According to the ACT Public Cemeteries Authority this preferred site meets many of the siting criteria for a cemetery. Siting criteria include:

- Suitable land classification under the Territory Plan (Broad acre)
- Proximity to main roads
- Able to accommodate separate or large exit/entrance
- Minimum site of 40 hectares
- Topography (predominately flat)
- Buffer zone (minimum 20 metre buffer around burial areas)
- Large traffic capacity/access to accommodate large cortege
- Consistent subsoil not containing large areas of rock
- Able to withstand rigorous mass soil movement
- Outside 100 year flood zone
- Low water tables desirable (ideally minimum three metres)
- Access to services (water, electricity and gas)
- Access to public transport
- Access to water and potential for capturing runoff in dams



How can I be involved with the consultation process?
The ACT Public Cemeteries Authority and ACT Government held meetings with representatives from key stakeholder groups to seek input to the consultation process during March 2009. A comprehensive community consultation program commenced on 30 March 2009 with a random telephone survey of 1,000 residents.

There are a variety of ways that the community can contribute to the consultation. These include:

- Completing a community survey either online on the Territory and Municipal Services (TAMS) website or a hard copy survey which can be picked up from all ACT Government Canberra Connect Shopfronts and ACT Public Libraries;
- Collecting information fact sheets from any ACT Government Canberra Connect Shopfront or ACT Public Library or online;
- Viewing information displays throughout the consultation period; and
- Attending a community information session.

To complete the survey or for more information visit www.tams.act.gov.au, or drop into a Canberra Connect Shopfront or your nearest ACT Public Library.

Submissions for the community survey close on Friday 22 May 2009.

After the first round of public consultation a discussion paper will be produced and released for further comment.

For more information on ACT Cemeteries please visit www.canberracemeteries.com.au.

Proposed Southern Cemetery
Frequently Asked Questions – Natural Burials

What is a natural burial?
The Australasian Cemeteries and Crematoria Association define a natural burial as the act of returning the body as naturally as possible to the earth. The body is not embalmed or cremated but instead buried in a simple casket or shroud in a protected green space. Only biodegradable and non-toxic materials may be buried with the body as part of a natural burial.

How are natural burials different from standard burials?
By choosing a natural burial, people are choosing a burial method which has a lower environmental impact. A natural burial reduces the energy and resource consumption associated with traditional practices in the longer term.

Are there markers to identify where the body was buried?
Natural burial grounds only contain natural markers that blend with the landscape. These markers can include shrubs and trees, or rocks or stones which may be engraved.

How can people find their deceased family member?
As in all cemeteries, careful records are kept of every interment and sites are mapped with a Geographic Information System (GIS).

Are there any natural burial grounds in Australia?
Natural burials grounds are located in Lismore (NSW), Kingston (Tasmania), Pinnaroo Valley Memorial Park (Western Australia) and the Lilydale Cemeteries Trust (Victoria). Queanbeyan Cemetery also has a 'bush' section. The South Australian Government announced in October 2008 that their first natural burial ground will be opened at Enfield Memorial Park. In a number of jurisdictions natural cemeteries are being used to establish or restore forests or woodlands with native plant species.

Internationally, natural burial grounds are the fastest growing environmental movement in the United Kingdom. The first woodland burial ground was opened in 1993 and there are now approximately 200 in the UK. ACT legislation will need to be reviewed should demand for natural burial in the ACT grow. At present natural burial is only open to members of the Muslim community because of an established practice of allowing burial in a shroud.

Would a new southern cemetery allow for natural burial?
Natural burial is being considered as an option for the proposed southern cemetery. Feedback from consultation with the community and a further feasibility study will inform the decision on whether to proceed with natural burial as a part of the southern cemetery.

Proposed Southern Cemetery
Frequently Asked Questions - Crematoria Services

Cremation is chosen by more that 50% of Australians as an alternative to conventional burial. In metropolitan areas this figure is often much higher with 60-80% of Australians choosing to be cremated. As such, cremation is one service that is being considered for inclusion at a new cemetery in the ACT.

There are approximately 90 crematoria in Australia. This means that there is one crematorium for every 250,000 people in Australia. The existing crematorium at Mitchell provides the sole cremation service across the Capital Region. The nearest other crematoria are located in Wagga Wagga, Bega and Broulee.

About 70% of Canberrans now choose to be cremated and any new cemetery would need to recognise that cremation is an important option. A new crematorium, and associated memorial areas, for southern Canberra would be more convenient for southern residents.

What is the environmental impact of a crematorium?

Generally the volume and type of emissions from a crematorium are considered relatively insignificant compared to other gas-fired facilities.

Should community feedback support further consideration of the proposal to build a crematorium as a part of a new southern cemetery, a detailed assessment of emissions in the immediate and surrounding areas would be undertaken. This would inform a broader assessment of the environmental, social and economic impact of a crematorium.

Modern crematoria are constructed and landscaped to complement the surrounding environment. Some crematoria are constructed as part of a memorial hall while others are stand-alone buildings. Cremation interment and memorials, and the common practice of ‘scattering ashes’ uses significantly less, or negligible, space compared to other popular forms of burial.

What environmental approvals are required?

The crematorium would need to meet or exceed all of the environmental standards set by the ACT Government's Environment Protection Authority (EPA).

In assessing the facility, the EPA would take into account the social, economic and environmental aspects of the crematorium. The ACT Heritage Unit and Parks, Conservation and Lands would also need to assess the proposal with regard to heritage and land use matters.

The operation of a crematorium is a Class A activity under the *Environment Protection Act 1997,* therefore the operator must obtain an Environmental Authorisation to operate the facility.

Where would a crematorium be located?

The Australasian Cemeteries and Crematoria Association Guidelines for a Crematorium recommend that cremators be located at least 200 metres from residences.

If a crematorium was located on the same site as the proposed cemetery it would be considerably further away than the recommended minimum distance.

Proposal for a new southern cemetery in the ACT
Frequently Asked Questions – Alternative Sites

The ACT Public Cemeteries Authority has identified the need for a new cemetery to cater for the future needs of the ACT. On 6 February 2009, the ACT Government agreed to a proposal from the Authority to explore the options in determining a site for a new cemetery in the ACT. The ACT Government and project consultants are now undertaking a community consultation program to gauge public opinion on the development of a new cemetery, its location and the services it could provide.

Has a site been identified for a new cemetery?
As Woden Cemetery is soon to reach full capacity a new cemetery would ideally be located in southern Canberra.

In recent years, the ACT Public Cemeteries Authority and the ACT Government have investigated a number of potential cemetery sites. These include:

- Part of Block 1677 (corner of Monaro Highway and Isabella Drive)
- Part of Block 154 Jerrabomberra
- Greenway (west of Rowland Crescent between the Murrumbidgee River and the Town Centre)
- Block 1676 and parts of Block 1677 Tuggeranong District (southern side of the intersection of Mugga Lane and Long Gully Road)

The site located near Mugga Lane and Long Gully Road has been identified by the ACT Public Cemeteries Authority as the most suitable, as assessed against siting criteria, to proceed with further evaluation.

Why was the current site identified as the preferred option?
The site, located on the southern side of the intersection of Mugga Lane and Long Gully Road (Block 1676 and parts of Block 1677 Tuggeranong District), has been identified by the ACT Public Cemeteries Authority as the preferred site for a new cemetery in the ACT. A preliminary assessment has indicated that this site is the 'best fit' with the siting criteria.

Siting criteria include:

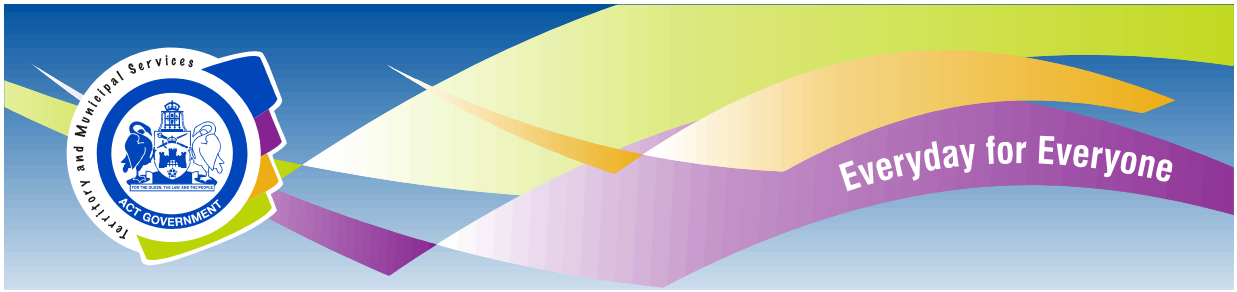
- Suitable land classification under the Territory Plan (Broad acre)
- Proximity to main roads
- Able to accommodate separate or large exit/entrance
- Minimum site of 40 hectares
- Topography (predominately flat)
- Buffer zone (minimum 20 metre buffer around burial areas)
- Large traffic capacity/access to accommodate a large cortege
- Consistent subsoil not containing large areas of rock
- Able to withstand rigorous mass soil movement
- Outside 100 year flood zone
- Low water tables desirable (ideally minimum three metres)
- Access to services (water, electricity and gas)
- Potential for to public transport
- Access to water and potential for capturing runoff in dams

A full feasibility study will be undertaken on the establishment of a cemetery, and possibly a crematorium, if the concept is supported by the community.

What is the planning process for a cemetery?
All proposed developments are assessed by the ACT Planning and Land Authority (ACTPLA) in accordance with the *Planning and Development Act 2007* and the Territory Plan.

For more information on the development assessment process visit www.actpla.act.gov.au

How can I be involved with the consultation process?
The ACT Public Cemeteries Authority and ACT Government held meetings with representatives from key stakeholder groups to seek input to the consultation process during March 2009. A comprehensive community consultation program commenced on 30 March 2009 with a random telephone survey of 1,000 residents.



There are a variety of ways that the community can contribute to the consultation. These include:

- Completing a community survey either online on the Territory and Municipal Services (TAMS) website or a hard copy survey which can be picked up from all ACT Government Canberra Connect Shopfronts and ACT Public Libraries;
- Collecting information fact sheets from any ACT Government Canberra Connect Shopfront or ACT Public Library or online;
- Viewing information displays throughout the consultation period; and
- Attending a community information session.

To complete the survey or for more information visit www.tams.act.gov.au, or drop into a Canberra Connect Shopfront or your nearest ACT Public Library.

Submissions for the community survey close on Friday 22 May 2009.
After the first round of public consultation a discussion paper will be produced and released for further comment.

For more information on ACT Cemeteries please visit www.canberracemeteries.com.au.

Appendix B – Community Survey Questionnaire

Attitudes of ACT residents towards the development of a new southern cemetery
Community Survey - 2009

In response to a recommendation from the ACT Public Cemeteries Authority, the ACT Government made an announcement on 6 February of this year that it would consult with the Canberra community about the development of a new southern cemetery. This survey is one part of that consultation process and will only take five minutes of your time.

Q1. Previous to this phone call, were you aware of the new proposal to develop a southern cemetery?

Yes O No O

Q2a. How supportive would you say you are of a new southern cemetery being developed?

Very supportive	Supportive	Neither	Not very supportive	Not at all supportive	D/K
O	O	O	O	O	O

Q2b. (If not very supportive or not at all supportive), please explain why.

……..

Q3a. Are you aware of any sites that you feel may be suitable for a new southern cemetery?

Yes O No O **(If no, go to Q4a)**

Q3b. (If yes), please specify the site. .....

Q3c. Why do you believe that this site is suitable?

……..

Q4a. If the new cemetery development was to go ahead, are there any specific types of burial that you believe the cemetery should cater for?

Yes O No O **(If no, go to Q5a)**

Q4b. (If yes), please specify what types?

……..

Q5a. Assuming that a suitable location was identified, how supportive would you say you are of a new crematorium being developed?

Very supportive	Supportive	Neither	Not very supportive	Not at all supportive	D/K
O	O	O	O	O	O

Q5b. (If not very supportive or not at all supportive), please explain why.

……..

Q5c. If a new crematorium was developed, do you believe that this crematorium should be placed on the same site as the new cemetery?

Yes O No O Don't know O **(If yes or don't know, go to Q6)**

Q5d. (If no), why do you say that?

……..

Q6. Do you have any comments you wish to make regarding the development of a new southern cemetery?

.....

DEMOGRAPHICS

Q7. What is your residential postcode? .....

Q8. For how many years have you lived in the ACT? .....

Q9. Please indicate your age group.

18 – 24	25 – 34	35 – 44	45 – 54	55 – 64	65+
O	O	O	O	O	O

Q10. Gender. Male O Female O

That completes the survey. As this is market research you can be assured that it is carried out in full compliance with the Privacy Act and the information you provided is only used for research purposes.

The closing date for submissions is Friday 22 May 2009.

Please return to:
Re: Proposed Cemetery Survey
Community Engagement and Communications
Department of Territory and Municipal Services
GPO Box 158
Canberra City ACT 2601

Further information on the proposed southern cemetery is available from the Territory and Municipal Services website **www.tams.act.gov.au** or phone Canberra Connect on 13 22 81.

Appendix C – Consultation List

The following list of individuals and groups were consulted with about the proposed cemetery development:

Members of the Legislative Assembly
- Ms Joy Burch
- Mr John Hargreaves
- Ms Caroline Le Couteur

Leader of the Opposition Zed Seselja
Tuggeranong Community Council
Woden Valley Community Council
Weston Creek Community Council
Gungahlin Community Council
Belconnen Community Council
North Canberra Community Council
Horse Paddock User Group
CPR (Canberrans for Power Station Relocation)
United Ngunnawal Elders Council
Indigenous Elected Body
Ngambri Inc.
No Waste / Revolve
Symonston Respite Facility (Department of Disability, Housing & Community Services)
Council of the Aged
Queanbeyan Cemetery Management
Roads ACT
ACT Planning and Land Authority
ACT Parks, Conservation and Lands
Multicultural and Community Affairs, Department of Disability, Housing and Community Services
Symonston Respite Facility, DisabilityACT, Department of Disability, Housing and Community Services
Environmental Protection Agency, DECW
ActewAGL (Electricity and Water)
ACT Public Service
ACT Muslim Advisory Council
Funeral Industry Representatives
War Graves, Dept of Veterans Affairs
Multicultural Community
Nature and Society Forum
ACT Greens Public Forum on Natural Cemeteries

Attachment B

Ecological Assessment

David Hogg Pty Ltd

DRAFT – 7/9/09

CANBERRA SOUTHERN CEMETERY
BLOCKS 1676, 1677, 1520 and 1521
TUGGERANONG
ECOLOGICAL ASSESSMENT

K. Nash and D.McC. Hogg

Report to Purdon Associates Pty Limited

September 2009

DAVID HOGG PTY LTD
ACN 008 564 047 ABN 35 008 564 047
ENVIRONMENTAL CONSULTANTS
SUITE 3, BANK BUILDING, JAMISON CENTRE, MACQUARIE, ACT
POSTAL ADDRESS: PO BOX 213, JAMISON CENTRE, ACT 2614
TELEPHONE: (02) 6251 3885 FAX: (02) 6253 1574
E-mail: dhpl@bigpond.com

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1. INTRODUCTION

1.1 Purpose and Content of the Report

The following report has been prepared for Purdon Associates Pty Limited as an input into planning for the proposed Canberra Southern Cemetery, to be located within part of the area consisting of Blocks 1676, 1677, 1520 and 1521, Tuggeranong District. The study area identified by the ACT Government as providing a suitable site for the cemetery is substantially larger than the area actually required, but contains areas of relatively high ecological value or of lower value with potential to improve over time.

The report is intended to inform the site selection process for the optimum location for the cemetery within the study area, taking account of the level of existing and potential ecological constraints.

Background information regarding the site, in terms of original vegetation, land use history and site criteria relevant to the proposal, is provided in Chapter 2. The current ecological characteristics of the study area are described in Chapter 3 and are used as a basis for discussion of the following matters:

- Assessment of vegetation condition based on classifications outlined in the *ACT Lowland Woodland Conservation Strategy* (Action Plan No. 27, Ref. 1), and current vegetation condition data compiled by the Research and Planning Section (TAMS) which supersedes that in Action Plan No. 27 (Chapter 4).
- Review of the area's strategic value for wildlife habitat and movement, considered in Chapters 5 and 6 respectively.
- Value of the site for threatened species (Chapter 7) and ecological communities (Chapter 8).
- A summary of relative ecological constraints within various parts of the study area (Chapter 9).
- Implications in relation to the Commonwealth *Environment Protection and Biodiversity Conservation Act* (*EPBC Act,* Chapter 10), and the ACT *Planning and Development Act* (*P & D Act*, Chapter 11).
- Assessment of opportunities for ecological enhancements or offsets to compensate for unavoidable adverse impacts (Chapter 12).

1.2 Study Area

The study area is approximately 340 ha in area. It is bounded by Mugga Lane and Long Gully Road to the north, Erindale Drive to the west, the Monaro Highway to the east and the suburbs of Macarthur and Fadden to the south, with special purpose reserves and nature reserves located between the study area and residential areas.

The study area comprises Blocks 1676, 1677, 1520 and 1521. Block 1677 is the largest block, the western part of which is located within Wanniassa Hills Nature Reserve. Block 1676, approximately 17 ha in size, is located within an area currently used for horse agistment. Block 1520 is a narrow strip of land that was identified as a potential services corridor but is understood to be required no longer for that

purpose. Block 1521 is an irregular shaped site located at the northern boundary of the study area, adjoining Long Gully Road. A small privately leased site on public land (Block 1596) and an access road into the site are located within the study area boundary but are not part of the development area. Figure 1.1 shows the location of the blocks within the study area.

1.3 Methodology

1.3.1 Review of existing information

A review of relevant background information was undertaken, including the *ACT Lowland Woodland Conservation Strategy* (Ref. 1) and more recent data compiled by TAMS. Reference is made to previous fieldwork conducted in the area by this firm (Refs. 2, 3) and to existing records and relevant information, as listed in the bibliography.

1.3.2 Field assessment

Field surveys were conducted in August 2009 with the following objectives:

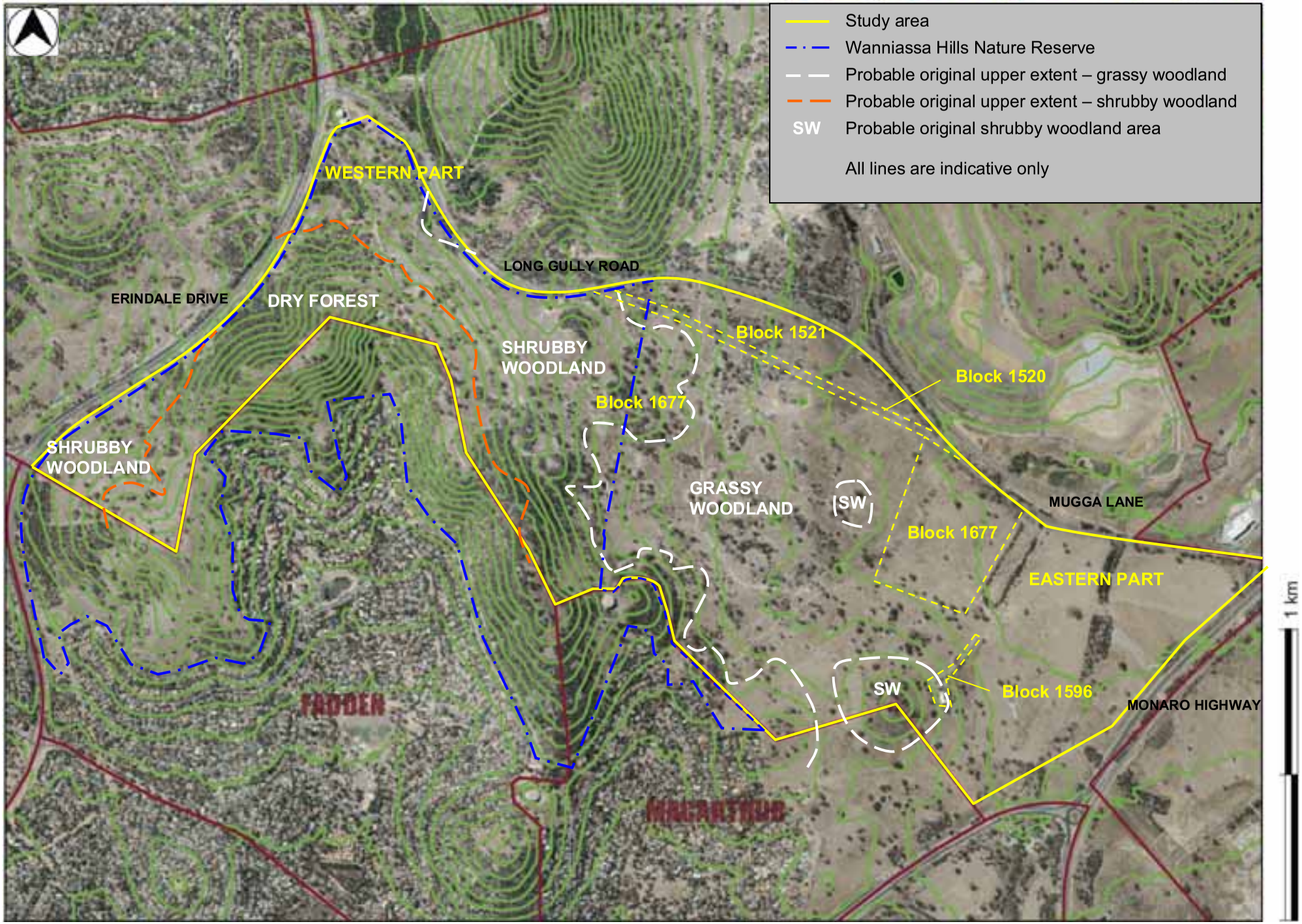
- To describe existing vegetation characteristics such as species diversity and abundance, extent of regeneration, extent of weed invasion.
- To identify the most likely original vegetation communities and map the probable boundaries between those communities.
- To assess vegetation condition.
- To review available habitat features.

The study area was inspected by meandering traverses to identify and map the vegetation communities. This was followed by more detailed inspections of the areas considered to have the highest potential to contain remnants of native vegetation and/or provide habitat for native fauna.

Probable vegetation boundaries were derived from an analysis of the dominant tree species and other vegetation characteristics occurring in each area. Factors such as elevation and soil characteristics were examined in areas where much or all of the tree cover had been removed.

The study area was divided into two areas based on current land uses, as described in Chapter 2. The western part is located in Wanniassa Hills Nature Reserve. Field surveys undertaken in this area were based on data in Action Plan No. 27, and were conducted at a broader scale generally than that undertaken for the eastern part (see Figure 1.1). This reflects the higher level of ecological constraint pertaining to the area as a result of the site's classification as a nature reserve. This issue is discussed further in Chapter 2.

Field surveys were undertaken towards the end of a relatively warm, dry winter within an extended period of below-average rainfall. Many native understorey species are perennial and may only emerge or flower under favourable environmental conditions. Native species are most accurately identifiable when flowering, with most forbs



5 m contour interval

Figure 1.1 Study area

flowering in spring, and grasses in late summer. The highly grazed grasses and low-growing shrubs across the study area are indicative of the heavy grazing prevalent at the time of the inspections. Grazing may prevent flowering and remove diagnostic features from the plant. This report has therefore examined general vegetation characteristics rather than producing a full species list. The latter, if required, would necessitate regular monitoring over the long term under conditions when plant growth was not unduly suppressed by grazing.

2. BACKGROUND INFORMATION

It is probable that, prior to European settlement, the study area contained dry sclerophyll forest in the most elevated regions and yellow box – red gum grassy woodland on the lower slopes and hills. Tablelands dry shrubby box woodland was the transitional ecological community located between the forest and grassy woodland. Natural temperate grassland was probably the dominant community within the lower slopes of the Jerrabomberra Valley located further north-east, beyond the boundary of the current study area.

The probable original boundaries of the various ecological communities within the study area are presented in Figure 1.1. Although there is no abrupt point that clearly defines boundaries between ecological communities, indicative boundaries based on the dominant eucalypt species, aspect, elevation and soil characteristics are provided as an aid to later discussion. The composition and abundance of eucalypts change gradually as the communities merge into one another.

Since European settlement, the study area has been subject to various land uses including tree removal, tree planting, pasture improvement and grazing. Consequently, the original vegetation structure and composition has been modified to differing degrees across the site. For example, there are large areas that have retained a high level of natural integrity located along the steep slopes within Wanniassa Hills Nature Reserve while paddocks dominated by introduced pasture are located in the eastern part of the study area.

The ACT Public Cemeteries Authority has identified the study area as a suitable area for the cemetery based on a number of site criteria (Ref. 4). The criteria particularly relevant to this report include:

- suitable land classification under the Territory Plan (Broadacre);
- topography (predominantly flat); and
- consistent subsoil not containing large areas of rock.

The study area has been divided into two parts reflecting current land uses, with the western part located within Wanniassa Hills Nature Reserve and the eastern part within broadacre land which is currently used as horse agistment paddocks. Each area has been further divided into sections based on similarities in vegetation characteristics for the purposes of the following discussion, with the sections indicated on Figures 3.1 (western part) and 3.2 (eastern part). Parts of the study area, principally areas located within Wanniassa Hills Nature Reserve but also upper hills in the eastern part, do not meet the site criteria listed above and are therefore unlikely to be suitable for the proposed development. Nevertheless, the ecological characteristics of all sections of the study area are described in Chapter 3.

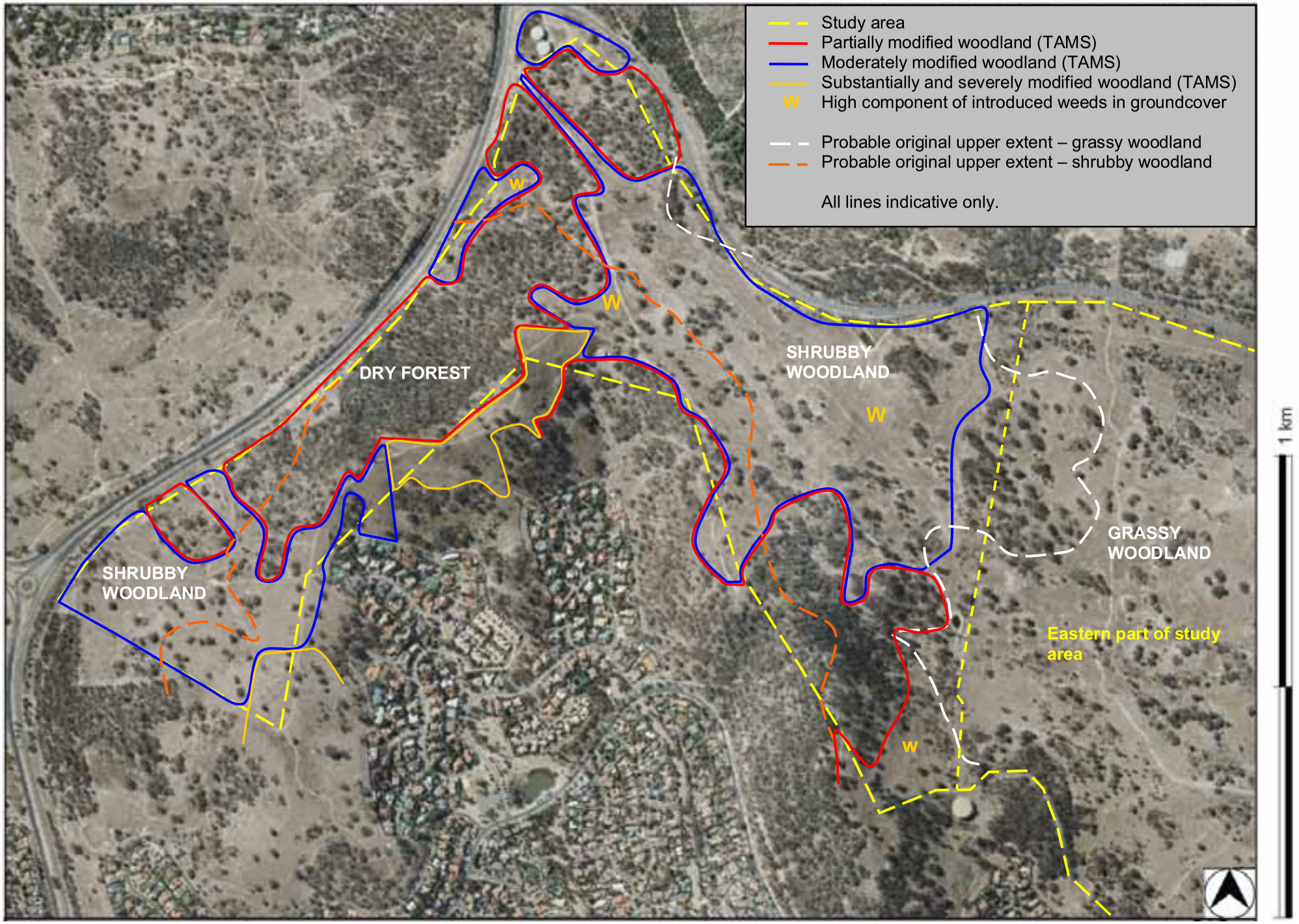


Figure 3.1 Existing vegetation – western part

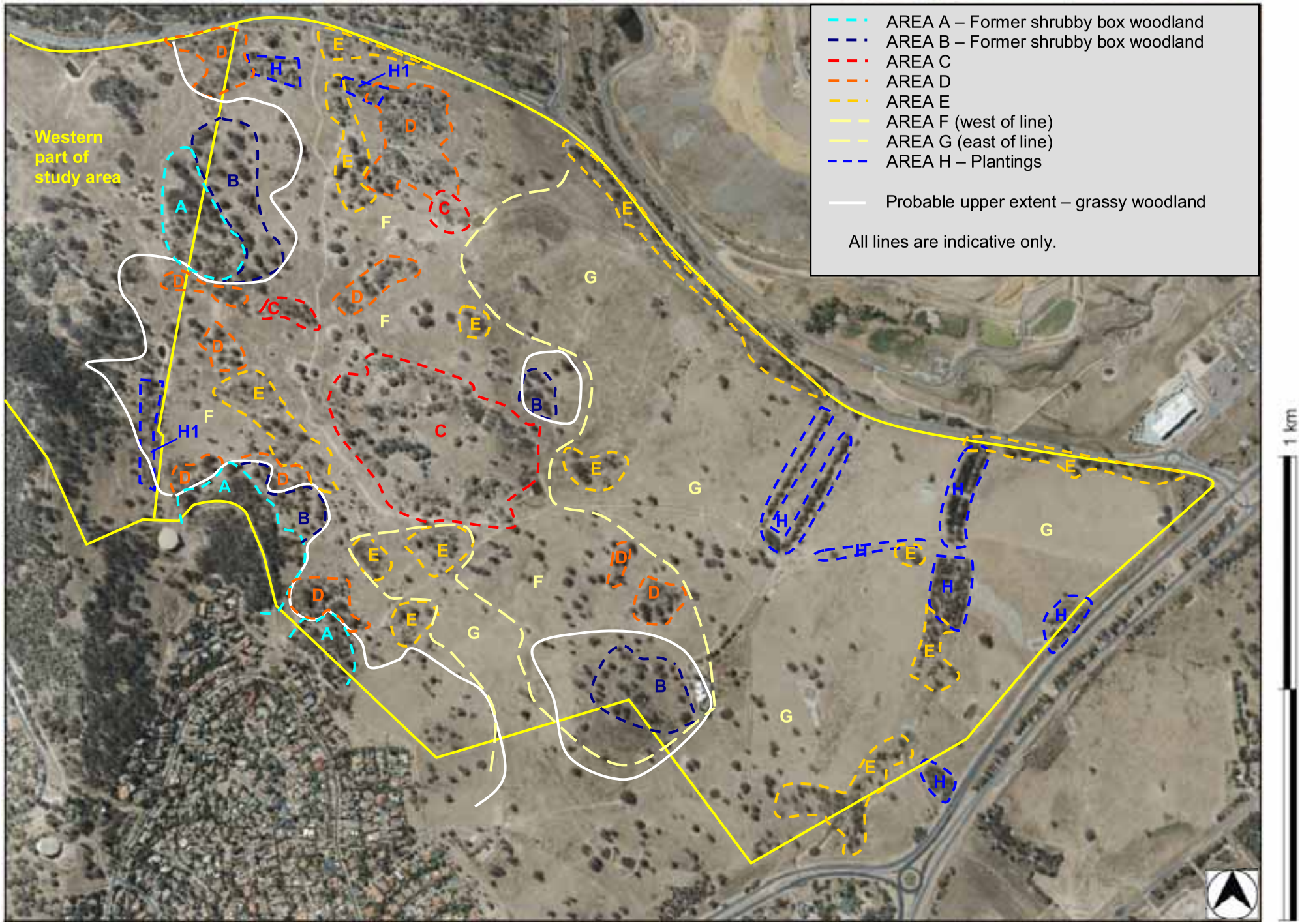


Figure 3.2 Existing vegetation – eastern part

3. DESCRIPTION OF VEGETATION CHARACTERISTICS

3.1 Western Part

The western part of Block 1677 is contained within Wanniassa Hills Nature Reserve. The reserve is located on two ridges and their associated hill slopes, with the western ridge extending in a north-to-south-west direction and the eastern ridge extending in a north-to-south-east direction (see Figure 1.1). The suburb of Fadden is located at the base of and between the two ridges, to the south.

The composition of the vegetation in different parts of the reserve reflects the elevation, aspect, soil type and level of disturbance at each specific site and, because these factors are variable across the area, the vegetation is reasonably diverse. In general, dry sclerophyll forest occupies the higher elevations and rocky knolls and intergrades with dry shrubby box woodland on the middle and lower slopes. Yellow box – red gum grassy woodland occurs on the lower slopes although, due to its elevation, the reserve contains only a small amount of this community (see Figure 3.1).

A substantial number of trees have been removed previously from different areas within the reserve, and these areas are generally in a degraded native condition. Most of the open and grassy areas located on the lower slopes were closely grazed at the time of the site inspections (August 2009).

The characteristics of the ecological communities within the reserve are described below. Although shrub species are listed as occurring in a particular community, many are found in both forest and woodland communities. The species referred to provide an indication of the species diversity within the site and is not intended as a comprehensive list.

Dry sclerophyll forest occurs on the tops of ridges in shallow, rocky and infertile soils, with small patches located on rocky knolls at lower elevations. The least disturbed areas containing this community are characterised by a relatively dense overstorey dominated by scribbly gum (*E. rossii*) and a well developed although patchy shrub layer, interspersed with an open groundcover dominated by silvertop wallaby grass (*Joycea pallida*). Broad-leaved peppermint (*E. dives*) occurs within the forest community on the cooler, moister, southern aspects, while cherry ballart (*Exocarpus cupressiformis*) is scattered throughout and kurrajong (*Brachychiton populneus*) occurs occasionally.

The most commonly occurring shrub species include hickory wattle (*Acacia implexa*), shiny cassinia (*Cassinia longifolia*) and heaths such as twin-flowered beard heath (*Leucopogon fletcheri*), hairy beard heath (*Leucopogon microphyllus*), urn heath (*Melichrus urceolatus*), daphne heath (*Brachyloma daphnoides*) and broom heath (*Monotoca scoparia*). Other shrub species that are locally common, occur at particular sites only or have a scattered distribution include cough-bush (*Cassinia quinquefaria*), bitter cryptandra (*Cryptandra amara*), grey guinea flower (*Hibbertia obtusifolia*), austral indigo (*Indigofera australis*), bush pea (*Pultenaea procumbens*) and five corners (*Styphelia triflora*).

Commonly occurring groundcover and forb species include matrushes (*Lomandra longifolia* and *Lomandra filiformis*), sticky everlasting (*Xerochrysum viscosum*) and nodding blue lily (*Stypandra glauca*), with species such as rock fern (*Cheilanthes austrotenuifolia*), false sarsaparilla (*Hardenbergia violacea*), digger's speedwell (*Derwentia perfoliata*) and creeping hovea (*Hovea heterophylla*) less widespread.

The dry forest within Wanniassa Hills Nature Reserve represents the lower altitude warmer component of the red stringybark (*E. macrorhyncha*) – scribbly gum alliance and has been assessed as an important example of this species association (Ref. 5).

Dry shrubby box woodland occurs on the lower exposed slopes of hills although extends to higher and lower elevations along creek-lines. Dry shrubby box woodland is characterised by an overstorey of red box (*E. polyanthemos*), apple box *(E. bridgesiana*) and mealy bundy (*E. nortonii*), with drooping she-oak (*Allocasuarina verticillata*) a locally dominant species at a several sites. The tree cover is generally more open within woodland than in dry forest.

The shrub layer in this community is well developed and contains similar species to the forest community in addition to a wider range of wattles (*A. dealbata*, *A. doratoxylon*, *A. mearnsii*), and shrubs such as native blackthorn (*Bursaria spinosa*) and violet kunzea (*Kunzea parvifolia*). The groundcover is dominated by silvertop wallaby grass although other grasses such as poa tussock (*Poa sieberiana*), purple wire grass (*Aristida ramosa*), kangaroo grass (*Themeda australis*), spear grasses (*Austrostipa* spp.), wallaby grasses (*Austrodanthonia* spp.), redleg grass (*Bothriochloa macra*) and weeping grass (*Microlaena stipoides*) are dominant in the more open areas and towards the lower boundary of the community, where shrubby woodland grades into grassy woodland.

Yellow box – red gum grassy woodland occurs on the lower slopes of hills and in gently undulating topography (Ref. 1). Prior to European settlement, grassy woodland probably surrounded the ridges that comprise the reserve, although most of these areas are beyond the boundaries of the reserve. The dominant tree species are yellow box (*E. melliodora*) and Blakely's red gum (*E. blakelyi*), although apple box is often co-dominant, particularly along creeklines. In an undisturbed condition, the community is characterised by an understorey of mid-height tussock grasses, a wide diversity of forbs and a discontinuous layer of low growing shrubs (Ref. 1).

The grassy woodland community within the reserve is restricted to the eastern boundary, with small pockets located adjacent to Long Gully Road (north). In general, these areas contain mature and regenerating yellow box and Blakely's red gum trees above a ground layer containing a mixture of native grasses and introduced grasses and weeds. As this community is more widespread within the eastern part of the study area, a more detailed species list is provided in Section 3.2.

Trees have been partially or completely removed most notably from the upper ridgeline, most of the north-east facing slope and a west facing slope located in the south-western part of the study area. These areas formerly contained shrubby box woodland or dry forest.

Native grasses (kangaroo, wallaby, spear, redleg, weeping and purple wire grasses), forbs (sticky everlasting, matrushes, New Holland daisy) and small shrubs (urn heath) occur in these areas although these species are combined with or replaced completely by introduced grasses and weeds, depending on the disturbance history and location of the particular site. For example, the open areas located on either side of the western ridge track are dominated by weeds such as St John's wort (*Hypericum gramineum*), great mullein (*Verbascum thapsus*), sorrel (*Acetosella vulgaris*), Paterson's curse (*Echium plantagineum*), storksbills (*Erodium spp.*), horehound (*Marrubium vulgare*), catsear (*Hypochaeris radicata*) and various thistles, whereas the open areas located in the northern part of the reserve contain a mixture of native grasses and weeds, with the dominance of the weeds most notable in lowlying areas underneath overhead transmission lines. Areas where a high component of weeds is particularly evident are indicated with a 'W' in Figure 3.1.

In other areas, particularly on upper slopes and drainage lines, the removal of trees has resulted in the formation of dense shrubby thickets dominated by species such as cassinia, native blackthorn and hopbush (*Dodonaea sp.*). In general, the sites that are the most open and lacking in trees are the sites that contain the greatest abundance of introduced grasses and weeds.

3.2 Eastern Part

The eastern part of the study area is lowlying and gently undulating, rising westwards towards the ridge of Wanniassa Hills Nature Reserve and south-westwards towards a lower ridgeline. Grassy box woodland was the original ecological community in the lower lying areas, intergrading with shrubby box woodland in more elevated and rocky areas (see Figure 3.2).

Previous rural land uses have resulted in modifications to much of the remaining vegetation, which consists of variously sized clusters of trees, areas of scattered trees and treeless areas. Tree removal has been most extensive in the north-eastern part, with large areas devoid of trees. Scattered trees remain mostly in the south of this area, while larger clusters are located in the western part of the area and around the perimeter.

The eastern part contains many separately fenced areas including paddocks, planting sites, small areas protected from grazing and individually fenced trees. The understorey and grassy vegetation was heavily grazed at the time of the field investigations, mostly by kangaroos and rabbits, but also by horses in the agistment paddocks.

Sections within the eastern part have been classified according to existing vegetation characteristics to facilitate subsequent discussion. For example, areas characterised by shrubby box woodland with a predominantly native understorey have been classed as Area A (see below) although such areas occur in different locations. Figure 3.2 shows the distribution of each vegetation class described in this section. The vegetation within the eastern part of the study area has been assessed in finer detail than that located in Wanniassa Hills Nature Reserve, based on advice that other site criteria (see Chapter 2) result in this area being the preferred location for the cemetery.

Area A, located on upper rocky slopes adjoining the western and southern boundaries, contains shrubby box woodland above an understorey generally dominated by native species. Vegetation in the three Area A patches is similar to that previously described in Section 3.1 for this community, although introduced shrub species are more common, including *Grevillea* sp., cotoneaster (*Cotoneaster glaucophyllus*) and privet (*Ligustrum* sp.), particularly in the southern area adjoining Macarthur.

Area B (four occurrences), located downslope from Area A and on the tops of low hills, contain degraded remnants of shrubby box woodland. There are widely spaced eucalypts (apple box, bundy, red box), a sparse scattering of a low diversity of shrubs, mostly native blackthorn and cassinia, and an understorey containing some native grasses but a large proportion of introduced grasses and weeds. Native understorey species are disturbance-tolerant (Ref. 5) and include redleg grass, spear grass, wallaby grass, native geranium (*Geranium solanderi*), rock fern, sheep's burr (*Acaena ovina*) and matrush. Introduced species include pasture grasses, shrubs such as briar rose (*Rosa rubiginosa*), firethorn (*Pyracantha* sp.) and hawthorn (*Crataegus monogyna*), and weeds such as Paterson's curse (very common), vipers bugloss (*Echium vulgare*), sorrel, great mullein, horehound and thistles. Eucalypt regeneration is sparse and patchy.

Area C, located on lower slopes in association with minor creek lines, contains remnant grassy woodland dominated by yellow box and/or Blakely's red gum, with apple box co-dominant and red box and bundy occurring as a minor component. The trees are of various ages, with several large trees amongst regenerating saplings. Area C is comprised of one large patch and two smaller patches and, while modified, is considered to retain more characteristics of the original grassy woodland community than other areas described below.

Disturbance-tolerant native grasses (spear grasses, wallaby grasses, weeping grass, wheat grass, redleg grass and purple wire grass) dominate the understorey, although the diversity of these grasses is limited in any one area, and bare ground and large patches of weeds are apparent. There are a few scattered shrubs (native blackthorn, cassinia, grey guinea flower) although these tend to be restricted to drainage lines and rocky outcrops. Native forbs, most commonly matrush, New Holland daisy (*Vittadinia cuneata*) and sticky everlasting occur in patches with rock fern associated with rocky outcrops and tall sedge (*Carex appressa*) associated with drainage lines and lowlying areas. Occasional small patches of less disturbance-tolerant species (Ref. 6), such as kangaroo grass and bulbine lilies (*Bulbine bulbosa*), are located in the largest Area C.

Although Area C contains weeds, these are generally less abundant than in the other grassy woodland areas. Typical weeds include Paterson's curse, fleabane (*Conyza* sp.), St John's wort, peppercress (*Lepidium* sp.), buchan weed (*Hirschfeldia incana*), storksbills, sorrel, and plantain (*Plantago lanceolata*). Introduced grasses, mostly phalaris, occur in wetter areas in lowlying ditches.

Area D, in ten sites scattered through the western part of the area, contains a similar overstorey to Area C with both mature and regenerating eucalypts present. Although the native component of the understorey is lower, with few or no native forbs and a

limited abundance or diversity of native grasses, and bare areas and large patches of weeds are common, the understorey could be regarded as predominantly native.

Area E, in thirteen widely scattered sites, contain clusters of eucalypts including yellow box and Blakely's red gum, but also red box and apple box, and a reasonable level of regeneration. The understorey is dominated by introduced grasses and weeds although there is a limited cover of native grasses in patches. The ground layer directly underneath the eucalypts may be dominated by weeds, but native grasses are often dominant just beyond the driplines of the trees.

Areas F and G. An indicative line marks the boundary between Areas F and G. **Area F**, located mostly in the western part of the area, generally contains scattered and/or small clusters of eucalypts above degraded native pasture. There may be some regeneration although this is limited in extent. **Area G**, located in the lowest lying areas, contains a groundcover dominated by introduced pasture, although there are some small patches containing native grasses. Most of the naturally occurring eucalypts have been removed. The large trees that remain in Area G, particularly Blakely's red gum, are showing signs of dieback while most remnant red box trees support a substantial amount of mistletoe (*Amyema* sp).

The boundary line between Area F and G is indicative only. In general, the native content within the ground layer of both areas tends to increase with an increase in elevation.

Area H contains planted native trees and shrubs including species that naturally occur within the study area but not necessarily on the specific site, for example, scribbly gum planted in grassy woodland, or include introduced native species such as brittle gum (*E. mannifera*) and Cootamundra wattle (*A. baileyana*). The groundcover is generally dominated by introduced pasture species and weeds, although some areas contain a higher proportion of native grasses. Both introduced and naturally occurring native trees have been planted amongst remnant trees in **H1** areas located near the western boundary of the eastern part (see Figure 3.2).

4. ASSESSMENT OF WOODLAND CONDITION

4.1 Existing Conditions

An assessment of the condition of the existing vegetation within the study area compared with the condition of the same vegetation community in its natural state can assist in identifying potential ecological constraints associated with the proposal. The condition of the vegetation and the amount and type of regeneration are important factors in determining the requirements for a referral under the *EPBC Act* or an environmental impact statement (EIS) under the *P&D Act*. These issues are discussed in Chapters 10 and 11 respectively.

Woodland remnants across the ACT occur in a continuum from remnants that appear largely intact to areas where there is little evidence of the previous woodland cover. The *ACT Lowland Woodlands Conservation Strategy* (Ref.1) classifies woodland remnants in relation to the assessed degree of modification since European settlement. The categories take into account species diversity, the extent of native cover in the groundlayer, the ability of the community to respond to assisted and natural regeneration and the presence of propagules (seed stock) that would provide a basis for regeneration. When describing woodland condition, tree and ground layers are often considered separately as either layer may retain ecological integrity to some degree without the other, and the community be still regarded as woodland.

There are some areas that are identified as woodland in Action Plan No. 27 but are assessed as dry forest in the present study. This does not affect the conclusions presented in the report.

Unmodified lowland woodland contains a relatively complete age range of trees (dead trees, mature trees with hollows, trees in middle stages of growth, saplings and seedling growth) and an understorey containing a high diversity of native grasses and forbs and, in some cases, a discontinuous layer of shrubs and sub-shrubs. Very little unmodified woodland remains in the ACT or surrounding region, if any, as most remnants have suffered at least some degree of disturbance or invasion by exotic species (Ref. 1).

The woodland categories described in Action Plan No. 27 (Ref. 1) are as follows:

- **Partially modified lowland woodland**, considered to be relatively intact remnants of the pre-European ecological community, typically contain a relatively complete age range of trees and understorey species not commonly found in disturbed areas. Some common annual and perennial weeds are likely to be present.
- **Moderately modified lowland woodland**, which has been subject to land uses that may have resulted in the loss of a significant component of the native understorey and changes in the species composition of the ground layer, retain their essential woodland character although they may not contain a complete age range of trees. The native understorey component remains high, with disturbance tolerant native species characteristic and some common annual and perennial weeds present.

- **Moderately modified lowland woodland – secondary grassland** is a community that develops when a woodland tree canopy is removed, although the ground layer remains relatively intact.
- **Substantially modified lowland woodland**, reduced to woodland trees over highly degraded native understorey containing a low diversity of native species, typically disturbance tolerant native grasses with few or no native forbs, is no longer regarded as a functional ecological community, although existing trees continue to provide valuable habitat for woodland fauna. Regeneration of trees is often minimal and highly dependant upon management.
- **Severely modified lowland woodland**. Isolated paddock trees or small groups of trees with an understorey of introduced pasture are an example of this category. Areas which formerly contained woodland but no longer contain any trees, show no signs of regeneration and contain a limited range of native understorey species are unlikely to recover their original condition.

The study area includes areas that have been subject to different management strategies. This is reflected in the varied condition of the vegetation across the study area which is assessed in terms of the woodland categories described above (see Figures 3.1 and 4.1).

Because of the high level of grazing, often to ground level, the precise composition of the groundcover across much of the area at the time of inspection was unclear. A precautionary approach has been adopted in that areas that appeared to contain some native grasses in the groundcover have been described as 'native' although most such areas contained a reasonable abundance of introduced annual and perennial weed species. A review of groundcover condition in spring or early summer is likely to assist in clarifying its native quality.

The assessment of the existing condition of the vegetation within the western part of the study area (Wanniassa Hills Nature Reserve) was based on information provided in Action Plan No. 27. Field inspections within the reserve were aimed at checking that information rather than collecting more detailed data as for the eastern part, which is the area most likely to contain the site for the proposed cemetery. The difference in survey detail is reflected in the discussion about the reserve area provided below and in Section 4.2.

Partially modified lowland woodland. Areas assessed as partially modified woodland occur within Wanniassa Hills Nature Reserve, generally on the upper slopes of the ridgelines (see Figure 3.1).

Outside the reserve, there are three small remnant patches of shrubby woodland (Area A, Figure 3.2) that would be considered as partially modified woodland although these patches are generally less intact than those located within the reserve.

Moderately modified lowland woodland – including secondary grassland. Moderately modified woodland occurs in the south-western and north-eastern parts of Wanniassa Hills Nature Reserve. These areas have a reduced cover of trees and, although they have an underlying cover of native grasses, often contain significant amounts of weeds (phalaris, St John's wort, Paterson's curse, burr and great mullein). The areas containing a substantial proportion of weeds within the ground layer are indicated with a 'W' in Figure 3.1.

Areas B, C and D in the eastern part contain woodland in a moderately modified condition. Area B contains moderately modified shrubby box woodland, while Areas C and D contain grassy woodland remnants, with the highest quality woodland in terms of native content located in Area C. Areas B and D have apparently experienced high intensity grazing and, as there is a basic cover of native grasses and some native forbs, it is possible that they still retain sufficient native propagules in the soil and that, with reduced grazing, may recover over time.

There are no areas within the study area containing secondary grassland in a moderately modified condition, i.e. areas where trees have been removed and the ground layer retains a high native component.

Substantially and severely modified lowland woodland. Within the nature reserve, substantially and severely modified woodland occurs on the ridge tops and treeless slopes. These areas are highly infested with a number of invasive weeds.

The eastern part of the study area contains large areas of substantially modified (Area F) or severely modified (Area G) woodland. There are small clusters of eucalypts and scattered individual trees above a groundcover containing degraded native or introduced pasture respectively. The lowlying areas in the eastern part of the study area, in particular, would no longer be considered to contain woodland. Planted areas (Area H) are generally assessed as substantially modified in the current survey. A small part of Area H1 located near Long Gully Road in the eastern part has been assessed as moderately modified, based on a higher native content in the ground layer.

In summary, although there are areas containing partially and moderately modified woodland vegetation, large parts of the study area, particularly within the eastern part, have been modified to such an extent that the existing vegetation no longer represents the original vegetation community. The probability of the vegetation in areas assessed as substantially or severely modified recovering to an original condition, even with significant rehabilitation effort, has been severely diminished.

4.2 Comparison of Current Assessment with TAMS Assessment

A systematic approach to woodland conservation in the ACT is presented in the *ACT Lowland Woodland Conservation Strategy* (Ref. 1). This strategy was based in part on the systematic mapping and classification of discrete areas of remnant woodland (woodland polygons) by the (then) Wildlife Research and Monitoring Unit, Environment ACT. This work was undertaken initially between 1997 and 1999 for the earlier Action Plan No. 10 for yellow box – red gum grassy woodland (Ref. 23), and was partly reviewed between 2001 and 2003 for Action Plan No. 27.

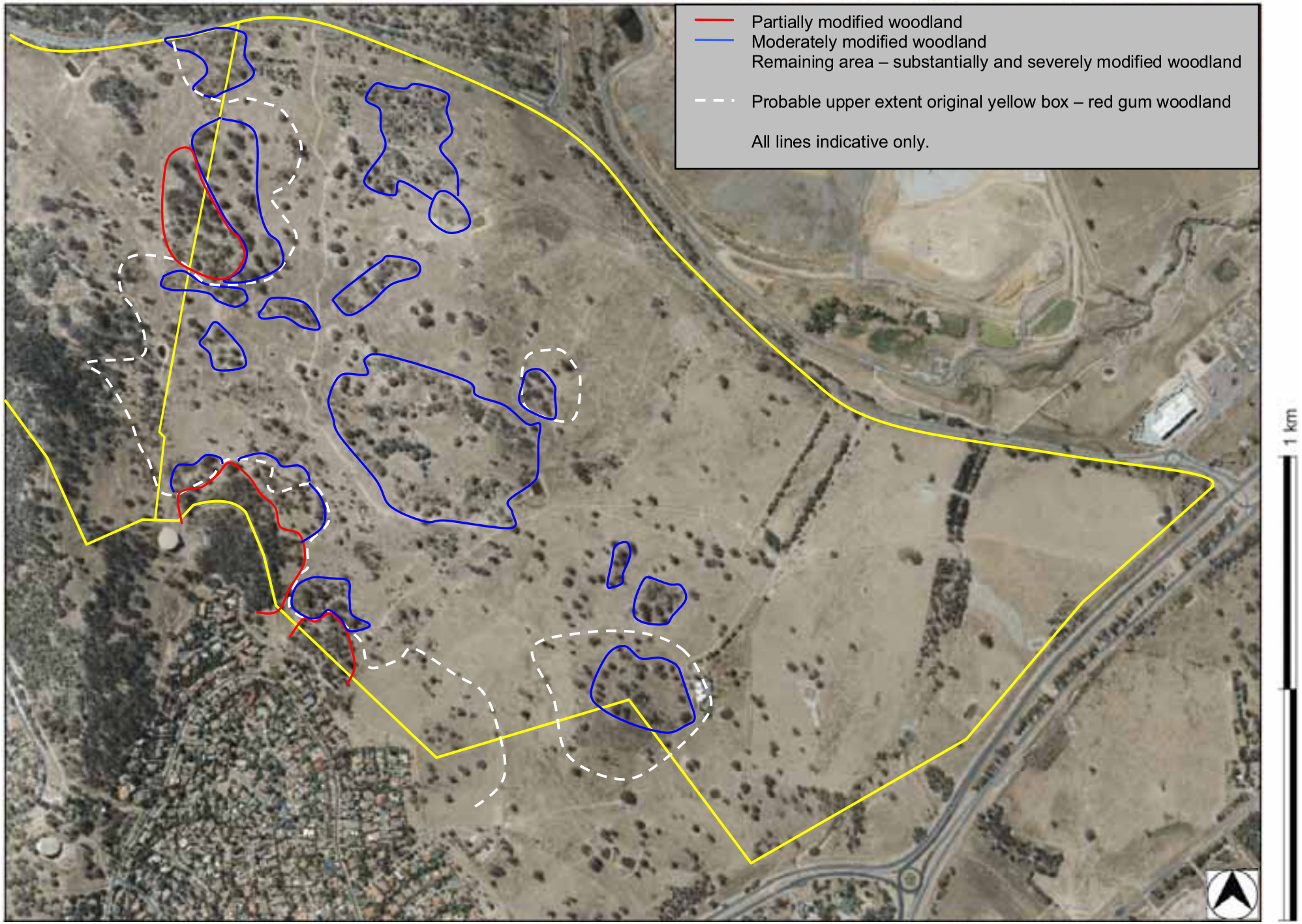


Figure 4.1 Eastern part – woodland assessment

The process of identifying woodland polygons for the Action Plans has been found to result in some woodland polygons spanning the boundaries between different woodland communities (eg. dry forest and grassy woodland). It is therefore considered that, while the woodland polygons are a useful tool in addressing woodland conservation at a broad scale, they do not necessarily provide an adequate basis for analysis at a local scale. The approach adopted in the present study of identifying the original woodland boundaries in the field, based on existing tree species and other characteristics, is considered to be more reliable, despite some margin of error in establishing the boundary in areas which have been largely cleared of old woodland trees, or where selective removal of certain species has occurred.

Nevertheless, a comparison of the results of the approach used in Action Plan No. 27 (subsequently up-dated by TAMS) to the approach used in the current study is regarded as useful in developing a broader understanding of the vegetation characteristics within the study area.

The updated TAMS map relevant to this report is provided in Figure 4.2 as an overlay to Figure 4.1. Areas of yellow box – red gum grassy woodland, listed as endangered under the ACT *Nature Conservation Act* (*NC Act*), have been identified by TAMS as located within the study area. The presence of threatened ecological communities is discussed in Chapter 8.

The current vegetation assessment undertaken within Wanniassa Hills Nature Reserve is generally consistent with the condition assessment of the area as provided by TAMS. There are some areas in the current study where the native content of the groundcover was found to be reduced, indicated on Figure 3.1 with a ‘W’, and may result in a lower classification for that area, i.e. substantially or severely modified rather than moderately modified. These are of particular note towards the eastern boundary of the reserve. The preparation of a detailed vegetation map of the reserve is beyond the scope of the present study, as areas contained within the reserve, zoned under the Territory Plan as Hills, Ridges and Buffer Areas (Ref. 7) are considered unlikely to be developed for the current proposal.

The most notable differences between TAMS and the current assessment of the eastern part of the study area are:

- the extent of the area classified as partially moderately modified woodland, i.e. TAMS classifies a larger area in this category; and
- the extent of the study area classified as yellow box – red gum woodland, i.e. TAMS classifies a larger area in this category.

The disparity between the extents of the area assessed as moderately modified woodland may be attributed in part to differences in methodology, as discussed previously, and to recent seasonal conditions.

Furthermore, the area is subject to significant grazing, mostly by kangaroos and horses. Substantial grazing reduces the height and amount of cover of native (and introduced) grasses. An exposed ground surface provides a suitable medium for the spread of introduced species into otherwise native dominated pasture. The end

result is a much diminished groundcover quality and a reduced capacity to recover condition over time.

Previous ecological studies of Block 1676 and immediate surrounds undertaken in January 2008 (Refs. 2, 3) assessed the groundcover as degraded native pasture, with native grasses dominant over the more elevated areas. The few native forbs that were present, generally found in a patchy or localised distribution, included native bluebell (*Wahlenbergia* sp.), New Holland daisy (*Vittadinia* sp.) and blue heron's bill (*Erodium crinitum*). The current survey classifies this area as dominated by introduced pasture with no forbs recorded. Although the change in groundcover is not a significant factor in itself, it highlights a reduction in overall groundcover quality at this location. It is probable that the quality of the remaining area has similarly diminished.

Overall, the current assessment is considered to more accurately represent both the type and quality of the vegetation within the study area than is provided in TAMS assessments.

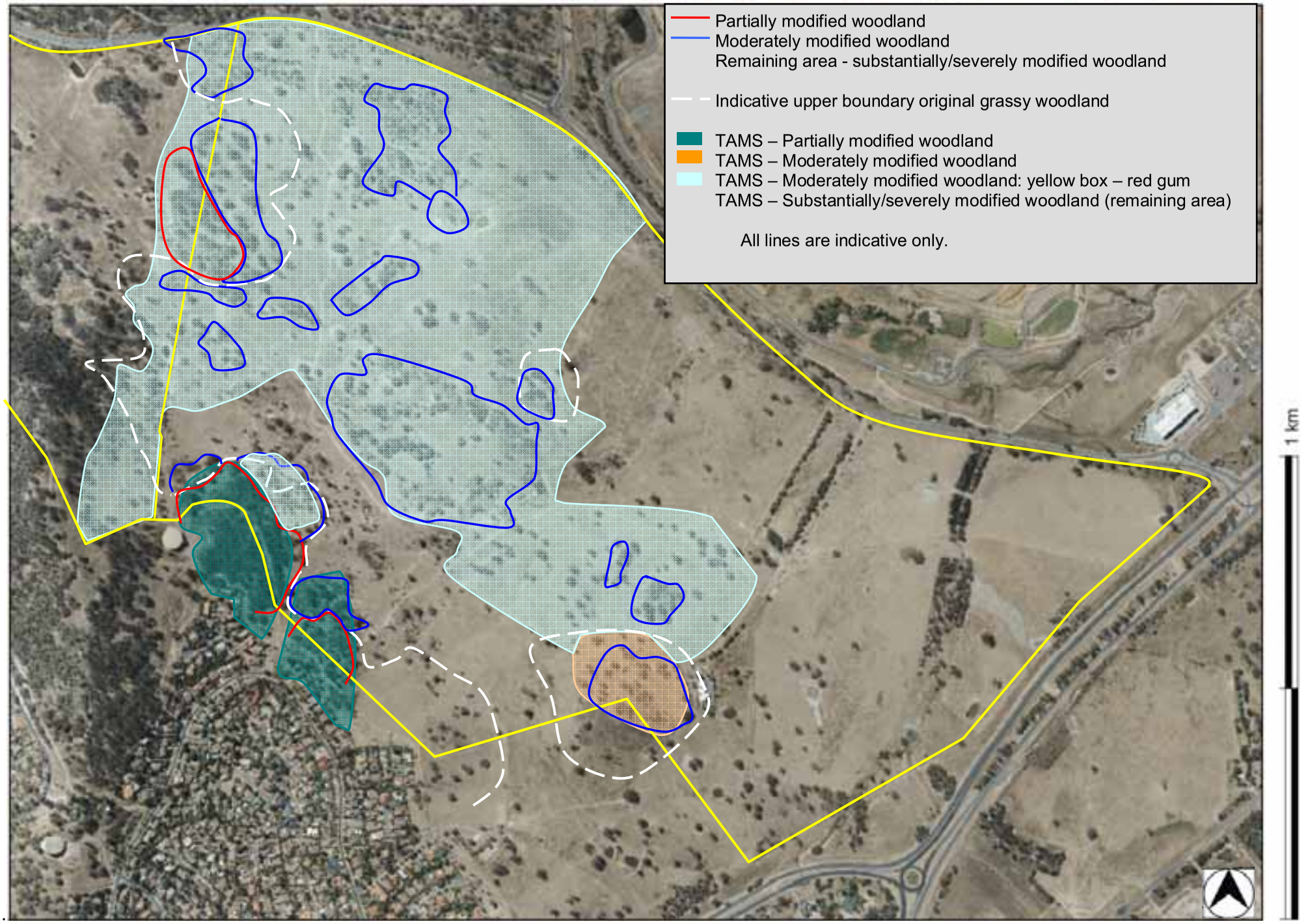


Figure 4.2 Comparison of woodland assessments

5. HABITAT VALUE

Woodlands provide habitat for birds, arboreal and ground mammals, bats, reptiles and invertebrates. The quality of habitat is related to the size of an area, complexity and compositional diversity, type and diversity of vegetation and overall condition. Habitat features such as tree hollows, standing dead trees, fallen timber, rocky outcrops, variability in the height of understorey and groundcover species, water and leaf litter provide shelter, food and nesting sites for fauna.

The size of remnants is critical for many animal species (Ref. 1). Studies for Greening Australia by CSIRO Sustainable Ecosystems (formerly CSIRO Wildlife and Ecology) have formed the basis for identifying the desirable size, spacing and vegetation characteristics for vegetation patches that provide habitat suitable for a wide range of plants and animals, including woodland birds that are known to be in decline (Refs. 10, 11). This information can be used to prioritise woodland remnants that warrant protection.

The more recent of these studies (Ref. 11) identifies the following characteristics as indicating priority for protection:

- A size of at least 10 ha.
- Within 1.5 km of other remnants that are of this size.
- Have a structurally complex understorey (tussock grasses and/ or shrubs).

Within the study area in general, areas of partially modified woodland contain the greatest range of habitat features, are in the best overall condition and thus provide potential habitat for the greatest range of native fauna. Similarly, the most modified areas contain the lowest diversity of habitat features and would support a low diversity of fauna.

Wanniassa Hills Nature Reserve, including the western part of the study area and areas beyond the study area boundary, contains the largest areas of partially modified woodland, with several patches greater than 10 ha in size (see Figure 3.1). Most of the smaller patches are generally linked by narrow bands of trees. These areas have high habitat value and would pose the greatest constraints to development, based on this value.

The highest quality remnant woodland patches in the eastern part of the study area have been assessed as containing partially modified woodland. These abut the reserve and meet the 10 ha size criteria if combined with more modified woodland surrounding these sites.

Moderately modified woodland patches in the eastern part are generally smaller than 10 ha unless combined with substantially modified areas, with the exception of the largest area, surrounding several creeklines and located towards the western boundary. This area, of moderate overall value, contains a range of habitat attributes (fallen logs, tree hollows, standing dead trunks, mistletoe, rocky areas) and the native groundcover is generally taller, denser and more diverse. The understorey appears to be somewhat protected from the intensity of the grazing occurring in the

more open areas, containing sedges and grazing sensitive species such as kangaroo grass and lilies not found elsewhere.

The smaller moderately modified woodland patches retain a reasonable habitat value although are unlikely to support a diverse range of fauna. Isolated paddock trees and small clusters have the lowest value, although individual paddock trees contribute to the dispersal of fauna through modified landscapes even though most have not yet reached the level of maturity associated with hollow formation, a critical habitat attribute for the support of woodland fauna.

Other features that have some capacity to support native fauna include mistletoe, dams, and rocky outcrops. Many of the scattered trees support an abundance of mistletoe and although mistletoe is an important resource for native fauna, large infestations of these parasitic plants can kill the host tree and indicates a woodland ecosystem in poor health (Ref. 8). Mistletoe is most prevalent within the study area on the scattered trees in the eastern part of the site.

Small dams are generally scattered in the eastern part of the study area. Aquatic vegetation (if present) is limited in diversity and consists mostly of rushes. The dams may provide habitat under favourable conditions for some frog species, although these are likely to be confined to the hardier, common frog species found in the Canberra area. The dams would have more importance as a source of water than for the provision of habitat for aquatic species, although several dams were dry or at a low level at the time of the current survey.

Rocky outcrops provide suitable habitat for fauna such as reptiles and a microclimate for vegetation that may be uncommon within a particular area. Within the study area, rocky outcrops are widespread in the western and southern sections, occurring within forested areas, in cleared areas and along drainage lines. An inspection of the outcrops found that rock fern was more concentrated in these areas and the diversity of native plant species was slightly higher than in the areas without rocks, although the species that were found in these locations were also found widespread. Overall, rocky outcrops that were located within wooded areas were associated with a greater diversity of native flora than those located in cleared areas. Fox dens were recorded in association with rocky outcrops in previously cleared areas.

The lowlying areas currently support large numbers of eastern grey kangaroos and are used for horse agistment. Grazing has significantly impacted the height and cover of both the native and introduced grasses within these areas and within the study area in general.

In summary, the most significant habitat features within the study area are contained within the least modified woodland and forest areas located within Wanniassa Hills Nature Reserve, with moderate value habitat in the remnant woodland patches located within the eastern part of the study area. In particular, the large remnant patch (Area C) contains a range of habitat features that would support a diverse range of native fauna, and would be considered to have a moderate ecological value and therefore a moderate level of constraint in terms of habitat provision. Large parts of the study area have been modified to such an extent that the existing vegetation no longer represents the original woodland community and the ability of the remnant

vegetation to support a wide diversity of native woodland fauna has been diminished. In particular, the eastern corner of the study area has low habitat value and is ranked low in terms of level of constraint.

6. STRATEGIC VALUE FOR WILDLIFE MOVEMENT

Broad landscape level wildlife movement corridors that facilitate animal movement in and around Canberra urban areas have been identified in the *ACT Lowland Woodland Conservation Strategy* (Ref. 1). These corridors include areas of nature reserves, other open space and rural land, linking remnant areas of woodland within the urban area and allowing for wildlife movement on either side of and around the city of Canberra.

Habitat connectivity in this context is not necessarily continuous but may rely on a series of disconnected but sufficiently large patches of woodland to establish corridors for the movement of wildlife (particularly birds). Paddock trees scattered throughout modified woodland landscapes provide 'stepping stones' which enable mobile species such as birds and insects to move frequently between roosting areas, nesting sites and foraging locations, even though these animals cannot live permanently in single trees (Ref. 8).

It has been established that a woodland patch with a minimum size of 10 ha is sufficient to support many fauna species, particularly woodland birds (Refs. 10, 11). A review of existing research about the relative importance of structural elements that comprise effective linkages between these habitat patches indicates that a minimum distance of 100 m between 'stepping stones', such as paddock trees, across an area no greater than 1 km are critical elements in relation to the movement of fauna (particularly birds) through an area (Ref. 12).

Figure 6.1 of the Action Plan No. 27 (Ref. 1) indicates the study area as a part of a habitat connectivity corridor that links the Majura Valley (and North Canberra) via Callum Brae with the Rob Roy Range in a north – south direction, and links the forested ranges in New South Wales with the Lower Molonglo region in an east – west direction. A previous study of the Hume West area (Ref. 9), located adjoining to the east, confirms the importance of the current study area as a part of a wildlife movement corridor of regional importance.

An aerial view of the study area shows a potential wildlife movement corridor of between 500 m and 1.5 km in width located across the study area in a broad sweeping curve, from the south-east corner along the southern boundary to the north-west corner (see Figure 6.1). Small stands of trees (both naturally occurring and planted), scattered paddock trees within severely and substantially modified woodland areas and larger patches of moderately and partially modified woodland all form components of this corridor. The north-eastern corner of the study area contains a lower number of trees and would have a lower level of constraint in relation to this criterion.

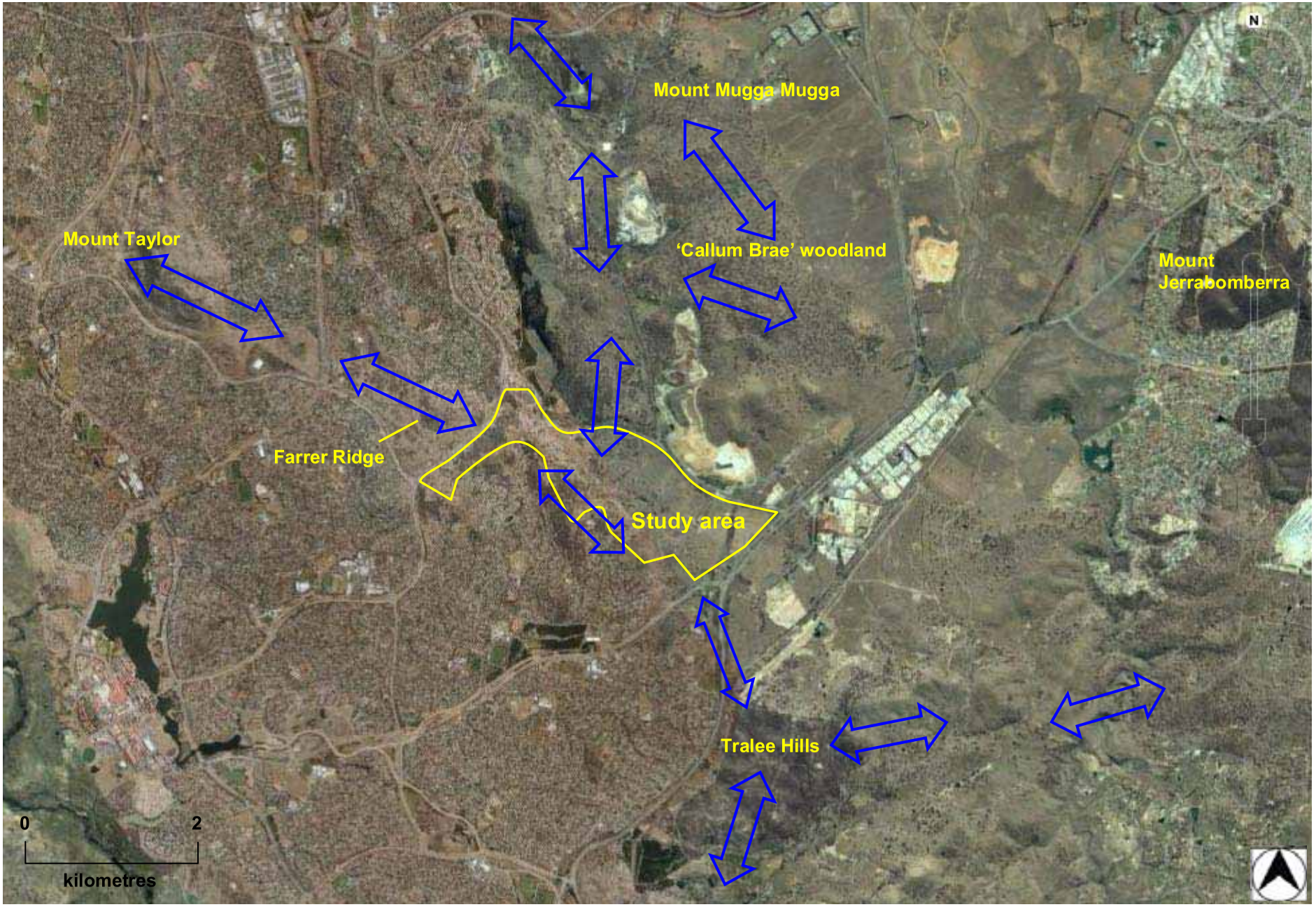


Figure 6.1 Potential wildlife movement corridors

7. THREATENED SPECIES

7.1 General

Threatened species are listed under both the ACT *Nature Conservation* Act (*NC Act*) and the Commonwealth *EPBC Act*, with some species appearing on one list and others appearing on both lists.

An *EPBC Act Protected Matters Report* (Ref. 13) has been used to generate a list of threatened ecological communities and species that are likely to occur or may occur within a 2 km radius of the study site. These are provided in Table 7.1. A review of previous reports and relevant documents (Refs. 1, 7, 8, 9) was undertaken to supplement the information provided by the protected matters report. The approach used to create a protected matters report generally results in a list of species that have some potential to occur anywhere within the search area although may not necessarily occur within a specific site. A comparison of the habitat features available with the habitat requirements of each listed species was undertaken, as described below, to generate a site-specific list of potential threatened species.

Fauna surveys undertaken to locate and map the occurrence of threatened species have been conducted in many areas within the ACT, in preparation for Action Plans relating to the conservation of woodlands, natural temperate grasslands and riparian areas. These surveys have tended to target the species most likely to occur in each vegetation community. As the study area has been identified as originally containing woodland vegetation, surveys within the area have related to identifying the likely threatened woodland fauna, in this case birds. Action Plan No. 27 (Ref. 1) identifies woodland birds as a special feature of woodlands, and lists eight threatened bird species. Two threatened plant species are also listed in association with woodland habitats. A comparison of the habitat features available within the study area with the habitat requirements of each listed species is described below.

The study area is unlikely to support **migratory terrestrial, wetland or marine bird** species as the site lacks habitat features such as extensive wetlands, large rivers, wet forests or damp gullies that are common habitat features utilised by the majority of these species (Refs. 14, 15). For similar reasons, the site is unlikely to support the listed **fish** or **frog** species.

The **golden sun moth** is found naturally in treeless grassland although is known to occur in secondary grassland (Refs. 16, 17). The presence of *Austrodanthonia* spp. (wallaby grasses) of at least 40% of the groundcover vegetation is generally accepted as an important habitat feature for this species while modification of habitat through fertiliser application, ploughing and intensive grazing are considered as threats (Ref. 14). There are no records of this species within the study area (Refs. 16, 17) and it is unlikely that the study area currently supports the golden sun moth, given the land use history of the site and the lack of suitable habitat.

The **spotted-tailed quoll** occurs in a wide range of forested habitats throughout its range. It appears to favour areas with a relatively complex understorey, often in association with complex rock formations, hollow-bearing trees, rocky escarpments and/or fallen logs such as that found within Namadgi National Park within the ACT

(Ref. 18). There are no records of the quoll in the study area (Ref. 18) and it is unlikely to occur because of a lack of suitable habitat.

The **pink-tailed worm lizard** is commonly found beneath small, partially-embedded rocks and is known to inhabit sloping, open woodland areas with a predominantly grassy groundlayer, particularly dominated by kangaroo grass. Typical habitat is well drained with rocky outcrops or scattered partially-buried rock (Ref. 19). Pink-tailed worm-lizard has been recorded in Farrer Ridge Nature Reserve (Ref. 19), approximately 750 m west of the western part of the study area, and in Callum Brae Nature Reserve (Ref. 19), approximately 1.5 km north of the eastern part. There are steep and rocky areas located within Wanniassa Hills Reserve, and rocky outcrops located on the hills within the eastern part, although these areas are not found in association with kangaroo grass. Pink-tailed worm lizard may occur within less disturbed rocky hill slopes within Wanniassa Hills Nature Reserve but is unlikely to occur within the eastern part of the study area, due to the lack of suitable habitat and a high level of previous disturbance.

The **striped legless lizard** is found primarily in native grasslands dominated by tussock-forming grasses such as kangaroo grass, although has been known to occur in some areas dominated by introduced grasses. The prolonged grazing across the site has prevented the development of a tussock structure within the grassy areas, an important habitat feature required by this species. The striped legless lizard has not been recorded within the study area (Ref. 16) and is unlikely to occur.

The **grassland earless dragon** is associated with natural temperate grassland, an ecological community that does not occur within the study area (Ref. 16).

It is unlikely that the study area supports any of the four plant species listed in the protected matters report or those listed within Action Plan No. 27 (Ref. 1). **Tarengo leek orchid**, **austral toadflax** and **hoary sunray** are highly susceptible to grazing (Ref. 7). In addition, tarengo leek orchid and austral toadflax are associated with damp sites, a feature not found within the study area. The hoary sunray is a distinctive plant that was not observed during the site inspection. There are no records of any of these species within the study area and they are unlikely to occur at this location. Essential habitat for **button wrinklewort** is found in and near the ecotone between grassy woodland and natural temperate grassland (Ref. 15), and as there is no natural temperate grassland within the study area, this species is unlikely to occur. A single specimen of the **small purple pea** was previously recorded on the verge of Long Gully Road (beyond the northern boundary of the study area) although subsequent surveys failed to find it (Ref. 1). The site was not considered viable in the long term in 1988 (Ref. 5).

The study area contains potential habitat for woodland bird species listed in Action Plan No. 27 although reporting rates are low for these species in the study area and surrounds (Ref. 1). The habitat is of low value within the eastern part of the study area. Higher quality habitat is located within Wanniassa Hills Nature Reserve. The following points, summarised from government databases (Refs. 14, 15, 16) and Action Plan No. 27 (Ref. 1), identify major habitat features required by each bird species listed in the action plan and relevant birds listed in the protected matters report, and indicates whether or not such features are located within the study area:

- The **Australian painted snipe**, listed in the protected matters report as a species that may occur, inhabits inland wetlands, a habitat feature not available within the study area.
- The **varied sittella** has a preference for red stringybark trees, a feature not located within the study area.
- Yellow box – red gum woodland with an understorey of native grasses, low shrubs or fallen logs is important habitat for the **hooded robin** and **brown treecreeper**, although both inhabit dry forests. The highest quality habitat for these species is located within the western part while less habitat and of a lower quality is located within the eastern part.
- The **white-winged triller** inhabits grassy woodland in the Canberra region. Low quality habitat is available within the eastern part.
- The **superb parrot** inhabit grassy woodland although is more commonly associated with woodlands in the north Canberra area, considered to be at the south-eastern edge of its range (Ref. 20). The superb parrot has not been recorded from the study area (Ref. 1).
- **Regent honeyeaters** generally inhabit dry forests and woodlands and show a preference for yellow box– red gum grassy woodland in the ACT. The species has been recorded from areas located in the northern part of the ACT such as Mount Ainslie and Mount Majura, although in low numbers (Ref. 1). Anecdotal records suggest the regent honeyeater utilises habitat located at Callum Brae Woodland (Ref. 20). Occurrences of the regent honey would most likely be restricted to the less modified forest and woodland areas located within Wanniassa Hills Nature Reserve, should it be present within the study area.
- The **painted honeyeater** is a very rare visitor to the ACT (Ref. 20), and is no longer listed in the current field list of birds in the Canberra region (Ref. 20). Although mistletoe, an important habitat feature for this species, is a common plant in the study area, the presence of the honey eater is highly unlikely.
- The **swift parrot** is a rare non-breeding visitor to the ACT where it is known to occur in yellow box – red gum woodland anywhere in the lower parts of the ACT below 700 m. Low quality habitat is available within the eastern part, with higher quality habitat located in the western part and reserve.

In summary, of the species listed in the protected matters report and in Action Plan No. 27, there is potential habitat in the western part of the study area that may be utilised by the pink-tailed worm lizard and six of the listed woodland birds (hooded robin, brown treecreeper, white-winged triller, regent honeyeater, painted honeyeater and swift parrot). The status of these species is presented in Table 7.2. Low quality potential habitat that may be utilised by some of the listed woodland birds is located within the eastern part.

Table 7.1 Ecological communities and species listed in Protected Matters Report

	Common name	Status
Threatened ecological communities		
Natural temperate grassland		Endangered
White box-yellow box-Blakely's red gum grassy woodlands and derived native grasslands	Box – gum woodland	Critically endangered
Threatened species		
Birds		
Xanthomyza phrygia	Regent Honeyeater	Endangered
Lathamus discolor	Swift Parrot	Endangered
Polytelis swainsonii	Superb Parrot	Vulnerable
Rostratula australis	Australian Painted Snipe	Vulnerable
Frogs		
Litoria castanea	Yellow-spotted Tree Frog	Endangered
Insects		
Synemon plana	Golden Sun Moth	Critically endangered
Mammals		
Dasyurus maculatus maculatus	Spotted-tailed Quoll	Endangered
Ray-finned fishes		
Maccullochella peelii peelii	Murray Cod	Vulnerable
Macquaria australasica	Macquarie Perch	Endangered
Reptiles		
Aprasia parapulchella	Pink-tailed Worm-lizard	Vulnerable
Delma impar	Striped Legless Lizard	Vulnerable
Tympanocryptis pinguicolla	Grassland Earless Dragon	Endangered
Plants		
Leucochrysum albicans var. tricolor	Hoary Sunray	Endangered
Rutidosis leptorrhynchoides	Button Wrinklewort	Endangered
Swainsona recta	Small Purple-pea	Endangered
Thesium australe	Austral Toadflax	Vulnerable
Migratory Species		
Migratory Terrestrial - Birds		
Haliaeetus leucogaster	White-bellied Sea-Eagle	Migratory
Hirundapus caudacutus	White-throated Needletail	Migratory
Merops ornatus	Rainbow Bee-eater	Migratory
Myiagra cyanoleuca	Satin Flycatcher	Migratory
Rhipidura rufifrons	Rufous Fantail	Migratory
Xanthomyza phrygia	Regent Honeyeater	Migratory
Migratory Wetland - Birds		
Ardea alba	Great Egret, White Egret	Migratory
Ardea ibis	Cattle Egret	Migratory
Gallinago hardwickii	Latham's Snipe	Migratory
Rostratula benghalensis s. lat.	Painted Snipe	Migratory
Migratory Marine Birds		
Apus pacificus	Fork-tailed Swift	Migratory
Ardea alba	Great Egret, White Egret	Migratory
Ardea ibis	Cattle Egret	Migratory
Listed Marine Species - Birds		
Apus pacificus	Fork-tailed Swift	Listed – overfly marine area
Ardea alba	Great Egret, White Egret	Listed – overfly marine area
Ardea ibis	Cattle Egret	Listed – overfly marine area
Gallinago hardwickii	Latham's Snipe	Listed – overfly marine area
Haliaeetus leucogaster	White-bellied Sea-Eagle	Listed
Hirundapus caudacutus	White-throated Needletail	Listed – overfly marine area
Lathamus discolor	Swift Parrot	Listed – overfly marine area
Merops ornatus	Rainbow Bee-eater	Listed – overfly marine area
Myiagra cyanoleuca	Satin Flycatcher	Listed – overfly marine area
Rhipidura rufifrons	Rufous Fantail	Listed – overfly marine area
Rostratula benghalensis s. lat.	Painted Snipe	Listed – overfly marine area

Source: Ref. 13

Table 7.2. Status of threatened species with potential to occur within the study area.

Common Name	**Scientific Name**	**Status**	
		NC Act	***EPBC Act***
Woodland Birds			
White-winged triller	*Lalage sueurii*	vulnerable	
Brown treecreeper	*Climacteris picumnus*	vulnerable	
Swift parrot	*Lathamus discolor*	vulnerable	endangered
Hooded robin	*Melanodryas cucullata*	vulnerable	
Regent honeyeater	*Xanthomyza phrygia*	endangered	endangered
Painted honeyeater	*Grantiella picta*	vulnerable	
Reptiles			
Pink-tailed worm lizard	*Aprasia parapulchella*	vulnerable	vulnerable

7.2 Value of Assessed Areas in Relation to Threatened Species

The partially modified and moderately modified woodland areas, particularly those located within Wanniassa Hills Nature Reserve and the larger patches of woodland within the eastern part, are the areas most likely to support threatened bird species, should they occur within the study area. These areas have a relatively high ecological value in terms of the provision of potential habitat for listed bird species.

The probability that the listed bird species nest or breed within the areas containing substantially and severely modified woodland (open grassy areas or areas containing scattered trees) is very low, particularly for the swift parrot which breeds in Tasmania. Such areas may be utilised as foraging or perching habitat, at least temporarily, and therefore have a relatively low value as potential habitat.

Although the pink-tailed worm lizard has not been recorded from the study area, it has been located in rocky areas located to the west and north of the study area. Potential habitat for this species, albeit of poor quality, occurs on the rocky hill slopes within Wanniassa Hills Nature Reserve. This species is unlikely to occur in the eastern part, particularly in areas most likely to be identified as suitable for the proposed cemetery, i.e. consistent subsoil not containing large areas of rock (Ref. 4). Overall, the study area has a low value as potential habitat for the pink-tailed worm lizard.

8. THREATENED ECOLOGICAL COMMUNITIES

8.1 General

Threatened ecological communities listed in the protected matters report or under ACT legislation with potential to occur within the study area include natural temperate grassland and woodland communities. These are discussed in the following sections.

8.2 Natural Temperate Grassland

There is no evidence to suggest that the natural temperate grassland ecological community occurs within the study area. Although this community occurs in low elevation areas and is found in association with lowland woodland communities, the identification of natural temperate grassland within the ACT has been the subject of an extensive review, resulting in the preparation of the *ACT Lowland Native Grassland Conservation Strategy* (Ref. 16). Maps contained within that strategy indicate the estimated pre-European and current distribution of lowland native grassland in the ACT. The proposal is located beyond both distribution boundaries.

8.3 Threatened Woodland Communities

8.3.1 Yellow Box – Red Gum Grassy Woodland (ACT Legislation)

The yellow box – red gum grassy woodland community listed as threatened (endangered) under the *NC Act* is described in the *ACT Woodland Conservation Strategy* (Ref. 1) as a community where:

- yellow box and/or red gum contribute 40% or more of the crown cover;
- there is a species-rich understorey of native tussock grasses, herbs and scattered shrubs and the understorey is not exotic pasture or degraded beyond recovery; and/or
- the trees have been removed or reduced but the species rich understorey remains.

Figure 8.1 shows the probable upper extent of the original yellow box – red gum within the study area. Areas with some potential to contain this community are restricted to woodland remnants in a moderately modified condition. The areas assessed as supporting partially modified woodland are all beyond the upper extent of the original yellow box – red gum ecological community. These areas support shrubby box woodland, an ecological community not listed as threatened under the *NC Act*. The area assessed as moderately modified woodland located on the hill top west of Block 1596 also supports remnant shrubby box woodland.

Areas of former woodland that occur in a substantially modified or severely modified condition are not considered to support yellow box – red gum grassy woodland (Ref. 1). These areas contain modified understorey vegetation (i.e. a low overall native content) and a high level of introduced invasive weeds as a result of significant disturbance over a prolonged period. These factors reduce the likelihood of the

occurrence of a species-rich understorey of native tussock grasses or herbs, and the potential for a sufficient native seed store remaining within the soil to allow the understorey vegetation to recover under favourable conditions.

The remaining areas that have some potential to support yellow box – red gum woodland are assessed as containing modified woodland (Figure 8.1) and include Area C and Area D (see Figure 3.2). These areas, while subject to recent intense grazing, may not have been subject to the level of soil disturbance associated with the open paddock areas (intense grazing by horses, pasture improvement).

Area C (Figure 3.2), particularly the largest area, is considered to contain remnant yellow box – red gum woodland. Blakely's red gum and yellow box would contribute about 40% of the existing crown cover although apple box and red box are commonly occurring. The understorey, while not particularly 'species rich' under current conditions, is not exotic pasture or degraded beyond recovery. There are patches containing some native forbs, including less grazing tolerant species (kangaroo grass, lilies), although most of the understorey species are considered grazing tolerant (Ref. 6). There are patches where introduced species are dominant, but these are restricted in size. The smaller patches assessed as Area C have a high native grass content but a low forb diversity within the understorey, and would be less resilient to disturbances such as intense grazing by kangaroos and rabbits. These smaller areas are marginal in meeting the criteria for inclusion as yellow box – red gum woodland.

Area D contains a similar overstorey to Area C with both mature and regenerating trees present. The native component of the groundcover is lower, with few or no native forbs and a limited abundance and diversity of native grasses. There are often bare areas and large patches of weeds. However, field surveys were conducted in early August, a time of year before many native forbs have emerged. A number of native forbs have some capacity to tolerate grazing and may remain as rootstock, and there may be a native seed store that would allow regeneration to occur under less intense grazing. By adopting a precautionary approach, these areas may meet the criteria for inclusion as yellow box – red gum woodland, although a reassessment of the condition of the understorey vegetation in late spring is recommended, should the development be likely to impact on these areas.

8.3.2 White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands (Commonwealth Legislation)

Since May 2006, the community described as 'White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands' (box – gum woodland) has been listed as a critically endangered ecological community under the Commonwealth *EPBC Act*.

The following characteristics are important in the context of box – gum woodland in the ACT (Ref. 21):

- The most common species are or once were yellow box and/or Blakely's red gum.

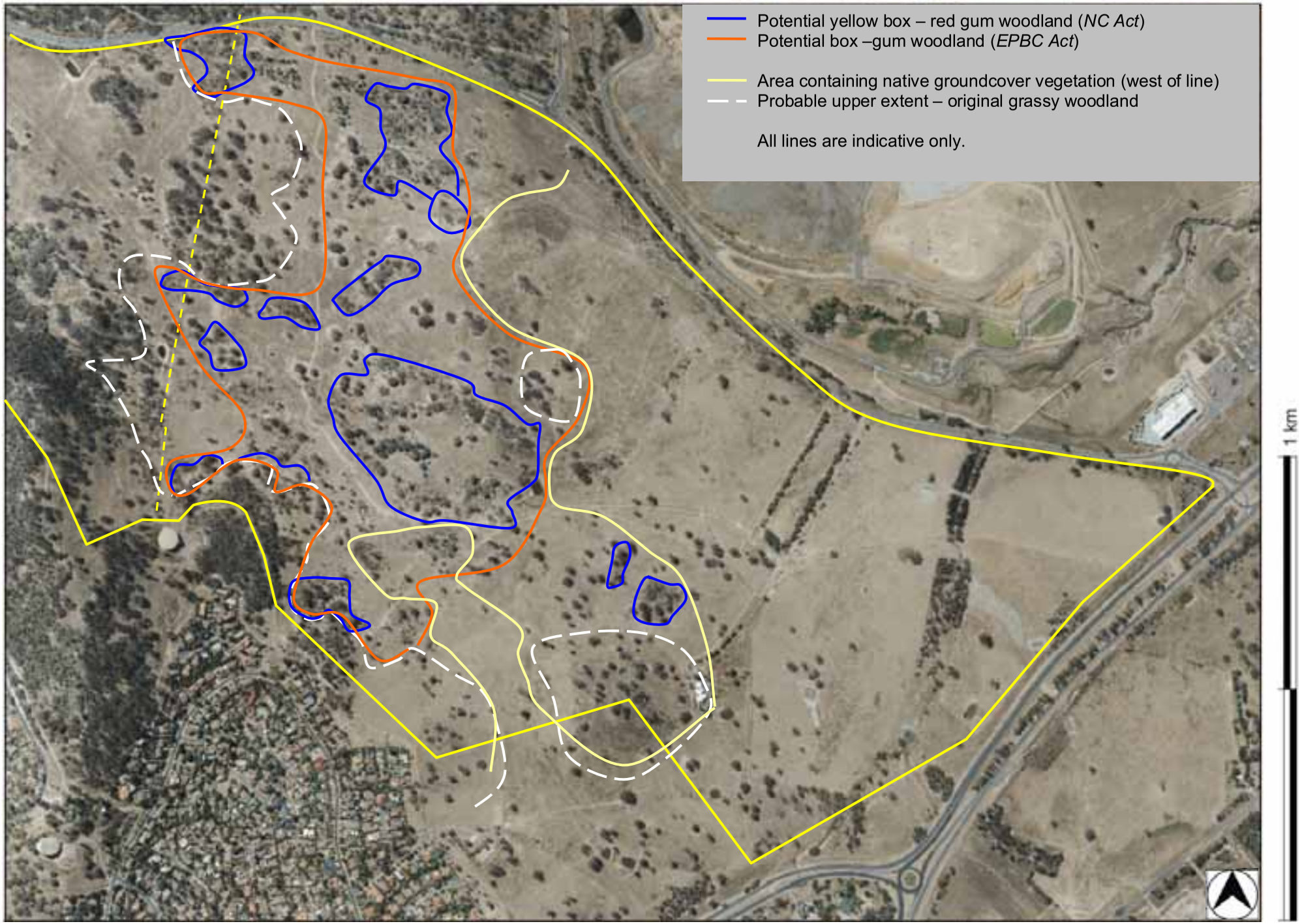


Figure 8.1 Assessment against *EPBC Act* and *P&D Act* criteria

- A predominantly native understorey (i.e. at least 50% of perennial groundcover vegetation is native).

and

- A patch size of 0.1 ha or greater with 12 or more native understorey species present, excluding grasses.

or

- A patch size of 2 ha or greater with either an average of 20 or more mature trees per hectare or natural regeneration of the dominant overstorey eucalypts.

Guidelines for the determination of areas containing this community are provided in the *EPBC Act Policy Statement* for this community (Ref. 21), in the form of a flow chart, reproduced in Figure 8.2. Although the species composition of this community differs only slightly to the ACT yellow box – red gum grassy woodland, differences occur in the manner in which the communities are identified. Whereas the ACT community is identified by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, the identification of box – gum woodland is based on a native perennial groundcover of at least 50%.

The probable upper elevation boundary of the original woodland community in the study area has been established in the current survey and is indicated in Figure 8.1. The existing condition of the vegetation located within the former woodland area is described in Chapter 3. The criteria used to identify box – gum woodland assesses perennial groundcover vegetation and discounts the amount of ground surface covered by annual weeds (eg. Paterson's curse, clovers).

An analysis of the above information and the application of the flow chart (see Figure 8.2) results in the identification of the area that could be feasibly considered to contain box – gum woodland (see Figure 8.1). Given the current degraded nature of the native groundcover beyond existing tree-lines, the area assessed as box – gum woodland is smaller than that assessed as native dominant. In areas where scattered trees only remain, the amount of regeneration was used to determine the probable box – gum boundary.

Within the area mapped as box – gum woodland in Figure 8.1, there are patches dominated by introduced pasture, and areas where the groundcover would be considered to meet the native dominant criteria only marginally. A reassessment of the condition of the understorey vegetation in late spring is recommended, should the development be likely to impact on this area.

8.4 Summary

A large part of the eastern part of the study site could fall within the *EPBC Act* criteria for box – gum woodland, with smaller patches considered to meet *NC Act* criteria for yellow box – red gum woodland. Development within these areas has a higher level of constraint in relation to these criteria than development beyond this area.

9. POTENTIAL ECOLOGICAL CONSTRAINTS

The purpose of the report is to identify the potential ecological constraints associated with various parts of the study area. As discussed in the preceding chapters, the ecological value of the component parts of the study area is related to the following factors:

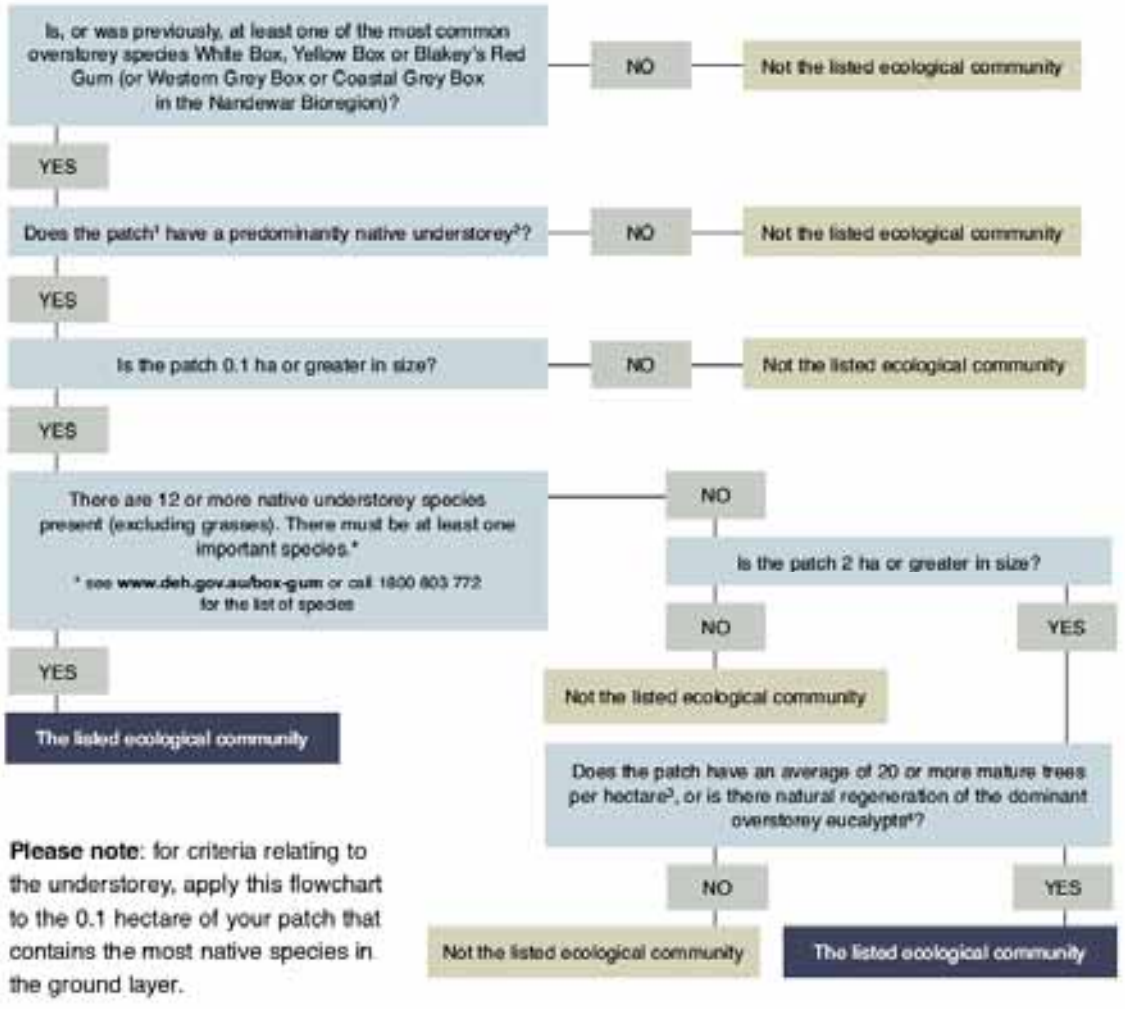
- The condition of the current vegetation in terms of the level of modification from the original ecological community. The least modified sites have the highest ecological value in terms of species diversity and capacity to withstand disturbance.
- The diversity of habitat features available within a particular area. Partially modified and large areas of moderately modified woodland, mostly located within or adjoining Wanniassa Hills Nature Reserve, have the highest ecological value in terms of the provision of habitat for fauna. Area C (Figure 3.2) has moderate ecological value, based on this criterion.
- The capacity of the area to facilitate wildlife movement, particularly of birds. Areas where trees are closely located (no more than 100 m apart) over a distance no greater that 1 km, that connect to larger areas (10 ha or greater) have the highest ecological value. Such a corridor is located across the study area in a broad sweeping curve, from the south-eastern corner along the southern boundary to the north-western corner.
- The potential for an area to support threatened species. Threatened species with some potential to occur within the study area are woodland birds only. The moderately modified and partially modified woodland areas within the study area have the greatest potential to support these species and therefore these areas have the highest ecological value in terms of this criterion.
- The occurrence of threatened ecological communities. The site contains yellow box – red gum woodland (listed under the *NC* Act) and box – gum woodland (listed under the *EPBC Act*). The areas in which these communities occur have a high ecological value relative to the other parts of the site that do not contain threatened ecological communities.
- The presence of native vegetation. The protection of native vegetation is recognised as an important factor contributing to biodiversity irrespective of whether or not such vegetation is part of a threatened community. The higher the native diversity of the vegetation, the more significant it is likely to be in terms of biodiversity conservation, and the wider the range of animal species it is likely to support.

Ecological constraints can seldom be described as absolute, as this means making a subjective judgement which weighs the value of retaining the ecological element against the value of permitting an action to proceed which could adversely affect that element. Such judgements cannot be based on ecological considerations alone, and need to reflect other environmental and functional factors, as identified in Chapter 2.

It is nevertheless feasible and desirable to identify the relative levels of ecological constraint applying to different parts of an area, although this can also involve subjective judgements. A hierarchy of constraints within the study area is indicated in

The flowchart below represents the lowest condition at which patches are included in the listed ecological community. This is not the ideal state of the ecological community. Large patches, those that link remnants in the landscape, those that occur in highly cleared areas, those that contain rare, declining or threatened species, and those that represent the entire range of the ecological community, are important for the long-term future of the ecological community.

Determining if your land has an area of the listed ecological community



Please note: for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

[1] Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:

- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m²) or greater.

[2] A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

[3] Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

[4] Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

Source: Department of Environment and Water Resources (Ref. 21)

Figure 8.2 Flow chart for assessing woodland patches

Figure 9.1, based on the type, condition, threatened status and habitat potential of the existing vegetation within the study area. This indicates that the areas with the highest level of constraints tend to be located towards the west of the study area, predominantly but not entirely within Wanniassa Hills Native Reserve, while the areas with the lowest level of constraint lie towards the eastern end. This assessment is based solely on ecological characteristics, not on existing Territory Plan land use boundaries, although the majority of the areas of high or moderate levels of constraint fall within the Hills Ridge and Buffers land use.

Figure 9.1 also indicates the likely preferred corridors for bird movement, which reflect woodland quality and tree density, and tend to follow the areas of high to moderate level of constraint. These corridors are indicative only and have not been confirmed by field observations. The movement of other types of wildlife is less predictable. Kangaroos, for example, are likely to move through the whole of the study area, depending on seasonal conditions and the time of day.

As a general conclusion, the ecological constraints will tend to be least in the lower, more open parts of the study, but this would not necessarily mitigate against sensitive development in other areas where constraints are greater. The latter areas may require more specific ecological assessment at the detailed planning stage.

10. IMPLICATIONS UNDER THE *EPBC ACT*

10.1 General

There is a legal requirement to submit a referral under the *EPBC Act* if a proposed action will have, or is likely to have, a significant impact on a matter of national environmental significance (e.g. a threatened species or ecological community, or a migratory species listed under the Act).

While the identification of significant impacts as part of a referral forms the basis for determining whether a proposal is a controlled action under the *EPBC Act*, it is common practice in the ACT to submit a referral even if a listed species or community is affected to only a minor extent, directly or indirectly. This is a precautionary approach which avoids the risk of a proposal being delayed at a later stage in the approvals process. The advice below with respect to referrals is based on such a precautionary approach.

A more comprehensive review of the potential impact of the proposal on matters listed under the *EPBC Act* is recommended once planning for the proposed development has progressed.

10.2 Threatened Species

The western part of the study area contains potential habitat for the swift parrot and regent honeyeater (see Section 7.1), both listed as endangered under the *EPBC Act*. Potential habitat of low quality for the pink-tailed worm lizard, listed as vulnerable, is located on rocky hill slopes within the study area, generally within Wanniassa Hills Nature Reserve. The eastern part of the study area contains low quality habitat for these species.

Development that results in the removal of a large number of trees, in particular within the areas identified as partially or moderately modified (see Figures 3.1 and 4.1) has some potential to impact on habitat for woodland birds. Development in the north-eastern part of the study area or that does not involve the removal of a substantial number of woodland trees is unlikely to impact on such habitat. In any event, woodland located in nature reserves at Wanniassa Hills, Callum Brae and Mount Mugga Mugga is likely to provide more important and higher quality habitat than the study area.

The proposal is unlikely to impact significantly on the pink-tailed worm lizard given that potential habitat within the area is of low quality and is in areas generally unsuitable for the proposal. The pink-tailed worm lizard has a widespread distribution in the Molonglo and Murrumbidgee river valleys, as well as areas within NSW. The proposal would have no impact on these areas.

Any impacts on potential habitat for listed woodland birds or the pink-tailed worm lizard that would probably result from the proposed use of part of the area as a cemetery are unlikely to be significant.

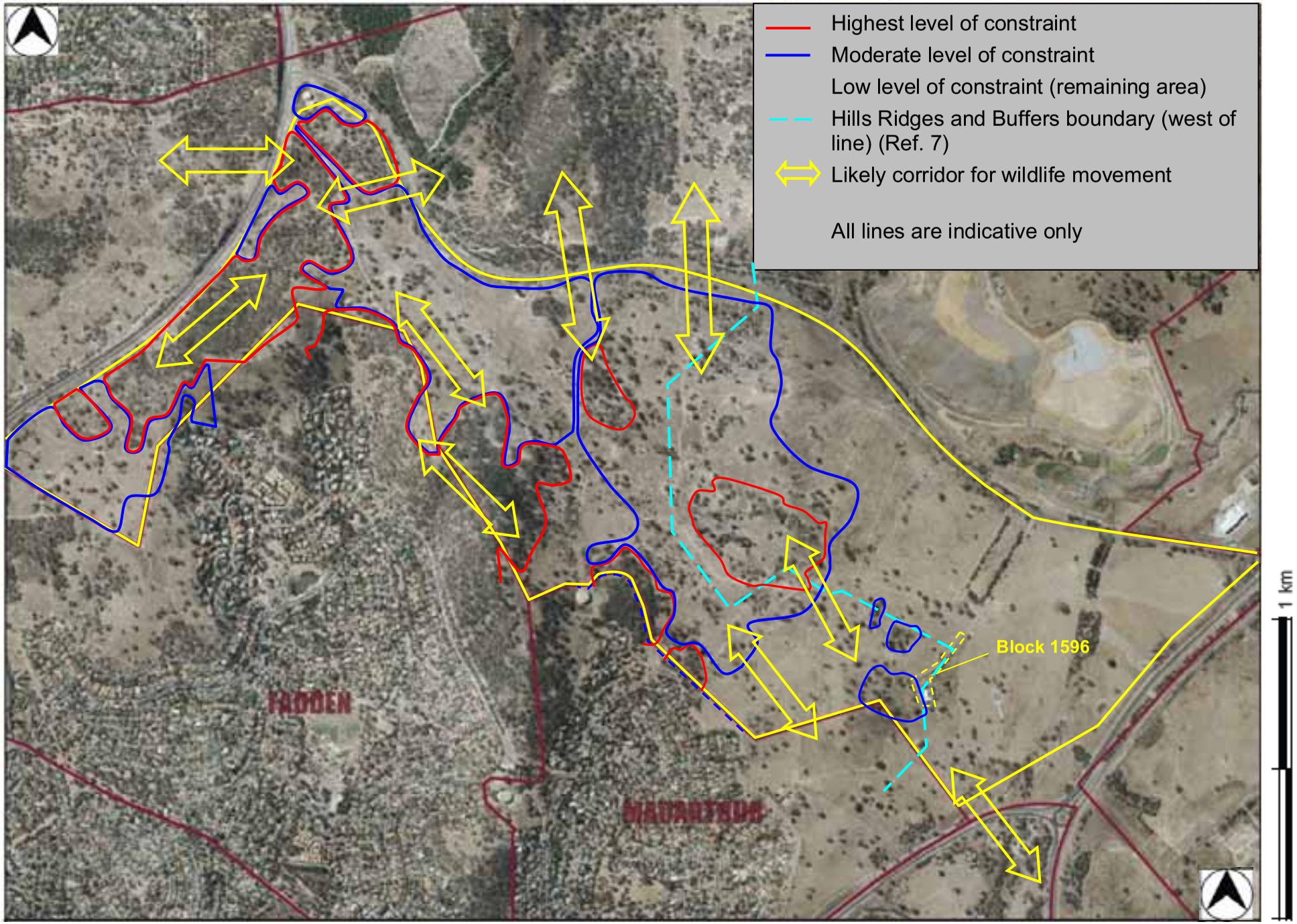


Figure 9.1 Potential ecological constraints

10.3 Threatened Ecological Communities

The eastern part of the study area contains the listed critically endangered community, White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. The probable extent of the community is discussed in Section 7.3.2 and indicated in Figure 8.1. A referral under the Act is recommended in relation to this community, should the development be likely to impact on this area.

11. IMPLICATIONS UNDER THE ACT *PLANNING AND DEVELOPMENT ACT*

11.1 General

The relevant ecological conditions under Schedule 4 Part 4.3 of the ACT *Planning and Development Act 2007* (*P&D Act*) that would trigger the requirement for an Environmental Impact Statement (EIS) are as follows:

- proposal that is likely to adversely impact on the conservation status of:
  - (a) a species or ecological community that is endangered; or
  - (b) a species that is vulnerable;…
- proposal involving the clearing of more than 0.5 ha of native vegetation;…

Native vegetation is defined under Section 73 of the *Nature Conservation Act* as any of the following kinds of vegetation indigenous to the area:

- trees;
- understorey plants;
- groundcover consisting of any kind of grass or herbaceous vegetation;
- plants occurring in a wetland or stream.

Each of the relevant conditions that may trigger an EIS is discussed in the following sections.

11.2 Impact on Conservation Status of Threatened Species or Ecological Communities

The species or ecological communities that are listed as endangered or vulnerable under the *NC Act* and that are known to occur or have some potential to occur within the study area include:

- yellow box – red gum grassy woodland;
- woodland birds (see Chapter 7); and
- pink-tailed worm lizard.

Potential impacts on threatened woodland birds and the pink-tailed worm lizard, discussed in Section 7.1, are unlikely to be significant, mostly due to the poor quality of potential habitat and the low probability that these species occur within the area most likely to be impacted by the proposal. In any event, the study area is not known to contain important habitat for any threatened species. Potential impacts are unlikely to be of such significance as to adversely impact on the conservation status of these species.

In 2004, it was estimated that approximately 10,865 ha of yellow box – red gum grassy woodland occurs within the ACT. The part of the study area that has been assessed (in this report) as containing the woodland community is less than 30 ha, or about 0.28 percent of the community within the ACT. As most of that woodland area would probably remain unaffected, any impacts of the proposal are unlikely to be significant.

The conservation status of threatened species and ecological communities is unlikely to be adversely impacted on by the proposal. Consequently, these matters are not considered in themselves to trigger an EIS, but should be discussed in any EIS prepared as a result of another trigger. This should be reviewed as the planning for the site progresses.

11.3 Impact on Native Vegetation

It is widely accepted that indigenous vegetation is that which is native to a given region or ecosystem. Woodland communities are identified by the characteristic flora and fauna species, i.e. in part by the native vegetation contained within the woodland. In the ACT, woodlands are further classified according to the level of modification that has occurred within the vegetation structure using pre-1750 unmodified woodland as a baseline. The condition of woodland remnants within the study area is described in Chapter 4 and indicated in Figures 3.1 and 4.1.

In the absence of useful guidance within the *P&D Act*, this firm has recently developed a methodology for identifying native vegetation for the purposes of applying the *P&D Act* (Ref. 22). The guidelines in relation to the assessment of woodland are applied to each area, as described below. The relevant guidelines are reproduced in Appendix A.

The areas identified as severely and substantially modified woodland (see Figures 3.1 and 4.1) contain a limited diversity and abundance of persistent and disturbance tolerant native grass species, combined with a high proportion of introduced pasture species and weeds. Grazing over a prolonged period, in addition to pasture improvement, has diminished the potential for the areas to retain a native seed bank that would promote the recovery of the original vegetation once grazing pressure was removed. In general, the diversity of native species is low, ecological functionality is reduced, and resilience to weeds and other disturbance is limited. According to the methodology adopted by this firm (Appendix A), these areas would not be considered as native. The existing trees are widely spaced, the regeneration is limited and the groundcover is described as native pasture.

The areas assessed as moderately modified lowland woodland contain vegetation that resembles the original woodland community, at least to some extent. These areas would be considered to contain native vegetation. The understorey is dominated by native grasses and, in some areas, contains a moderate diversity of native forbs.

The areas assessed as partially modified lowland woodland contain vegetation that resembles the original woodland community and would be considered to contain native vegetation. The understorey is dominated by native grasses, shrubs and forbs, although may contain patches of introduced grasses and weeds.

The study has identified a potential area containing box – gum woodland, listed as threatened ecological community under the *EPBC Act*. This area, presented on Figure 8.1, would meet the criteria for inclusion as native vegetation, although the boundary of this area would be subject to further surveys in more suitable seasonal conditions. The area as indicated is most likely to be greater than the actual extent of

this community as it was subject to a precautionary approach, as discussed in Sections 4.1 and 8.3.2.

Should the total area of native vegetation to be cleared be greater than 0.5 ha, the preparation of an EIS to address this issue would be required under the *P&D Act*. This should be reviewed as the planning for the site progresses.

12. OPPORTUNITIES FOR ECOLOGICAL ENHANCEMENT

A change in landuse within the study area could offer the opportunity to maintain or improve the area's existing environmental values. Such measures may be implemented to offset unavoidable impacts in areas of ecological value, or simply to enhance the ecological quality of parts of the area which are not required for development. Examples of such ecological enhancement are as follows:

- Plantings of additional native eucalypts in the Hills, Ridges and Buffers area (the southern and western parts of the eastern part) to improve habitat connectivity. Species selected would be site-specific and could include yellow box, apple box and Blakely's red gum in the lower areas and red box and bundy on the upper slopes. This would be subject to being compatible with the use and management of that land. New plantations would need to be protected against grazing (horses, rabbits and kangaroos).
- In addition to tree planting, the planting of suitable understorey species could enhance the quality of the area as bird habitat and as a wildlife movement corridor.
- A targeted weed strategy could be implemented for the control of St John's wort, great mullein and Paterson's curse (among others).

The ecological enhancement of parts of the study area (or adjacent land) could become important in addressing the requirements of the *EPBC Act*, which currently places strong emphasis on the provision of offsets in situations where adverse impacts on matters of national environmental significance (in this case, box – gum woodland) are unavoidable. While avoiding such impacts is normally a preferred outcome, if this is not practicable, the provision of biodiversity offsets needs to be addressed in the planning and design of the project.

A more detailed assessment under favourable seasonal conditions is desirable as background to considering opportunities for ecological enhancement, irrespective of whether or not these are implemented as offsets. The preferred time for undertaking that assessment would be late spring or early summer when native forbs are most readily detectable and identifiable. It would be desirable for such work to proceed in parallel with the identification of development options in order to focus on areas where ecological enhancement would be compatible with development.

13. CONCLUSIONS

The study area contains remnants of dry sclerophyll forest in the most elevated regions, shrubby box woodland on the middle slopes in rocky terrain and yellow box – red gum grassy woodland on the lower slopes and hills. The condition of the existing vegetation is related to land use history and varies considerable across the study area. The least disturbed areas, generally located within the western part of the study are, contain remnant vegetation in the best overall condition. The eastern part of the study area has undergone a higher level of previous modification and contains vegetation in poor native condition.

The lowlying part of the study area, mostly located in the eastern part, contains remnant yellow box – red gum woodland, listed as endangered under the *NC Act* and critically endangered under the *EPBC Act*. The woodland occurs in a moderately modified condition.

The forest and woodland areas and the patches of scattered trees provide important habitat for woodland birds. These areas are a component part of a broad wildlife movement corridor facilitating animal movement across the southern Canberra suburbs and into New South Wales.

Development of the proposed cemetery is feasible with little adverse impact on ecological values, provided that development is generally limited to the lowlying areas located within the eastern part of the study area. The retention of trees in those areas where trees remain scattered or in small stands would support the preservation of ecological values within the more disturbed areas.

Some limited impacts on box – gum woodland and native vegetation may result from the proposal and, therefore, require action under the *EPBC Act* and the *P&D Act*, but this would depend on the detailed design of any development.

Opportunities exist within the study area for ecological enhancement, potentially as an offset for unavoidable impacts, but would be beneficial in any case.

A more detailed analysis under favourable seasonal conditions is desirable in higher quality areas subject to proposed development. Potential offsets and ecological enhancement is possible and should be integrated with the design of the overall project.

REFERENCES

1. ACT Government. *ACT Lowland Woodland Conservation Strategy.* Action Plan No. 27, 2004. Environment ACT, Canberra.

2. Nash, K. and Hogg, D. *Natural Gas Power and Data Centre Site Part Block 1671, District of Tuggeranong Ecological Investigation*. Report prepared for CBRE Consulting on behalf of ActewAGL. January 2008; amended June 2008.

3. Nash, K. and Hogg, D. *Canberra Technology City Part Block 1671, Tuggeranong District Proposed Services Ecological Assessment.* Report to ActewAGL. October 2008.

4. ACT Government. *Proposed Southern Cemetery and Crematorium. Fact Sheet 1. Frequently asked questions.* Department of Territory and Municipal Services. Available at: http://www.tams.act.gov.au/__data/assets/pdf_file/0010/144892/Proposed_Cemetery_Fact_Sheet_FAQs.pdf Accessed: August 2009.

5. National Capital Development Commission. *Sites of significance in the ACT. Volume 4. Woden, Tuggeranong and Associated Areas. Technical Paper 56.* Canberra, February 2008.

6. Sharp, S., Dorrough, J., Rehwinkel, R., Eddy, D. and Breckwoldt, A. *Grassy Ecosystem Management Kit: A guide to developing conservation management plans.* Environment ACT, Canberra, 2005.

7. ACT Legislation Register. *Territory Plan 2008*. 24 July 2009. Available at: http://www.legislation.act.gov.au/ni/2008-27/current/default.asp

8. Lindenmeyer, D., Crane, M. and Damian, M. *Woodlands a disappearing landscape.* CSIRO Publishing, Australia, 2005.

9. *Hume West Industrial Planning Study.* Prepared by GHD Consultants for ACT Planning and Land Authority, September 2007.

10. Freudenberger, D. *Guidelines for Enhancing Grassy Woodlands for the Vegetation Investment Project,* October 1999. A report commissioned by Greening Australia, ACT and SE NSW, Inc.

11. Freudenberger, D. *Bush for the birds: Biodiversity enhancement for the Saltshaker Project, 2001.* Available at: www.cse.csiro.au/publications/2001/Saltshaker.pdf

12. Doerr, V., Doerr, E. and Davies, M. *Native Species in Australia's Fragmented Terrestrial Landscapes? Collaboration for Environmental Evidence Systematic Review No. 44*, 2008 (under draft review as at 4 September 2009). Available at: http://www.environmentalevidence.org/Reviewsinprogress.html

13. Australian Government. *EPBC Protected Matters Search Tool.* Department of the Environment, Water, Heritage and the Arts. Available at: www.deh.gov.au/erin/ert/epbc/index.html Accessed August 2009.

14. Australian Government. *Species Profile and Threats Database.* Department of the Environment, Water, Heritage and the Arts. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl Accessed August 2009.

15. NSW Government. *Threatened Species Database.* Available at: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx. Accessed August 2009.

16. ACT Government. *A vision splendid of the grassy plains extended: ACT Lowland Native Grassland Conservation Strategy.* Action Plan No. 28, 2005. Arts, Heritage and Environment, Canberra.

17. Hogg, D.McC. *A strategic approach to the conservation and environmental assessment of golden sun moth sites in the Canberra area.* Prepared by David Hogg Pty Ltd on behalf of Land Development Agency, February 2009.

18. ACT Government. *Spotted-tailed Quoll* (Dasyurus maculatus) – *a vulnerable species.* Action Plan No. 30. Environment ACT, Canberra, 2005.

19. ACT Government. *Ribbons of Life: ACT Aquatic Species and Riparian Zone Conservation Strategy*. Action Plan No. 29, 2007, Department of Territory and Municipal Services, Canberra.

20. Canberra Ornithologists Group (COG). *Birds of Canberra Gardens.* Available at: http://garden.canberrabirds.org.au/ Accessed June 2009.

21. Australian Government. *White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands EPBC Act Policy Statements*. Department of Environment and Heritage. May 2006. Available at: http://www. environment.gov.au/epbc/publications/box-gum/pubs/box-gum.pd

22. Hogg, D. *Guidelines for identification of native vegetation under the Planning and Development Act*. David Hogg Pty Ltd. July, 2009.

23. ACT Government. *Yellow box/ red gum grassy woodland: An endangered ecological community.* Action Plan No. 10. Environment ACT, Canberra, 1999.

APPENDIX A. CRITERIA FOR ASSESSING NATIVE STATUS OF GRASSY WOODLAND

Original vegetation/ layer	Current condition	Status	Comments
Grassy woodland – Trees	Mature trees at typical grassy woodland density (> 20 trees/ ha).	Native	20 trees/ ha adopted as a criterion for box –gum woodland under *EPBC Act* (Ref. 21).
	Scattered mature trees (< 20 trees/ ha), moderate to extensive regeneration.	Native	Size/ age of regeneration is not critical (cf. *EPBC Act*), but the more established the regeneration, the higher the quality of the woodland tree layer.
	Scattered mature trees (< 20 trees/ ha), little or no regeneration.	Not native	
Grassy woodland – Understorey/ groundcover	Native grassland (predominantly native grasses with high native forb diversity), possible scattered shrubs.	Native	*EPBC Act* specifies 12 or more non-grassy native understorey species in 0.1 ha of highest diversity (Ref. 21), but a lower number may be acceptable if they are widespread. Presence of scattered shrubs is optional. A high density of shrubs would indicate shrubby woodland (see below) rather than grassy woodland.
	Native pasture (predominantly native grasses but few or no forbs).	Not native	Unlikely to regenerate to native grassland due to lack of forbs (Ref. 1). Small areas of native pasture within NTG which could be recolonised by forbs may be considered native.
	Degraded native pasture (some native grasses but high component of exotic grasses/ weeds).	Not native	
	Exotic pasture	Not native	

[1] Adapted from Table 1, Ref. 22.

Attachment C

Infrastructure Services Plans

DUTY OF CARE

Telstra Corporation Limited

IMPORTANT:

- Please read and understand all the information and disclaimers provided below.
- Sketches and Plans provided by Telstra are circuit diagrams only and indicate the presence of telecommunications plant in the general vicinity of the geographical area shown; exact ground cover and alignments cannot be given with any certainty and cover may alter over time. Telecommunications plant seldom follow straight lines and careful on site investigation is essential to uncover and reveal its exact position.
- Due to the nature of Telstra plant and the age of some cables and records, it is impossible to ascertain the location of all Telstra plant. The accuracy and/or completeness of the information can not be guaranteed and, accordingly Telstra plans are intended to be indicative only.

"DUTY OF CARE"

When working in the vicinity of telecommunications plant you have a legal "Duty of Care" that must be observed. The following points must be considered:-

1. It is the responsibility of the owner and any consultant engaged by the owner, including an architect, consulting engineer, developer, and head contractor to design for minimal impact and protection of Telstra plant. Telstra will provide plans and sketches showing the presence of its network to assist at this design stage.
2. It is the owner's (or constructor's) responsibility to:-

a) Request plans of Telstra plant for a particular location at a reasonable time before construction begins.

b) Visually locate Telstra plant by hand digging (pot-holing) where construction activities may damage or interfere with Telstra plant (see "Essential Precautions and Approach Distances" section for more information).

c) Contact Telstra's **Network Integrity Group** (see below for details) if Telstra plant is wholly or partly located near planned construction activities.

DAMAGE:

ANY DAMAGE TO TELSTRA'S NETWORK MUST BE REPORTED TO 132203 IMMEDIATELY.

- The owner is responsible for all plant damage when works commence prior to obtaining Telstra plans, or failure to follow agreed instructions.
- Telstra reserves all rights to recover compensation for loss or damage to its cable network or other property including consequential losses.

CONCERNING TELSTRA PLANS:

- **Phone 1100 - Dial Before You Dig** for plans of Telstra plant locations. Please give at least 2 business days notice.
- Telstra plans and information provided are **valid for 60 days** from the date of issue.
- Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose. The plans and details should be disposed of by shredding or any other secure disposal method after use.
- Telstra plans or other details are provided only for the use of the applicant, its servants, or agents. **The applicant may not give the plans or details to other parties, and may not generate profit from commercialising the plans or details.**
- Please contact the **Network Integrity Help Desk** (see below for details) immediately should you locate Telstra assets not indicated on these plans.
- Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.
- Please ensure Telstra plans and information provided remains on-site at all times throughout your construction phase.

ESSENTIAL PRECAUTIONS and APPROACH DISTANCES:

NOTE: If the following clearances cannot be maintained, please contact the Network Integrity Help Desk (see below for details)

for advice on how best to resolve this situation.

1. On receipt of plans and sketches and before commencing excavation work or similar activities near Telstra's plant, **carefully locate this plant first** to avoid damage. Undertake prior manual exposure such as potholing when intending to excavate or work **closer** to Telstra plant than the following approach distances.

- Where Telstra's plant is in an area where road and footpaths are well defined by kerbs or other features a minimum clear distance of 600mm must be maintained from where it could be reasonably presumed that plant would reside.
- In non established or unformed reserves and terrain, this approach distance must be at least 1.5 metres.
- In country/rural areas which may have wider variations in reasonably presumed plant presence, the following minimum approach distances apply:

a) Parallel to major plant: 10 metres (for IEN, optic fibre and copper cable over 300 pairs)
b) Parallel to other plant: 5 metres

- Note: Even manual pot-holing needs to be undertaken with extreme care, commonsense and employing techniques least likely to damage cables. For example, orientate shovel blades and trowels parallel to the cable rather than digging across the cable.
- If construction work is parallel to Telstra plant, then careful hand digging (pot-holing) at least every 5m is required to establish the location of all plant, hence confirming nominal locations before work can commence.

2. Maintain the following minimum clearance between construction activity and **actual location** of Telstra Plant.

Jackhammers/Pneumatic Breakers	*Not within 1.0m of **actual location.***
Vibrating Plate or Wacker Packer Compactor	*Not within 0.5m of Telstra ducts.* *300mm compact clearance cover before compactor can be used across Telstra ducts.*
Boring Equipment **(in-line, horizontal and vertical)**	*Not within 2.0m of **actual location**.* *Constructor to hand dig (pot-hole) and expose plant.*
Heavy Vehicle Traffic (over 3 tonnes)	*Not to be driven across Telstra ducts (or plant)* *with less than 600mm cover.* *Constructor to check depth via hand digging.*
Mechanical Excavators, Boring and Tree Removal	*Not within 1.0m of **actual location.*** *Constructor to hand dig (pot-hole) and expose plant.*

- All Telstra pits and manholes should be a minimum of 1.2m in from the back of kerb after the completion of your work.
- All Telstra conduit should have the following minimum depth of cover after the completion of your work:-
- **Footway 450mm**
- **Roadway 450mm at drain invert and 600mm at road centre crown**
- For clearance distances relating to Telstra pillars, cabinets and RIMs/RCMs please contact the Network Integrity Help Desk (see below for details).

FURTHER ASSISTANCE:

Over-the-phone assistance can be obtained by calling the **Network Integrity Help Desk**.

Where on-site location is provided, the owner is responsible for all hand digging (pot-holing) to visually locate and expose Telstra plant.

If plant location plans or visual location of Telstra plant by digging reveals that the location of Telstra plan is situated wholly or partly where the owner plans to work, then **Telstra's Network Integrity Group** must be contacted through the **Network Integrity Help Desk** to discuss possible engineering solutions.

NOTE:

If Telstra relocation or protection works are part of the agreed solution, then payment to Telstra for the cost of this work shall be the responsibility of the principal developer or constructor. The principal developer or constructor will be required to provide Telstra with the details of their proposed work showing how Telstra's plant is to be accommodated and these details must be approved by the Regional Network Integrity Manager prior to the commencement of site works.

RURAL LANDOWNERS - IMPORTANT INFORMATION

Where Telstra owned cable crosses agricultural land, Telstra will provide a one off free on-site electronic cable location. Please note that the exact location of cables can only be verified by visual proving by pot holing, which is not covered by this service. The Network Integrity Helpdesk Officer will provide assistance in determining whether a free on-site location is required. Please ring the Network Integrity Helpdesk Officer as listed above.

PRIVACY NOTE

A GUIDE TO READING Telstra PLANS

Telstra Corporation Limited
ABN 33 051 775 556

Exchange
(major cable present)

Footway access chamber
(can vary from 1-lid to 12-lid)

Roadway access chamber

Pillar/cabinet
(above the ground / free standing)

Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V electricity.

PT Public telephone
Please Note: This equipment is powered by 240V electricity.

Direct buried cable

Cable jointing pit
(number indicating pit type)

Buried cable jointing pit
(number indicating pit type)

Elevated cable joint
(above ground joint on buried cable)

Cable loop (direct buried)

Telstra Plant in shared utility trench

Aerial Cable
(above ground)

Aerial cable
(attached to joint use pole e.g. power)

SMOF **Optical fibre cable direct buried**

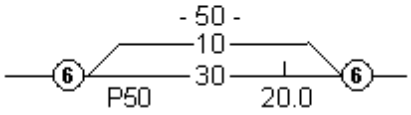
Single to multiple round conduit
Configurations 1, 2, 4, 9 respectively
P100 (Attached text denotes conduit type and size)

Multiple square conduit
Configurations 2, 4, 6 respectively
E85 (Attached text denotes conduit type and size)

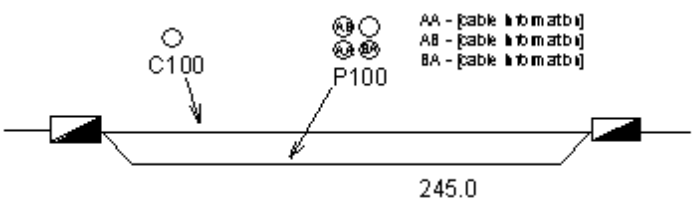
Some examples of conduit type and size:
A - Asbestos cement, P - PVC / plastic, C - Concrete, GI - Galvanised iron, E - Earthenware.
Conduit sizes *nominally* range from 20mm to 100mm.

P50	50mm PVC conduit
P100	100mm PVC conduit
A100	100mm asbestos cement conduit
E 85	85mm square earthenware conduit

Some examples of how to read Telstra plans:



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits, 20.0m apart, with a direct buried 30-pair cable along the same route.



Two separate conduit runs between two footway access chambers (manholes) 245m apart. A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along the same route.

WARNING: Telstra's plans show only the presence of cables and plant. They only show their position relative to road boundaries, property fences etc. at the time of installation and Telstra does not warrant or hold out that such plans are accurate thereafter due to changes that may occur over time.
DO NOT ASSUME DEPTH OR ALIGNMENT of cables or plant as these vary significantly.
The customer has a DUTY OF CARE when excavating near Telstra cables and plant. Before using machine excavators TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG (potholing) to identify its location.
Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

ACCREDITED PLANT LOCATERS (For your area)

On-site assistance should be sought from an **Accredited Plant Locater** if the telecommunications plant cannot be located within 2.5

Accredited Plant Locaters:

Name and Address	Phone Number	Ask for:
Australian Underground Surveys - Canberra	Ph/Fax: 02 62311762 Mob: 0417 458 803	Barry Fowler
Capital Locating ACT - Canberra	0418 482 395	Mark Stephenson
D-Tech Services - Canberra	0438 630 852 02 6278 7548	Terry Pike
P.A.&V.A. Fletcher - CanberraFletcher Plumbing & Co PtyLtd - Albury	02 60251769Ph: 02 6043 3188 Fax: 02 6043 3199	Paul FletcherPaul Fletcher
National Cable Locations - Canberra	Ph: 02 6292 0867 Fax: 02 6292 0877 Mob: 0415 158 474	Michael Matthews
P.L.T.S - Albury	Mob: 0412 116 524 Fax: 02 6041 1658	Paul Larkin
Protech Plumbing - Sydney	02 9542 8820 0418 971 587	Glenn East
Southern Cable Services - Yass	Ph: 02 6226 5201 Mob: 0417 255 573	Terry Lemon

metres of the locations indicated on the drawings provided.

On-site advice should be obtained from a suitably qualified contractor highly skilled in locating Telstra plant if there is any doubt whatsoever about the actual location of the telecommunications plant, the best method for locating the telecommunications plant or the correct interpretation of the drawings provided. In the case where Telstra plant is outside a recognised road reserve Telstra recommends that the **Network Integrity Help Desk** is contacted for assistance prior to engaging an Accredited Plant Locater.

For the assistance of customers Telstra has established strict criteria to assess the skill of contractors that may be engaged by owners requiring Telstra plan locating services to perform any of the following activities if requested to do so by the owner:

- review Telstra's plans to assess the approximate location of Telstra plant;
- advise owners of the approximate location of Telstra plant according to the plans;
- advise owners of the best method for locating Telstra plant;
- advise owners of the hazards of unqualified persons attempting to find the exact location of Telstra plant and working in the vicinity of Telstra plant without first locating its exact position.
- perform trial hole explorations by hand digging (pot-holing) to expose Telstra plant with a high degree of skill, competence and efficiency and utilising all necessary safety equipment.

Telstra has provided a number of contractors with certification as an Accredited Plant Locater.

A list of Accredited Plant Locaters operating in your area is attached. Accredited Plant Locaters are certified by Telstra to perform the tasks listed above. Owners may engage Accredited Plant Locaters to perform these services, however Telstra does not give any warranty in relation to these services that Accredited Plant Locaters are competent or experienced to perform any other services.

The attached list provides the names and contact details for Accredited Plant Locaters who service your area and can provide you with assistance in locating Telstra plant on site. These organisations have been able to satisfy Telstra that they have a sound knowledge of telecommunications plant and its sensitivity to disturbance; appropriate equipment for locating telecommunications plant and competent personnel who are able to interpret telecommunications plans and sketches and understand safety issues relevant to working around telecommunications plant. They are also able to advise you on the actions which should be taken if the work you propose will/could result in a relocation of the telecommunications plant and/or its means of support.

We recommend that you engage the assistance of one of these Accredited Plant Locaters as a step towards discharging your Duty of Care obligations when seeking the location of Telstra's telecommunications plant.

Please Note:

1. The details of any contract, agreement or retainer for site assistance to locate telecommunications plant shall be for you to decide and agree with the organisation engaged. Telstra is not a party to any contract entered into between an owner and an Accredited Plant Locater. The Accredited Plant Locaters are able to provide guidance concerning the extent of site investigations required.
2. Payment for the site assistance will be your responsibility and payment details should be agreed before the engagement is confirmed.
3. Telstra does not accept any liability or responsibility for the performance of or advice given by an Accredited Plant Locater. Accreditation is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.
4. Each Accredited Plant Locater has been issued with a certificate which confirms the Accreditation. Each year Telstra will reassess the accreditation and where appropriate will issue a letter confirming the accreditation for the next calendar year. You have the right to request the organisation you engage to show evidence of this certificate and its currency.
5. The Accredited Plant Locater is required to service each engagement with the personal attendance of at least one accredited employee who has satisfactorily completed a Telstra approved employee accreditation training course. These people will carry a certification card issued by Telstra.
6. Neither the Accredited Plant Locater nor any of its employees are an employee or agent for Telstra and Telstra is not liable for any damage or loss caused by the Accredited Plant Locater or its employees.
7. The attached list contains the current names and contact details of Accredited Plant Locators who service your area, however, these details are subject to change.

DBYD Notification Response

TransACT Communications
Contact: 02 62298009
ABN: 23 093 966 888

NO TransACT assets found within 20meters of your location.

To:	Mr Graham Sandeman	From:	**30213 - Transact Communications**
Company:	Purdon Associates	Date:	26/08/2009
Address:	Unit 3 9 Mckay St Turner Act, 2612	Location:	**Mugga Lane** **Tuggeranong** **ACT, 2900**
Phone:	0262571511	Sequence#:	**16580359**
Fax:	0262488347	Job#:	**3535368**
Email:	graham.sandeman@purdon.com.au	District:	Tuggeranong

Please allow a minimum of three (3) working days for an on-site location.

The response to this enquiry has been obtained from TransACT's records based on the GML location provided by DBYD from your original request.

IMPORTANT NOTICE

This form and associated plans are to be kept at the work site.
DO NOT ASSUME DEPTH OR ALIGNMENT of cables or plant as these may vary significantly.

This information is valid for 14 days from the sent date and indicates the presence of the TransACT underground network in the area in the original DBYD GML file. The location of the TransACT underground network may vary over time. Accordingly TransACT plans are intended to be indicative only. The Recipient must make arrangements with TransACT for an on-site investigation to determine its location, if such an investigation is required or requested. The Recipient, of this document is responsible for any damage caused to the TransACT underground network and any other TransACT plant or equipment where works commence before the receipt of this reply, or where the Recipient fails to follow any instructions issued by TransACT following an on-site investigation. All investigation/excavation on or around the TransACT underground network must be Soft dig. TransACT reserves the right to recover compensation for any loss or damage, including consequential losses, to its underground network or any other plant or equipment, caused by the Recipient. If an on-site investigation is required or requested, the Recipient must contact TransACT at least 3 business days prior to the commencement of any works. If additional works are planned at a location, which is not specified in this reply, or if works are not carried out within 14 days from the date of this reply, please note that TransACT requires the Recipient to lodge an additional request.

DBYD Notification Response

TransACT Communications
Contact: 02 62298009
ABN: 23 093 966 888

RECIPIENT'S DUTY OF CARE

It is the Recipient's responsibility to:

1. request information of TransACT underground network for a particular location at a reasonable time before construction is due to begin
2. must first physically expose TransACT plant by Soft Dig (Pot Holing)
3. Prior to any mechanical excavation, visually locate TransACT plant by hand Pot Holing (Soft Dig) every 5 metres where construction activities may damage or interfere with TransACT underground network.

DAMAGE

ANY DAMAGE TO TRANSACT'S NETWORK MUST BE REPORTED IMMEDIATELY.

It is the Recipient's responsibility to locate TransACT's underground plant by careful hand Pot Holing prior to any mechanical excavation in the vicinity and to exercise due care during that excavation. TransACT will accept no liability for the accuracy and / or the completeness of the information contained herein.

TRANSACT WILL SEEK COMPENSATION FOR LOSS CAUSED BY ASSET DAMAGE.

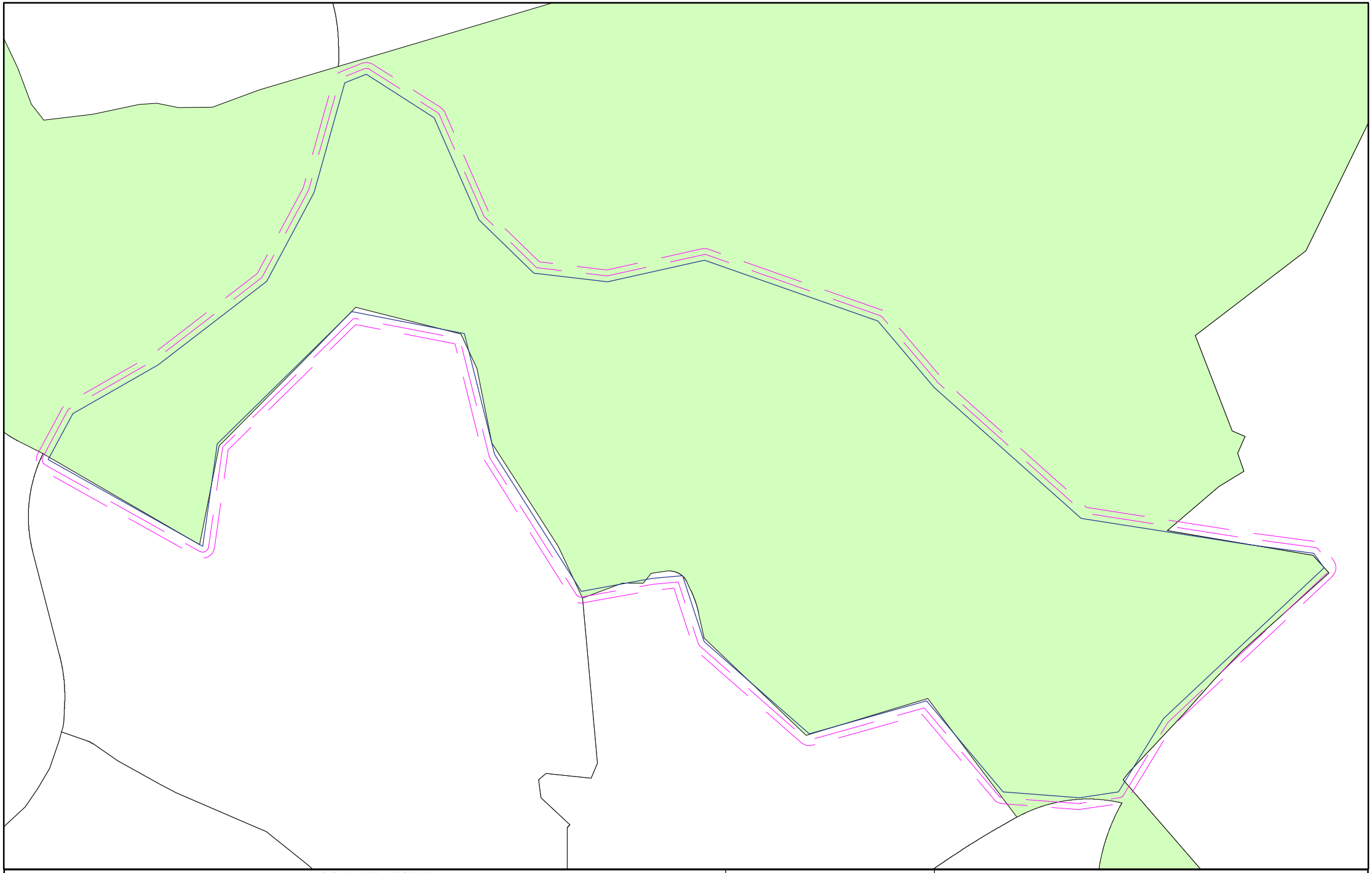
Further assistance can be obtained via the TransACT contact details shown at the beginning of this document.

PRIVACY NOTE

Your information has been provided to TransACT by DBYD. TransACT keeps your information in accordance with its privacy policy.

Definition – The terms below have the following meanings in this document

1. **Recipient** means the recipient of this document including its contractors, employees and agents
2. **Soft Dig** means to physically expose the TransACT plant by non mechanical excavation
3. **Pot Holing** means to physically expose the TransACT plant by non mechanical excavation



CONDUIT LEGEND

- Communications (100/110mm, 1 conduit)
- Communications (100/110mm, 2 conduits)
- Communications (100/110mm, 3 conduits)
- Communications (100/110mm, 4 conduits)
- Communications (20/32/50/63mm, 1 conduit)
- Communications (20/50/63mm, 2 conduits)
- Communications (20mm, 4 conduits)
- Communications (20mm, 6 conduits)
- Electrical (32/35/50/63100/110mm)

WARNING

This plan contains commercially senstive information and is to be treated accordingly. No such information is to be passed onto other parties without the written consent of TransACT Captial Communications.

TransACT Capital Communications Pty Ltd
TransACT House
470 Northbourne Avenue, Dickson, ACT, 2602
PO Box 1006, Civic Square, ACT, 2608
Phone: (02) 6229 8000 Fax: (02) 6229 8025

TransACT Everytime.

Network Operations Centre - Asset Analysis
1 Lyonpark Road,
Macquarie Park, NSW 2113
Ph: 1800 505 777
Fax: 1300 307 035

27/08/2009

To: Mr Graham Sandeman

Company: Purdon Associates

Address: Unit 3 9 Mckay St

Turner, Act 2612

Fax: 0262488347

Asset Location Reply

Dear Mr Graham Sandeman,

With reference to your enquiry of

- **Location:** Mugga Lane Tuggeranong, ACT 2900
- **Sequence No:** 16580366
- **Dial Before You Dig Job No:** 3535368
- **Dial Before You Dig Customer No:** 843216

After referring to the Optus and/or Uecomm asset database, OPTUS find that within the vicinity of your proposed works there are:

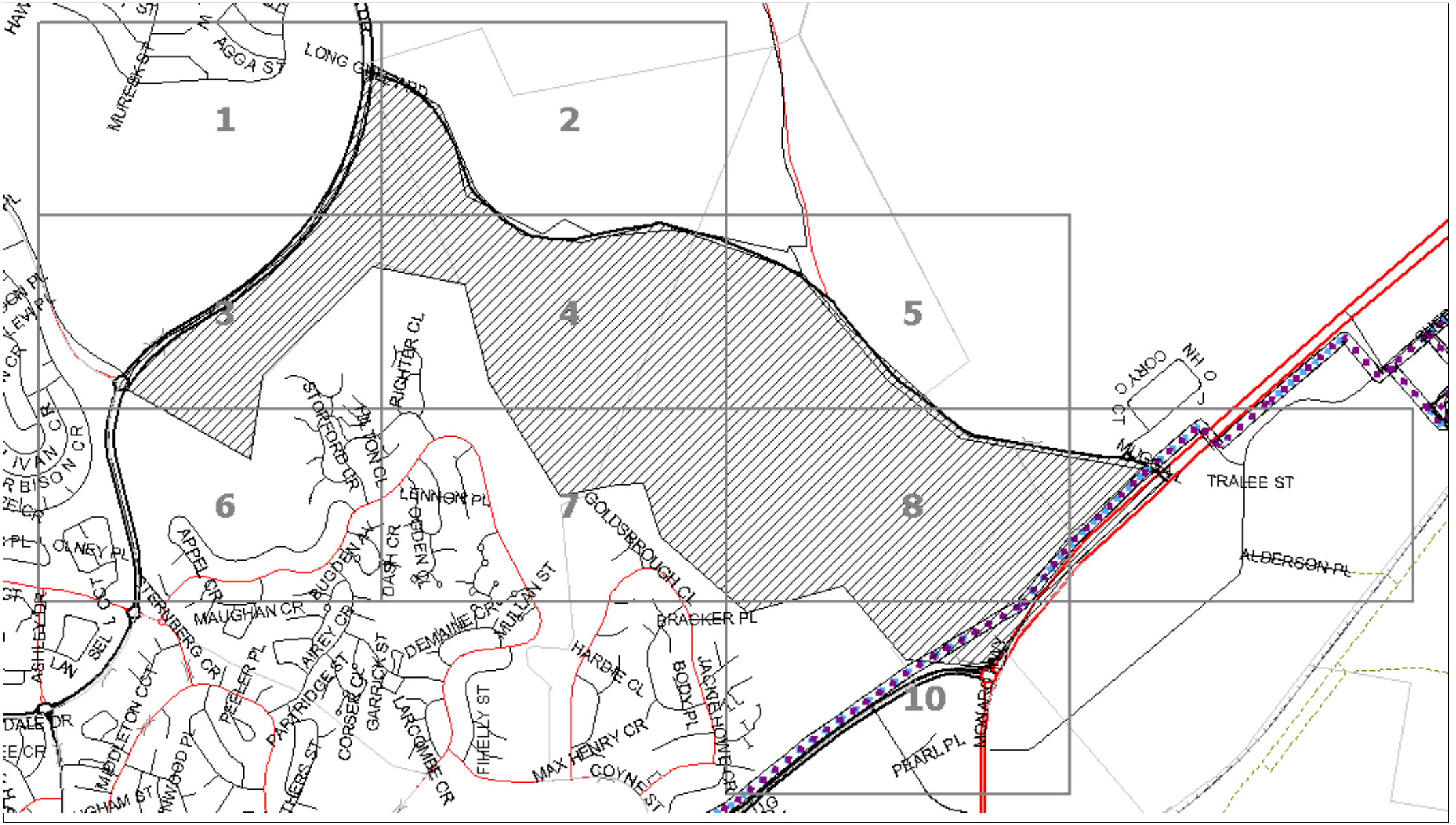
EXISTING Optus UNDERGROUND ASSETS
Please refer to the attached map for further details as you are responsible for any damage you may cause to Optus and/or Uecomm assets due to negligence on your part.

Note: You must not commence work without first obtaining an on-site location of the Optus underground plant and approval of your works plans. Only Optus staff (or Optus approved location contractors) are to provide onsite location services for Optus plant. You can arrange Optus and/or Uecomm onsite locations by calling Optus on 1800 505 777 and Optus or its approved representatives will attend your site to identify the exact location of Optus assets (the "Optus and/or Uecomm Asset Alignment").

Optus requires 2 clear business days notice to conduct an on-site location.
The initial on site location visit will not normally incur a charge, but at the discretion of Optus, subsequent site visits may incur a charge to be applied at an hourly rate.

We thank you for your enquiry and appreciate your continued use of the Dial Before You Dig Service and/or Optus Asset Analysis Service. If you require further information please contact Optus on **1800 505 777**

This reply relates only to the location indicated above and is valid for 14 days from the sent date. Where additional works are planned that have not been specified with this reply, Optus require that an additional enquiry be submitted. In the case of no additional location request being submitted, Optus will hold the relevant party responsible for any damage to Optus and/or Uecomm plant and all expenses incurred by Optus as a result of asset damage.

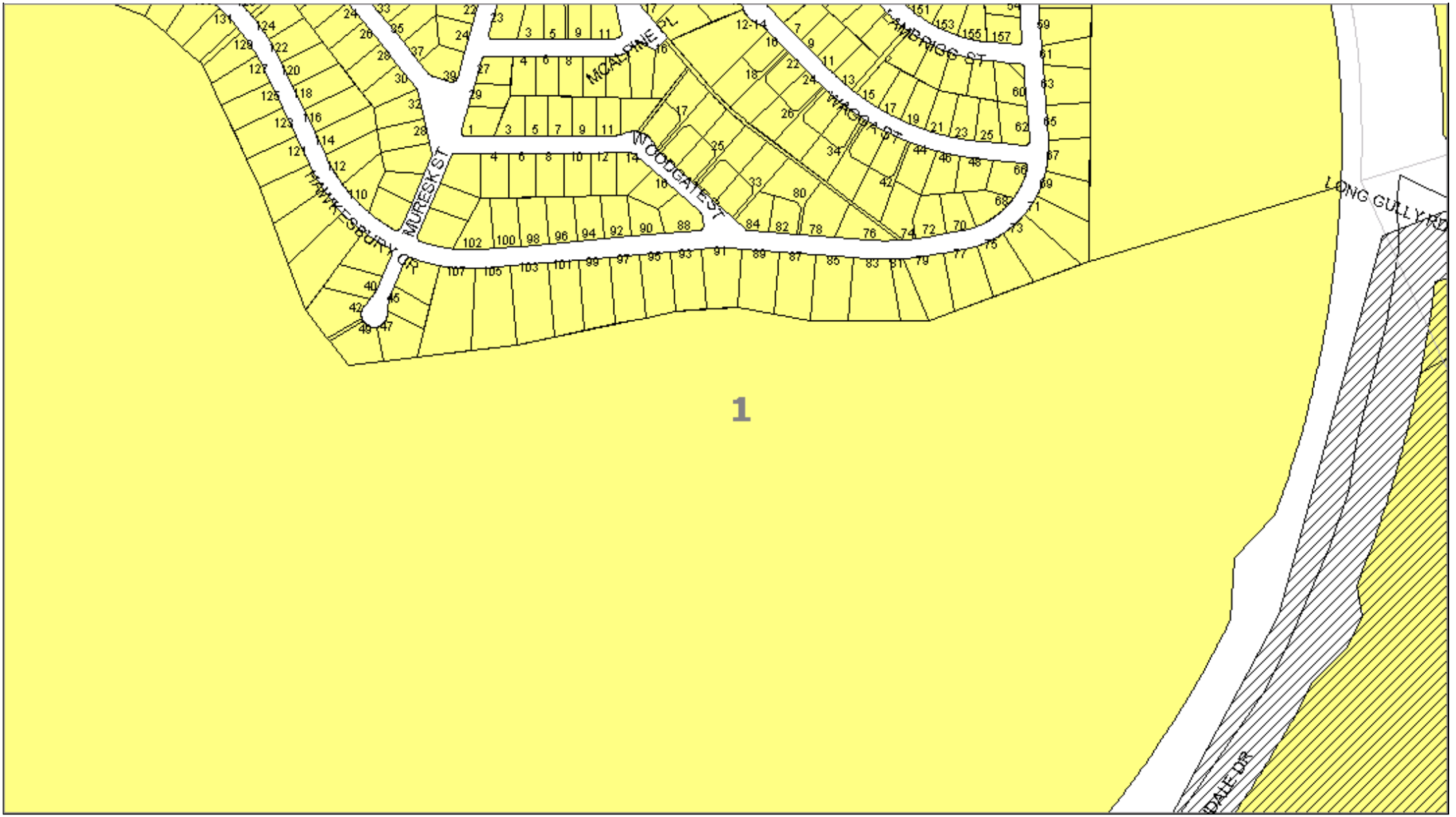


Optus
Cable Optus Undergroud OVERVIEW MAP
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
- Line
- Point
- Area

Undergound Asset
- Optus
- Optus In Other Utility's Duct



Optus
Cable Optus Undergroud Map 1 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

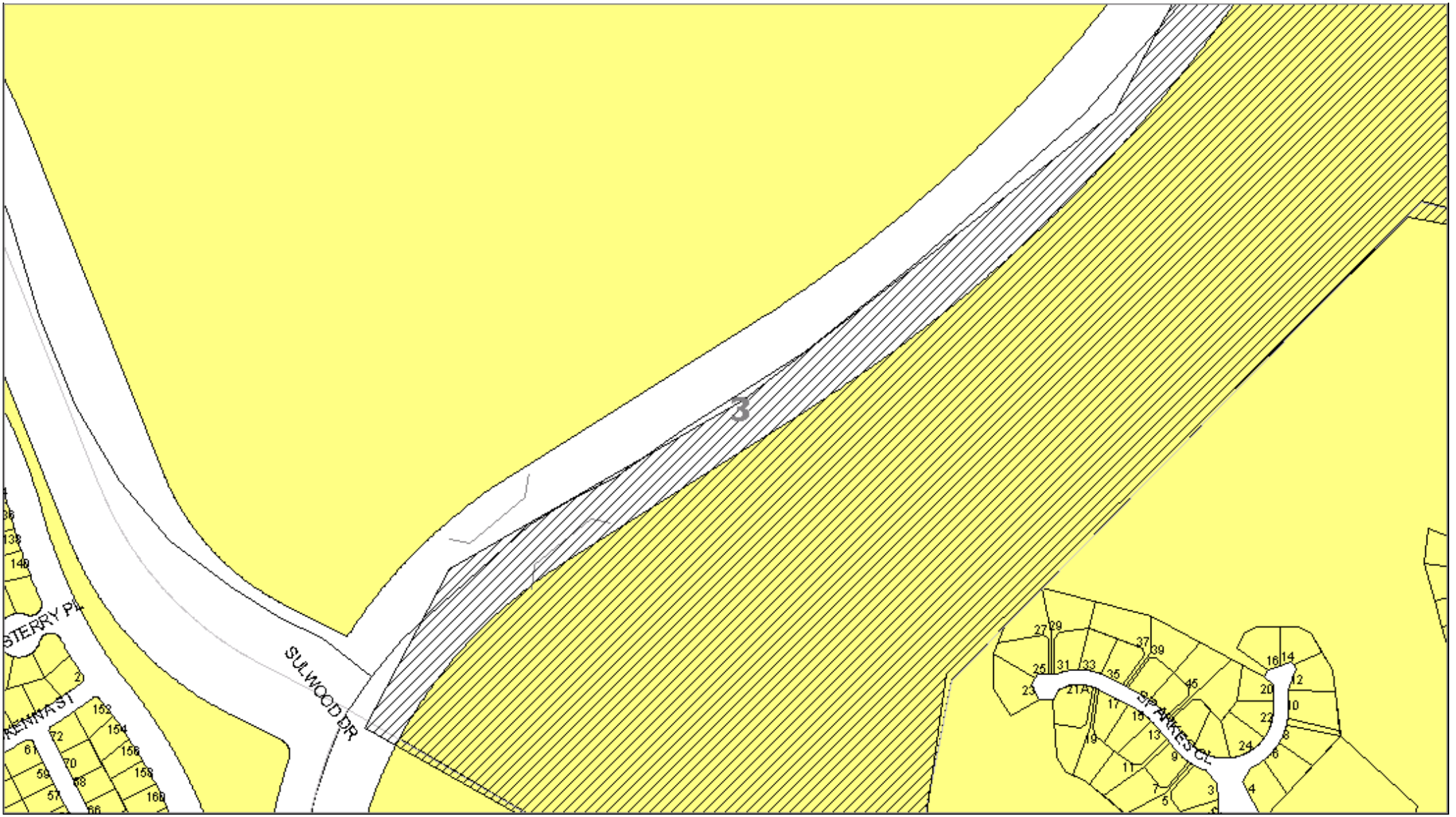
Optus
Cable Optus Undergroud Map 2 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

N
W
E
S

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

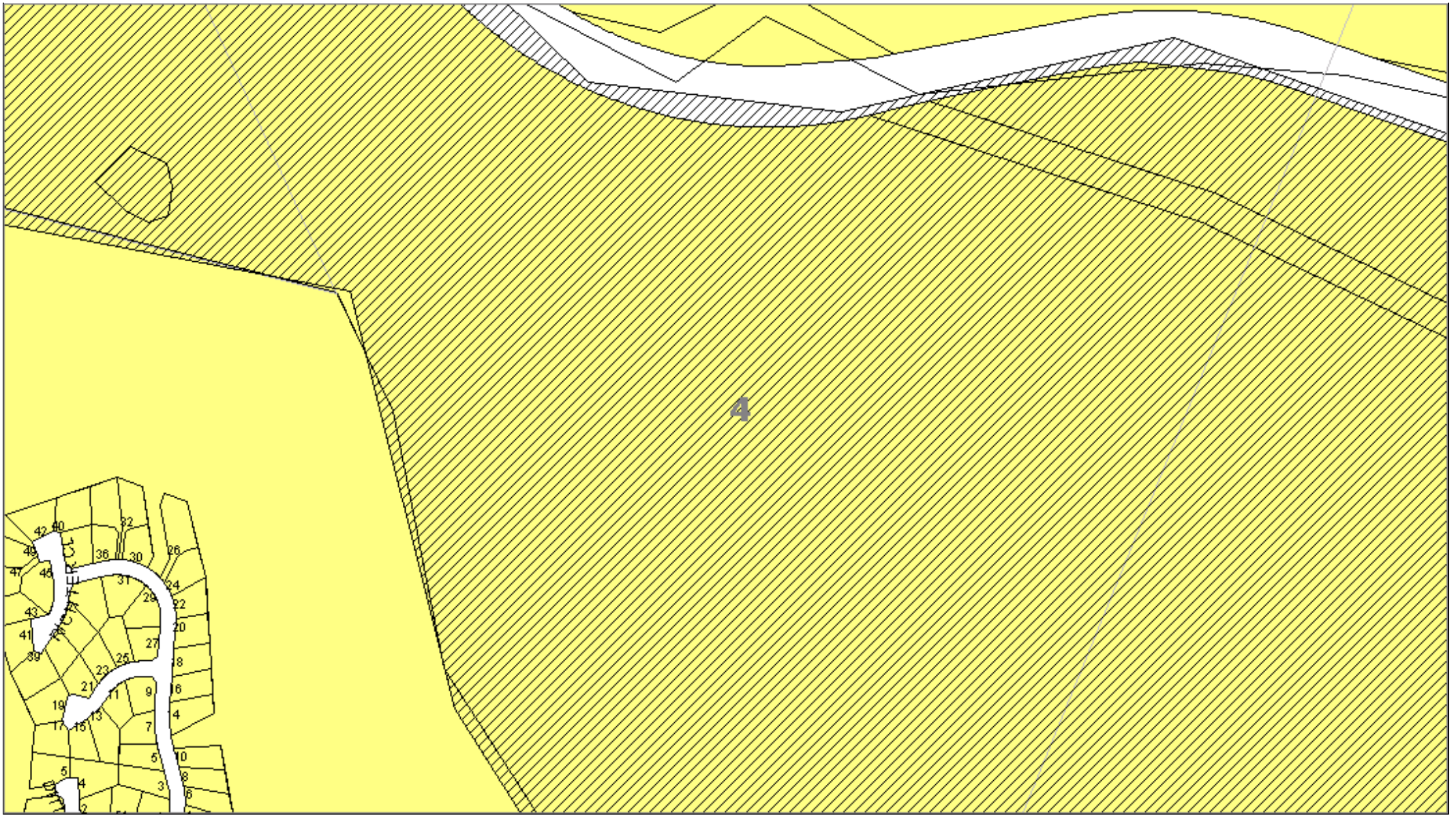


Optus
Cable Optus Undergroud Map 3 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
- Line
- Point
- Area

Undergound Asset
- Optus
- Optus In Other Utility's Duct



Optus
Cable Optus Undergroud Map 4 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

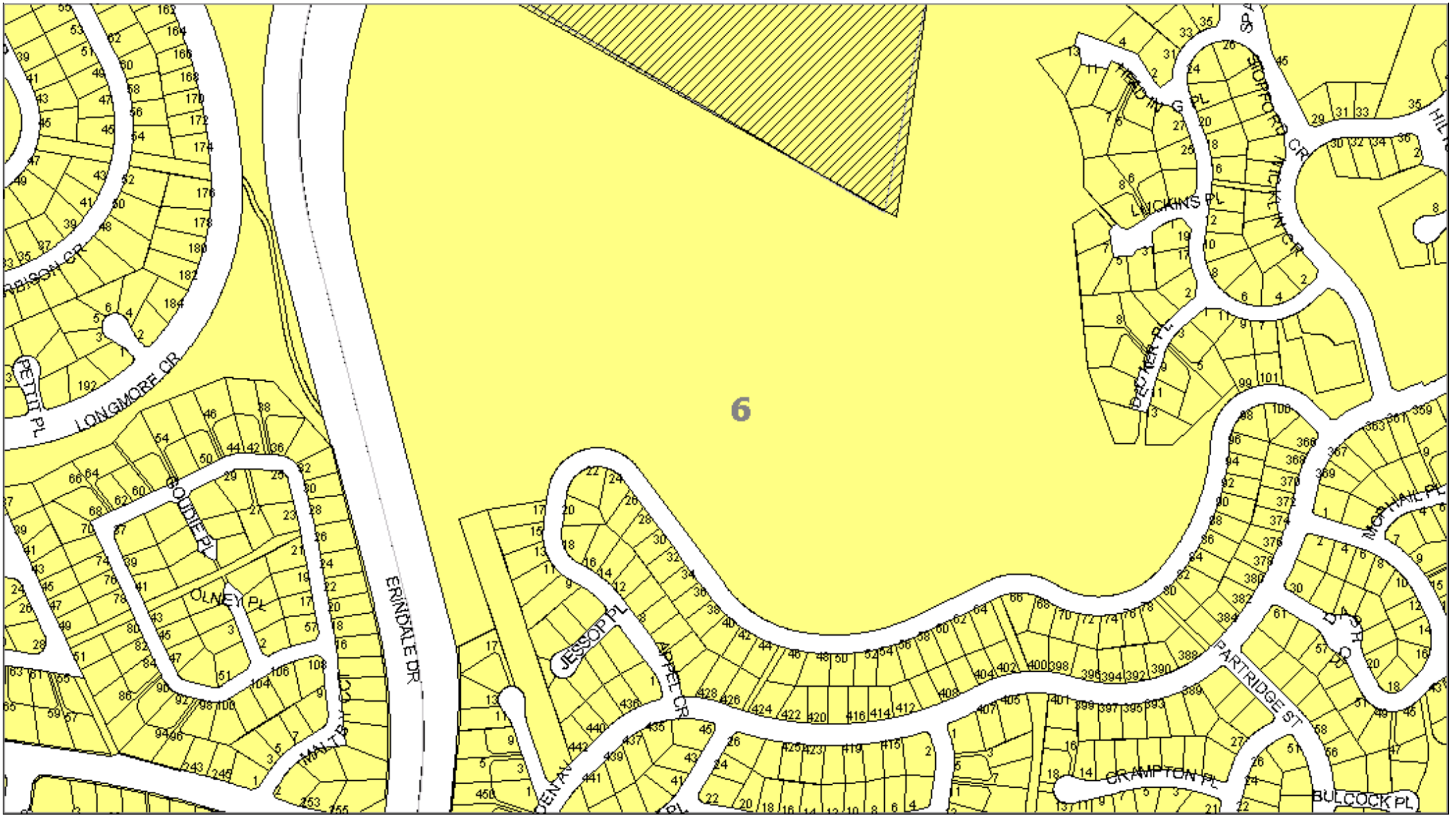
Optus
Cable Optus Undergroud Map 5 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

N W E S

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

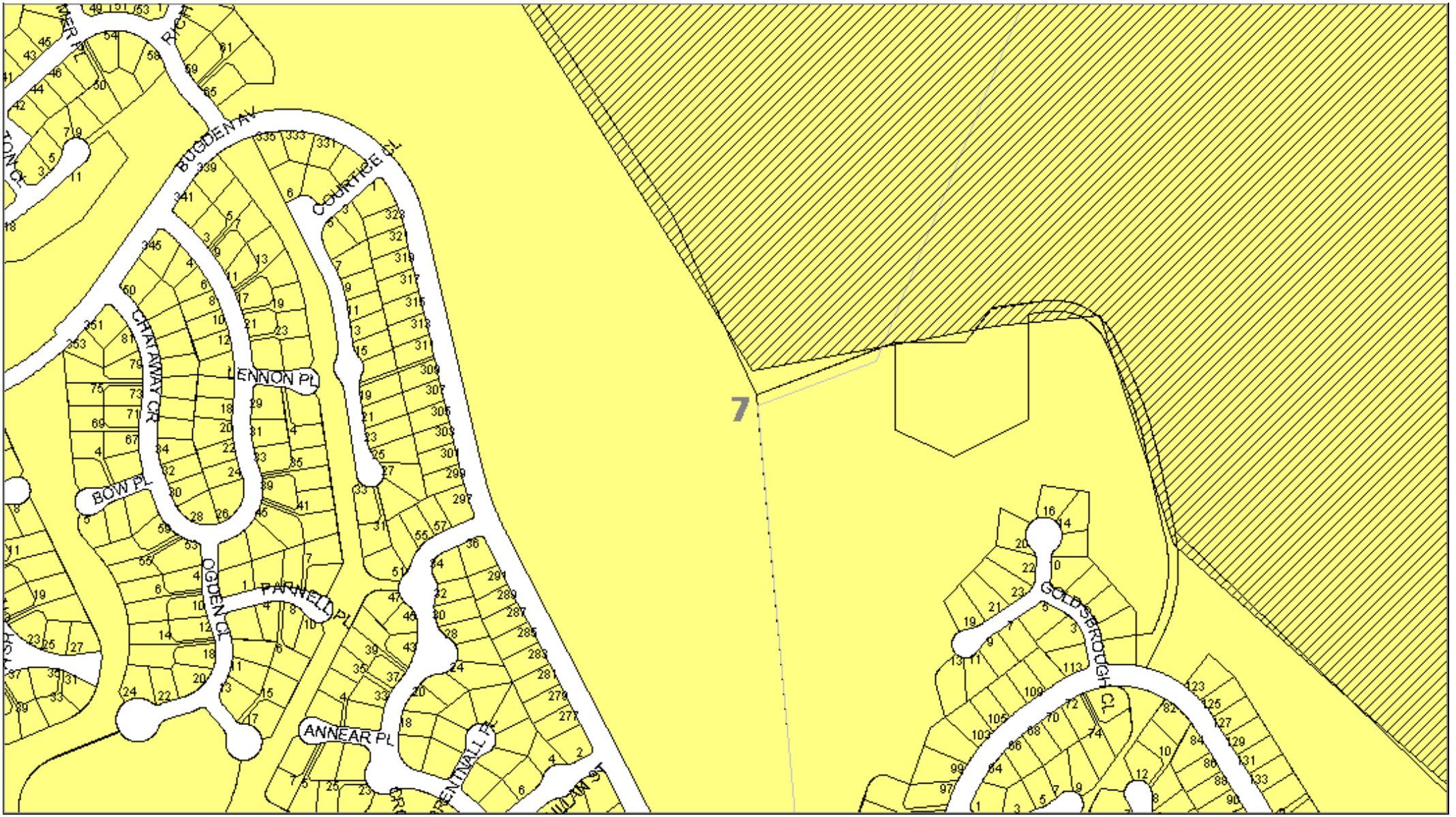


Optus
Cable Optus Undergroud Map 6 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
- Line
- Point
- Area

Undergound Asset
- Optus
- Optus In Other Utility's Duct

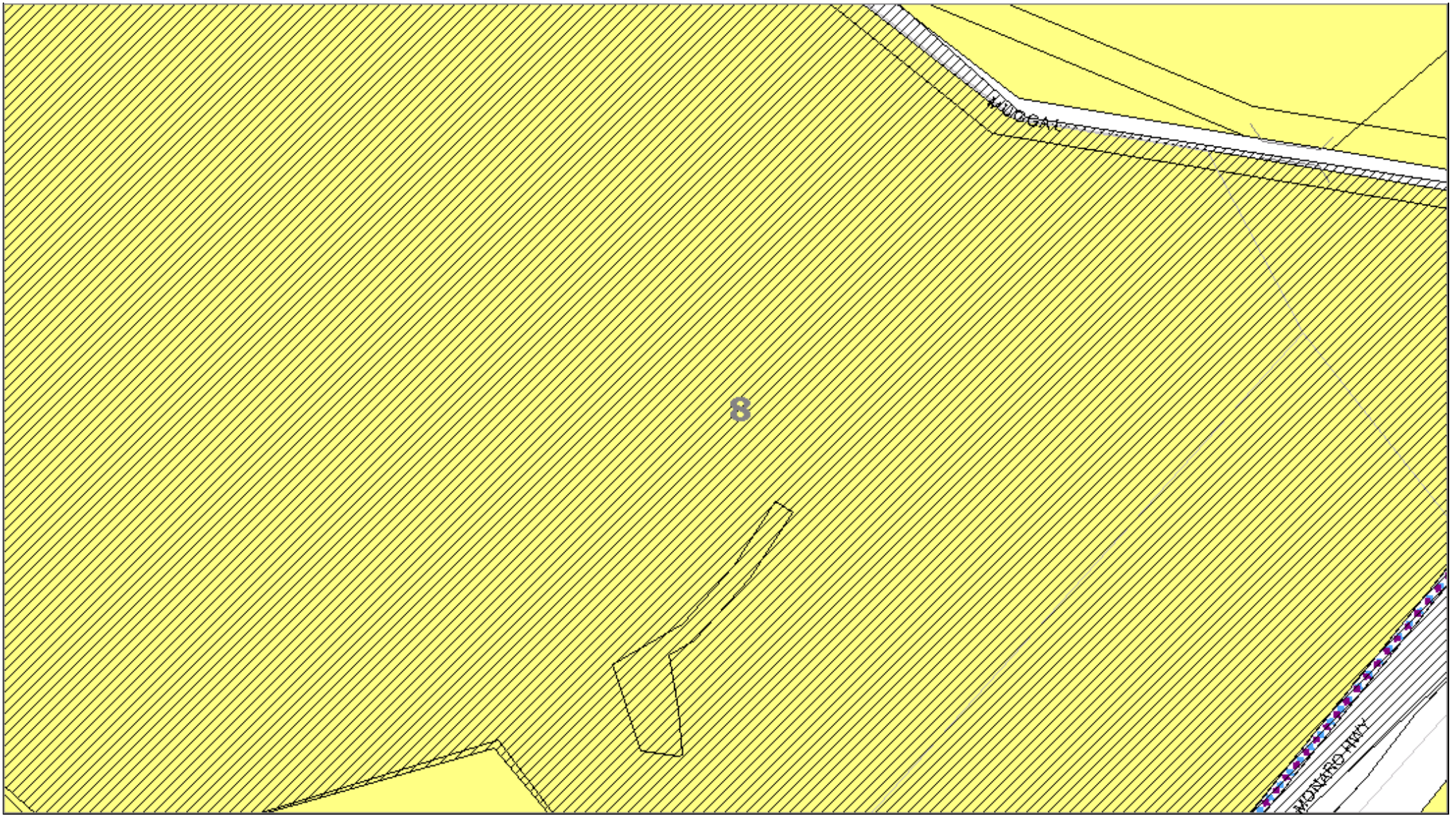


Optus
Cable Optus Undergroud Map 7 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
- Line
- Point
- Area

Undergound Asset
- Optus
- Optus In Other Utility's Duct



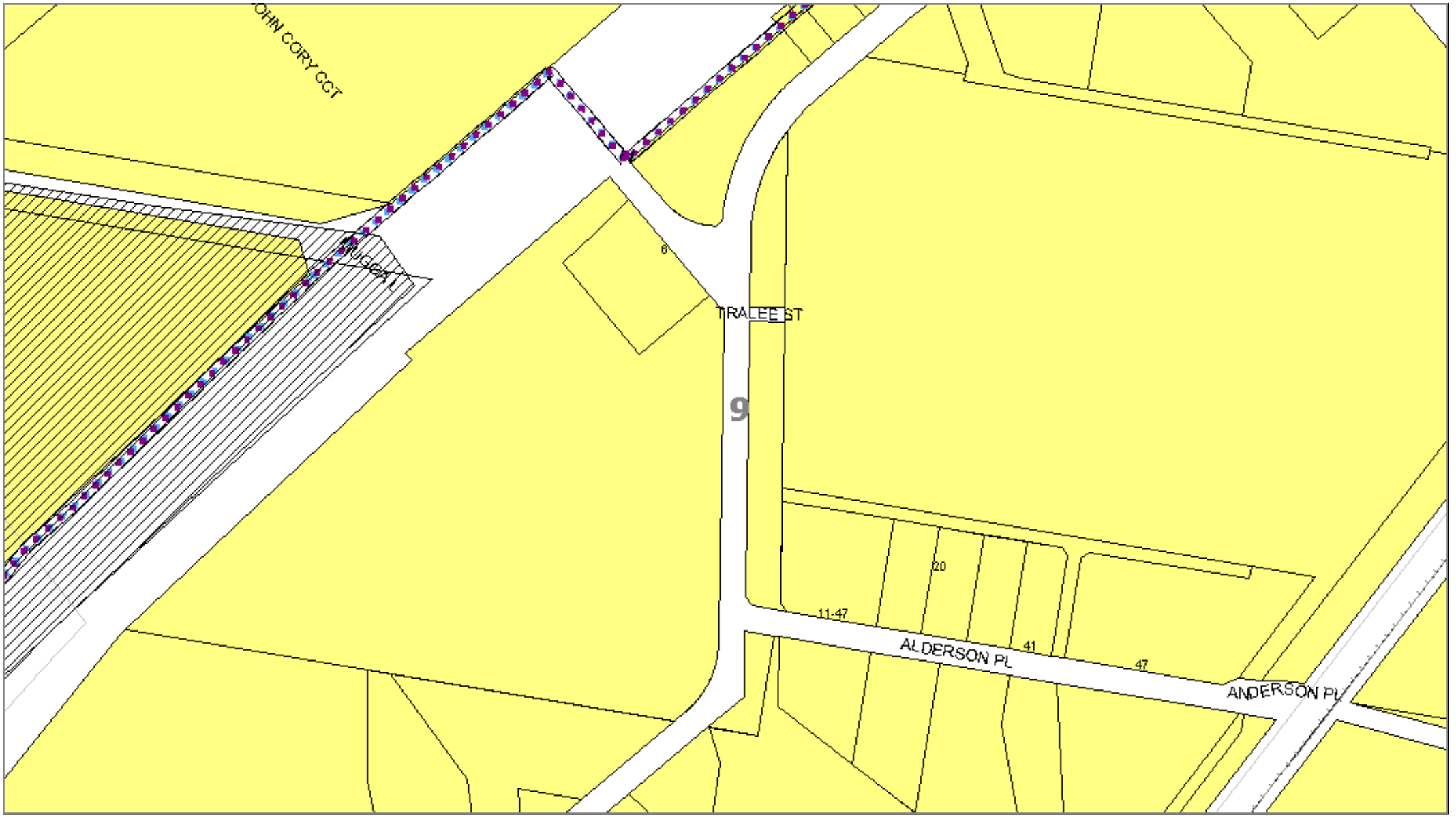
Optus
Cable Optus Undergroud Map 8 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

N
W
E
S

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

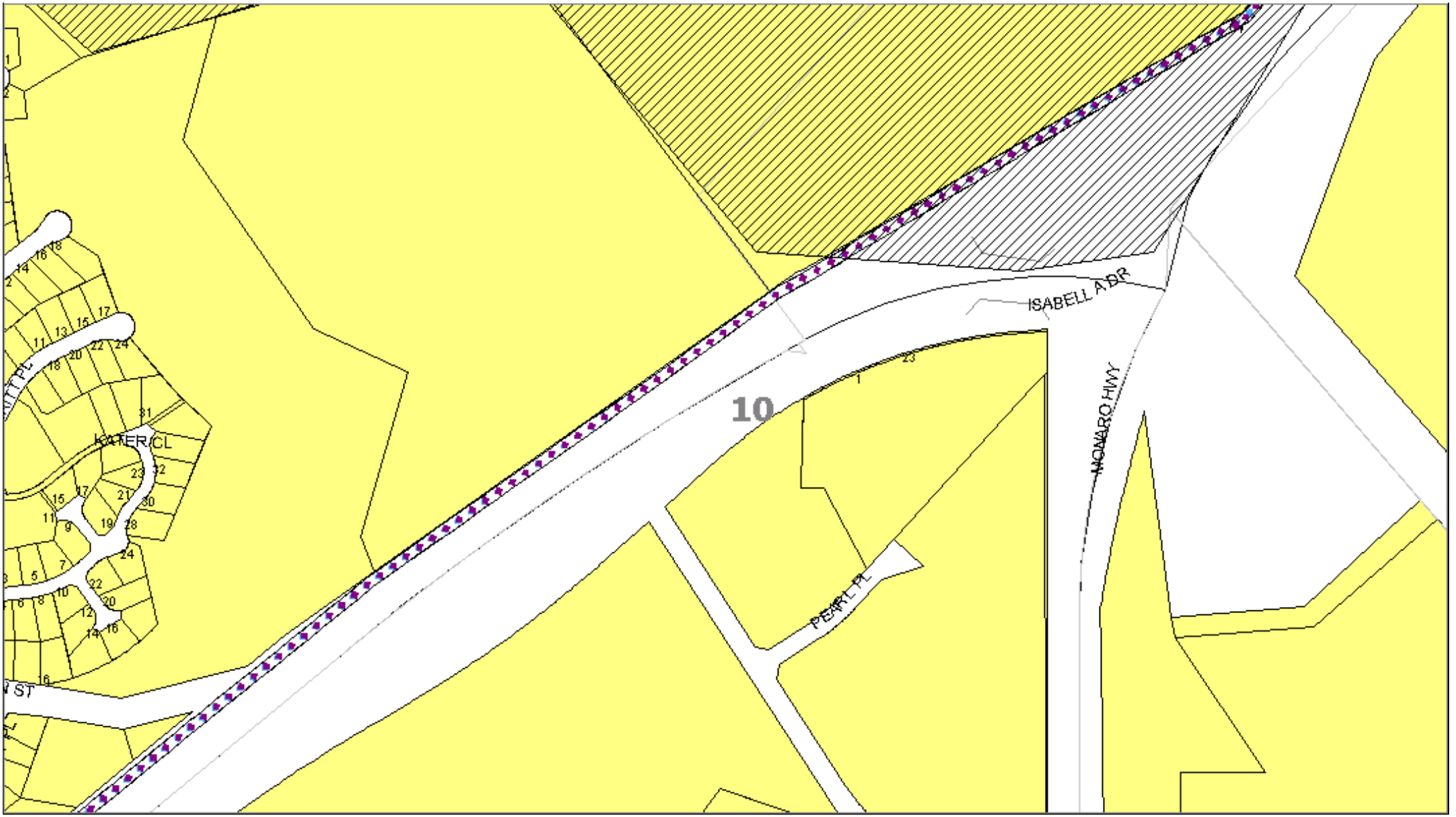


Optus
Cable Optus Undergroud Map 9 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct



Optus
Cable Optus Undergroud Map 10 of 10
Scale: 1 : 5000 **Printed On:** 27/08/2009

Sequence Number: 16580366
Location: Mugga Lane

Job Location
Line
Point
Area

Undergound Asset
Optus
Optus In Other Utility's Duct

Network Protection

NATURAL GAS LOCALITY PLAN & ADVICE

Sequence Number:	16580367	**Date:**	27/08/2009
To:	Mr Graham Sandeman		
Fax/Email:	graham.sandeman@purdon.com.au	**Pages:**	1
Requested Address:	Mugga Lane Tuggeranong (Block 1677)		

1. The following types of gas mains are in the vicinity of the location of your intended work as per the attached map: (mark applicable)

☒ No record of gas mains

☐ High pressure steel main (Refer Section 2)

☐ Large diameter plastic feeder main (Refer Section 2)

☐ Small diameter plastic distribution main (Refer Section 2)

NB: Individual customer gas connections are generally not shown on the accompanying maps. For information regarding individual gas connections refer to Section 4.

2. Your obligations and responsibilities:

Consistent with the requirements of Part 2 General – Section 8 of the Utility Networks (Public Safety) Regulations 2001 No. 28 Jemena require that: (mark applicable)

☐ You **MUST** meet with a Jemena representative on site prior to the commencement of any excavation works. Mandatory Stand-by may be required – refer Charges.

☒ You must follow the General Excavation Guidelines (Section 3)

☒ We recommend you request an inlet service location

3. General Excavation Guidelines:

In addition to the requirements of Part 2 General – Section 8 of the Utility Networks (Public Safety) Regulations 2001 No. 28:

- The requestor is responsible to ensure all workers on site are aware of the presence of natural gas infrastructure in the vicinity of the intended work and ActewAGL's requirements.
- The requestor shall ensure that under no circumstances will mechanical excavation be carried out within 1.0 metre of a gas main without there being an Jemena Representative on site.
- The requestor shall be responsible to maintain the presence / visibilities of all gas markings.

4. Additional Information:

- Please note that Jemena Asset Management only provides information on the location of Gas infrastructure. For all inquiries pertaining to other utilities please contact Dial Before You Dig on **1100**
- For additional information or clarification on the Gas information provided, please contact **02 6203 0600**
- To arrange an onsite meeting or site location please contact **02 6203 0660**
- **For all emergencies please contact 131 909**

Network Protection

NATURAL GAS LOCALITY PLAN & ADVICE

Sequence Number:	16566868	**Date:**	26/08/2009
To:	Mr Graham Sandeman		
Fax/Email:	graham.sandeman@purdon.com.au	**Pages:**	
Requested Address:	Mugga Lane Tuggeranong		

1. The following types of gas mains are in the vicinity of the location of your intended work as per the attached map: (mark applicable)

☒ No record of gas mains

☐ High pressure steel main (Refer Section 2)

☐ Large diameter plastic feeder main (Refer Section 2)

☐ Small diameter plastic distribution main (Refer Section 2)

NB: Individual customer gas connections are generally not shown on the accompanying maps. For information regarding individual gas connections refer to Section 4.

2. Your obligations and responsibilities:

Consistent with the requirements of Part 2 General – Section 8 of the Utility Networks (Public Safety) Regulations 2001 No. 28 Jemena require that: (mark applicable)

☐ You **MUST** meet with a Jemena representative on site prior to the commencement of any excavation works. Mandatory Stand-by may be required – refer Charges.

☒ You must follow the General Excavation Guidelines (Section 3)

☒ We recommend you request an inlet service location

3. General Excavation Guidelines:

In addition to the requirements of Part 2 General – Section 8 of the Utility Networks (Public Safety) Regulations 2001 No. 28:

- The requestor is responsible to ensure all workers on site are aware of the presence of natural gas infrastructure in the vicinity of the intended work and ActewAGL's requirements.
- The requestor shall ensure that under no circumstances will mechanical excavation be carried out within 1.0 metre of a gas main without there being an Jemena Representative on site.
- The requestor shall be responsible to maintain the presence / visibilities of all gas markings.

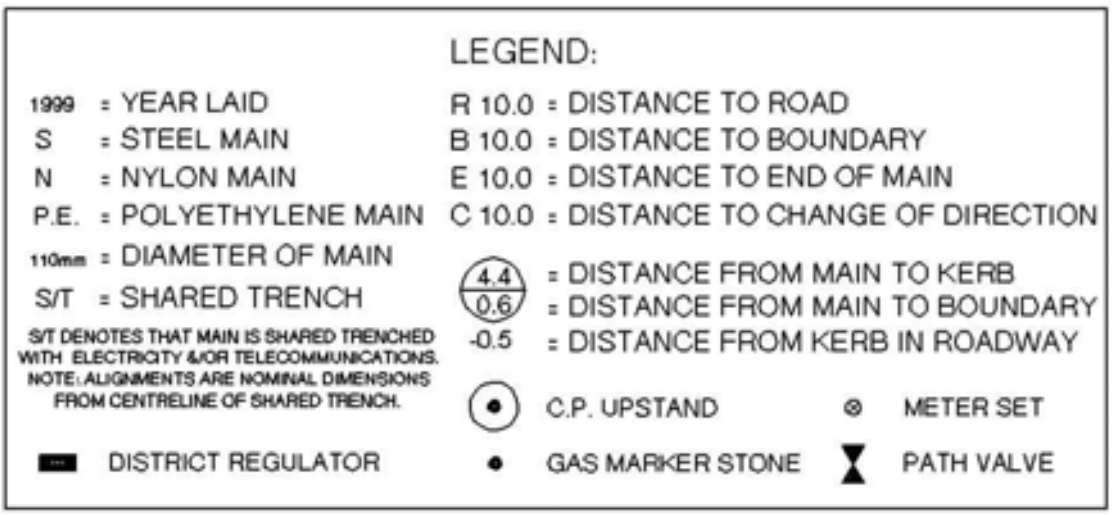
4. Additional Information:

- Please note that Jemena Asset Management only provides information on the location of Gas infrastructure. For all inquiries pertaining to other utilities please contact Dial Before You Dig on **1100**
- For additional information or clarification on the Gas information provided, please contact **02 6203 0600**
- To arrange an onsite meeting or site location please contact **02 6203 0660**
- **For all emergencies please contact 131 909**

In Case of Emergency Phone 131 909 (24 hours)

Network Protection

Canberra Network:



Charges:

- First 2 hours of Stand-by - No charge.
- Subsequent times during & outside business hours will incur a charge.

Warning: ActewAGL plans have been provided to show the position of underground gas mains and equipment in public gazetted roads only. **Individual customers services are not generally included** on these plans. These plans have been prepared solely for ActewAGL's own use and indicate the position of underground mains and installations relative to boundaries and kerbs as at the time the mains were installed, and do not necessarily reflect any subsequent changes eg: changes to road alignments.

Jemena will accept no liability for inaccuracies in the information or lack of information on such plans for any cause whatsoever arising. Persons excavating or carrying out other earthworks will be held responsible for any damage caused to underground mains and equipment, and the costs associated with replacement or repair.

Please note that the information contained on the map provided is not a method of determining gas availability for the purposes of connection to a natural gas supply. Please contact a gas retailer to determine the availability of gas as an energy source.

In Case of Emergency Phone 131 909 (24 hours)

118 Lysaght Street
PO BOX 5
MITCHELL ACT 2911
Phone: (02) 6209 9770
Fax: (02) 6209 9761

Web: www.diverse.com.au

Date: 26th August 2009
Attention / To: Mr Graham Sandeman
Company: Purdon Associates
Fax No: (02)
Email: graham.sandeman@purdon.com.au

Mob:
Phone: (02) 6257 1511

From: Ioanna Grimbas

Subject: Dial Before You Dig Request

Sequence No. **16580360, 16580361, 16580362, 16580363, 16580364 & 16580365**

Hello Graham,

Thank you for using Dial Before You Dig.

I am looking after the Commonwealth's Optical Fibre Network, called ICON and have received advice concerning your proposed work in ***Mugga Lane, Tuggeranong. (as per diagram supplied)***

There are underground fibres along the area you have indicated on your enquiry.

Please phone **Ioanna** on **(02) 6204 3387** to arrange an onsite visit. Please be aware that your requested visit would require at least two (2) days notice.

Regards,

Ioanna Grimbas
ICON Asset's
Diverse Data Communications
Email: igrimbas@diverse.com.au

ActewAGL House 221 London Circuit Canberra ACT 2600 * GPO Box 366 Canberra ACT 2601
Telephone 13 14 93 **Facsimilie** 02 6249 7237 www.actgewagl.com.au

Application for Asset Location Advice

Applicant/Contractor

DBYD Sequence Number 16580343

Name	**Purdon Associates**				
Contact Name	**Mr Graham Sandeman**				
Telephone	**0262571511**	Mobile	**Not Supplied**	Fax	**0262488347**
Address	**Unit 3 9 Mckay St, Turner**				

Work Details

Suburb	Block	Section
Address		
UBD Reference		
Description		

Advice

The approximate location of ACTEW or ActewAGL underground services in this area are shown on the ActewAGL plans attached.

Electricity Network ☐ Water Network ☐ Sewer Network ☐ Effluent Network ☐ Legend Sheet ☐

Comments

This advice is valid from **26-Aug-2009** *to **26-Nov-2009** *For three months

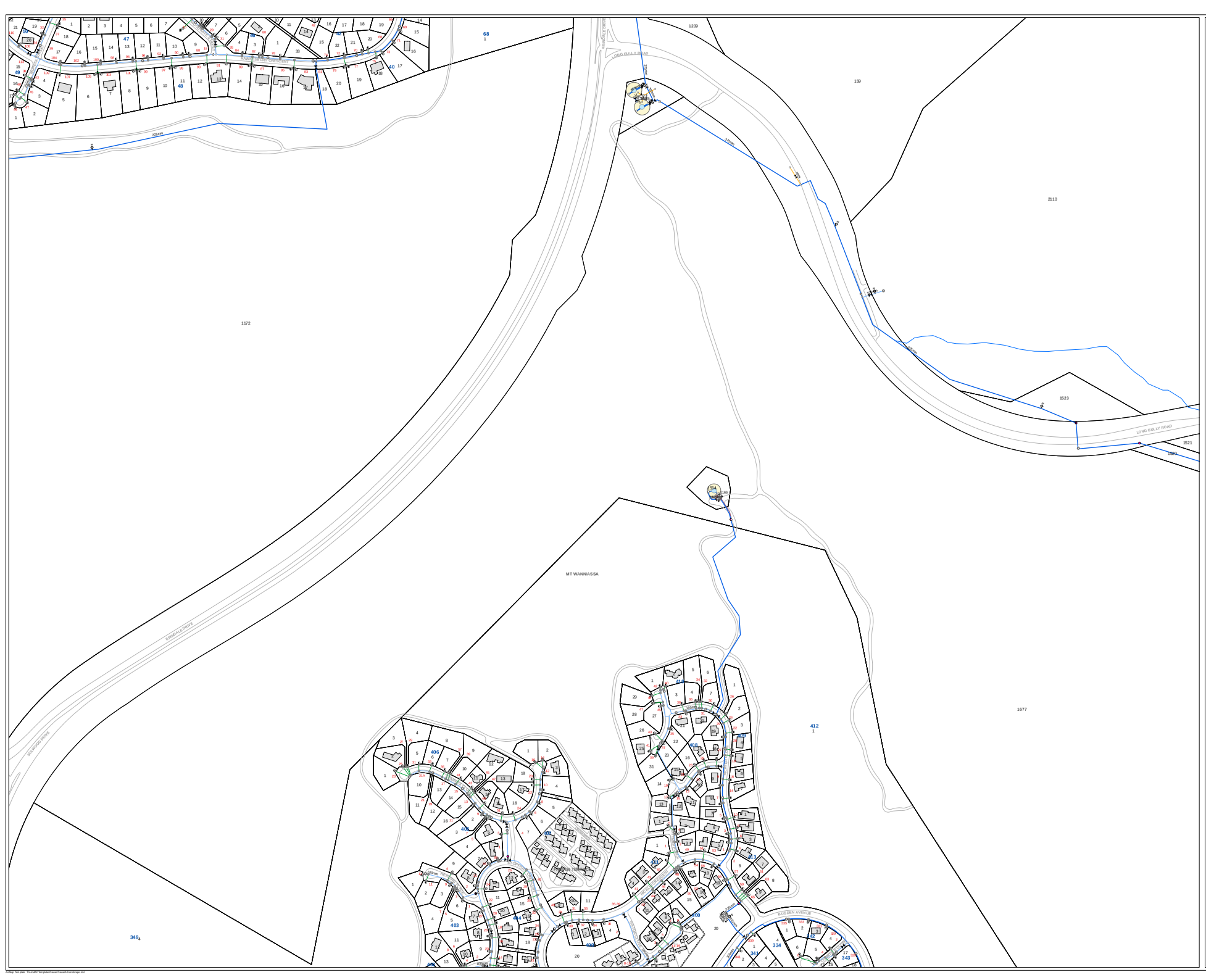
Disclaimer

1. The attached plans may show the position of such underground services and other structures and equipment relative to fences, buildings, property lines, kerbs and/or other points of reference as they existed at the time of installation and not necessarily corrected to take account of any subsequent alterations.
2. Whilst ACTEW or ActewAGL has endeavored to keep its records current, neither party makes any warranty as to the accuracy of the attached plans.
3. ACTEW or ActewAGL accepts no liability whatsoever for losses arising from the use of its attached plans except where
   (a) ACTEW or ActewAGL by its servants or agents attends on site (at the request of the user), prior to the commencement of any excavation work and marks the location of that asset or other equipment; and
   (b) such servants or agents have been negligent.

Further Information

1. ACTEW or ActewAGL does not ensure that the plans show more than the presence or absence of its assets and will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever. Persons excavating are required to exercise care if assets are indicated and will be held responsible for any damage caused through failure to exercise such care.
2. Additional underground assets may be installed at any time. Users are advised to be alert for installations performed after the date of issue of the attached plans, and to apply to ActewAGL for up to date asset location advice if their work is protracted.
3. No excavation, structures, material storage, heavy vehicle parking, blasting, change of surface level or other work is to be undertaken which will interfere with the reliability of, or access to, ACTEW or ActewAGL plant, lines and/ or underground assets. ACTEW or ActewAGL will seek to recover restoration costs for damage caused to underground assets, lines and/ or plant arising from such interference.
4. On request, a representative of ActewAGL will be available to visit the work site and arrange the approximate asset location. These arrangements may be made by phoning 6293 5770 between 7:30am and 4pm. Appointments will only be accepted if the Asset Location Advice Sequence Number is supplied. The location and marking of assets will not take place unless this Asset Location Advice and attached plans are on site.
5. The fact that the asset location has been marked, does not relieve the contractor of the responsibility of exposing and or working near the asset without damage.
6. ActewAGL recommends that potholing techniques be used to first locate the pipes or cables before commencing full-scale excavation or implementing ActewAGL's recommended specifications concerning minimum safety distances when excavating within the vicinity of ACTEW's or ActewAGL's networks.
7. Excavation of water mains 450mm or greater must be done by ActewAGL Water at the Contractor's expense.
8. ActewAGL strongly advises that **ALL** cables, including those identified as 'Abandoned', be treated as 'LIVE' and dangerous until such time that they are proven 'DE-ENERGISED' and safe. ActewAGL therefore recommends that cables identified as 'Abandoned' and which may be impacted, severed, damaged and/or removed by the excavation works be proven 'DE-ENERGISED' and safe before commencing full-scale excavations.

THIS FORM AND ASSOCIATED PLANS ARE TO BE KEPT AT THE WORK SITE



ActewAGL Water Network

Block 177 - Tuggeranong
Sequence# 16580343

N

0 25 50 100 150 200 M

ActewAGL

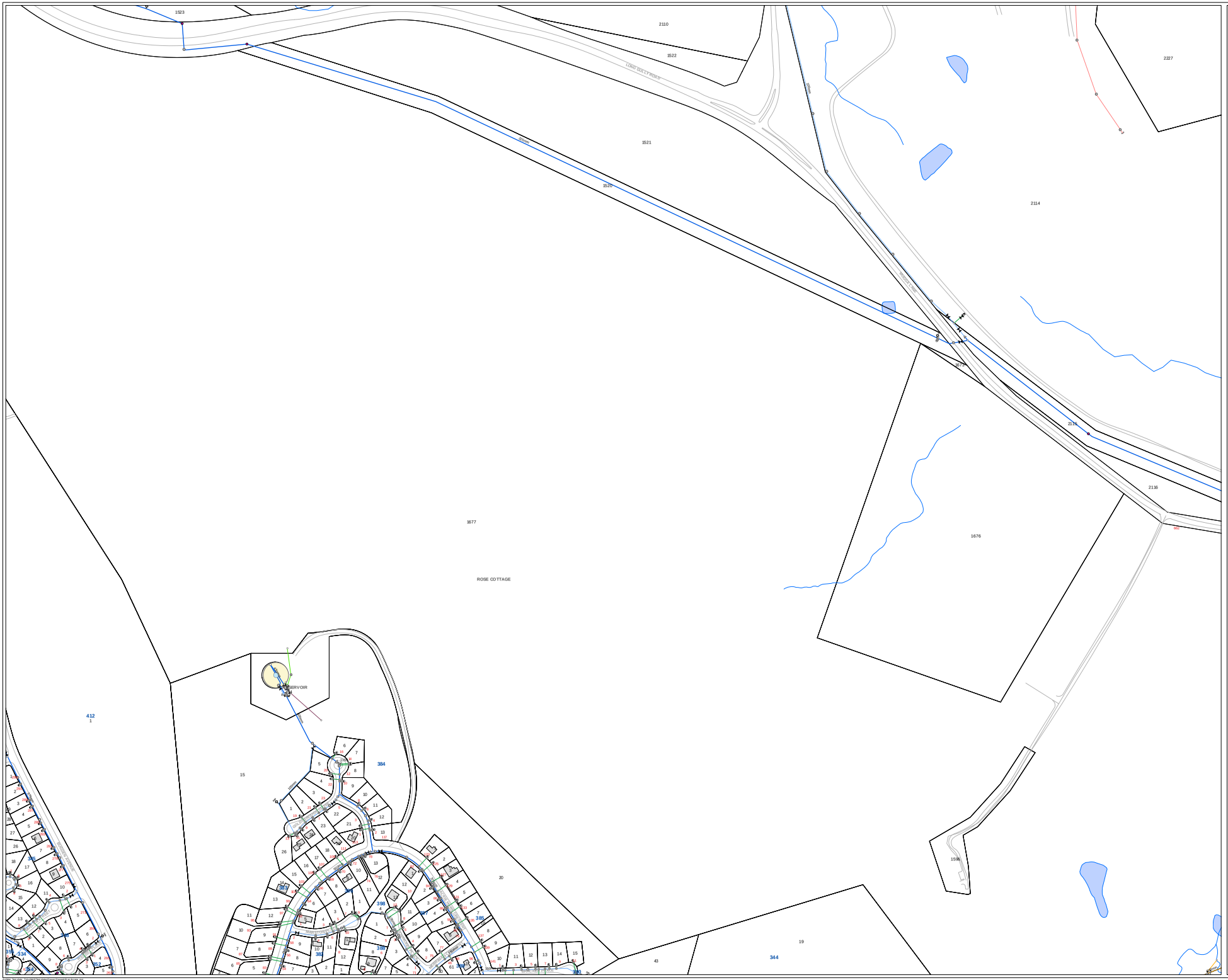
ActewAGL Water Network

Block 177 - Tuggeranong
Sequence# 16580343

0 25 50 100 150 200 M

All network distribution data is the property of ActewAGL and no warranty as to the accuracy or completeness of the information is provided. No liability for any loss or damage arising from the use of this information will be accepted. Copyright (c) ActewAGL 2003

Cadastral information has been provided by the ACT Planning and Land Authority (ACTPLA). Cadastral data should not be used externally to ActewAGL without written permission from ACTPLA. (C) ACT Government 2004.



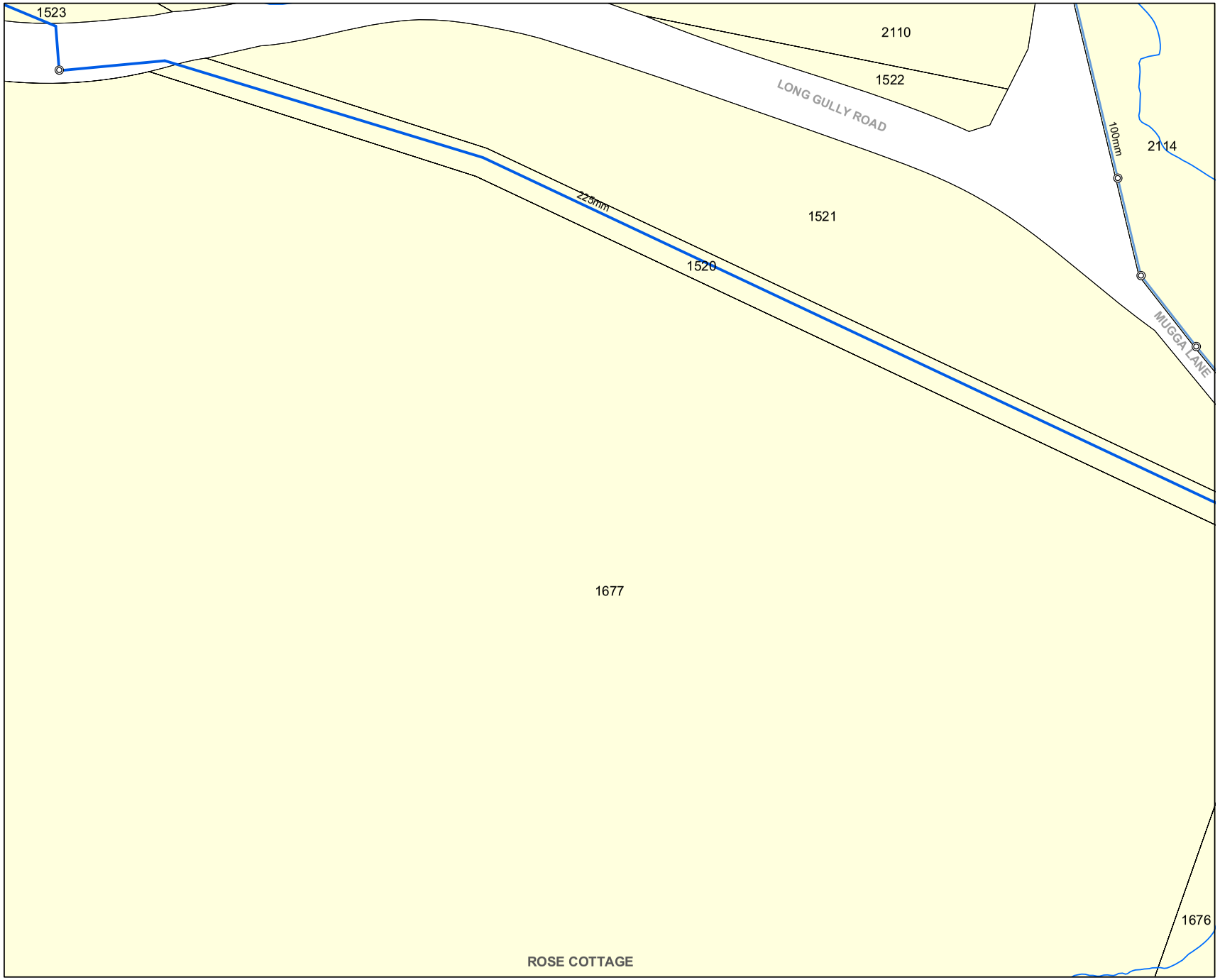
ActewAGL Water Network

Block 177 - Tuggeranong
Sequence# 16580343

N

0 25 50 100 150 200 M

ActewAGL



ActewAGL Water Network

HUME

Extractor:

Date: 11 Aug 2009

N

0 25 50 100 150 200 M

ActewAGL

ArcMap Template: T:\ArcMAPTemplates\Water\WaterA3Landscape.mxt

ActewAGL Water Network

HUME

Extractor:

Date: 11 Aug 2009

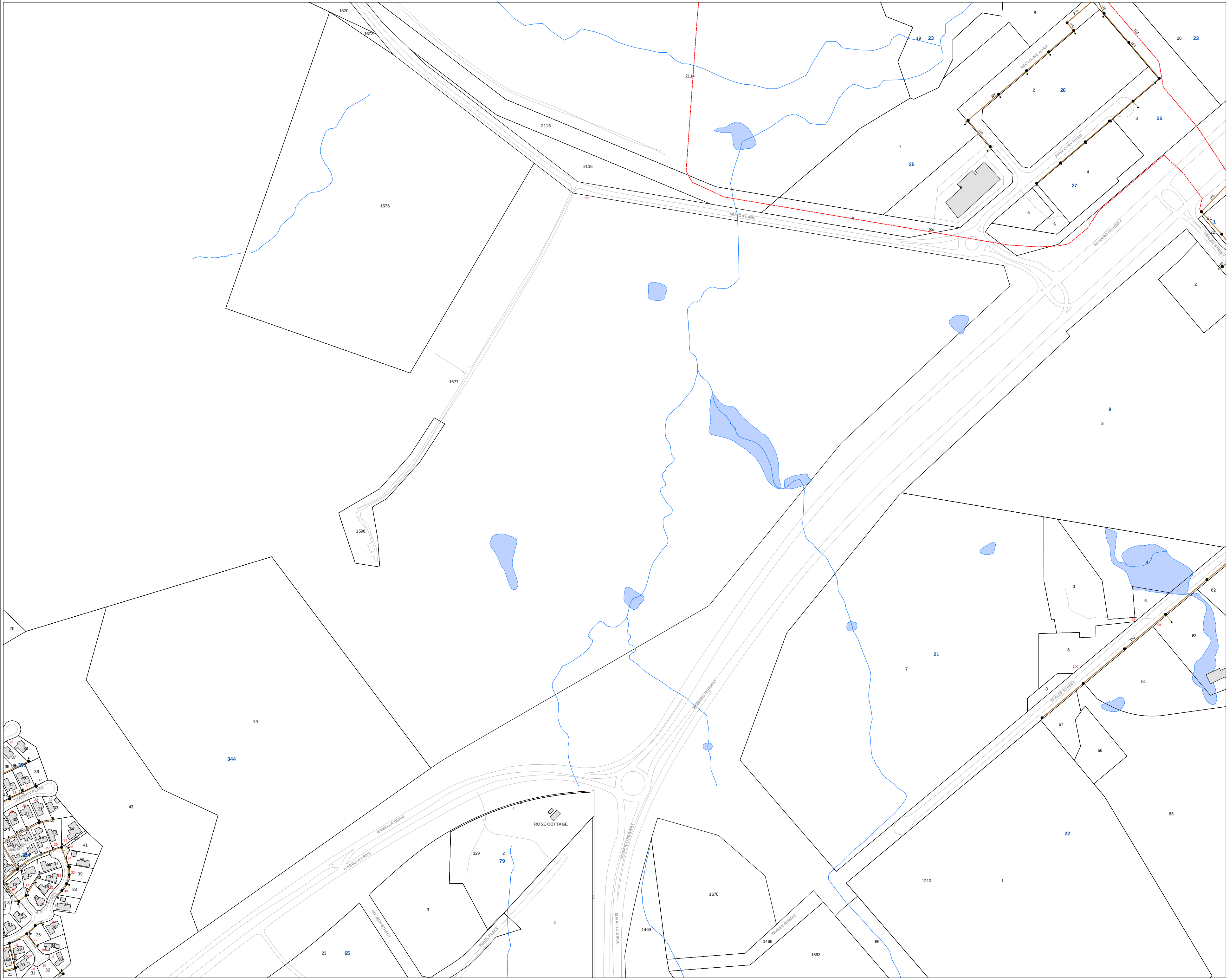
N

0 30 60 120 180 240
M

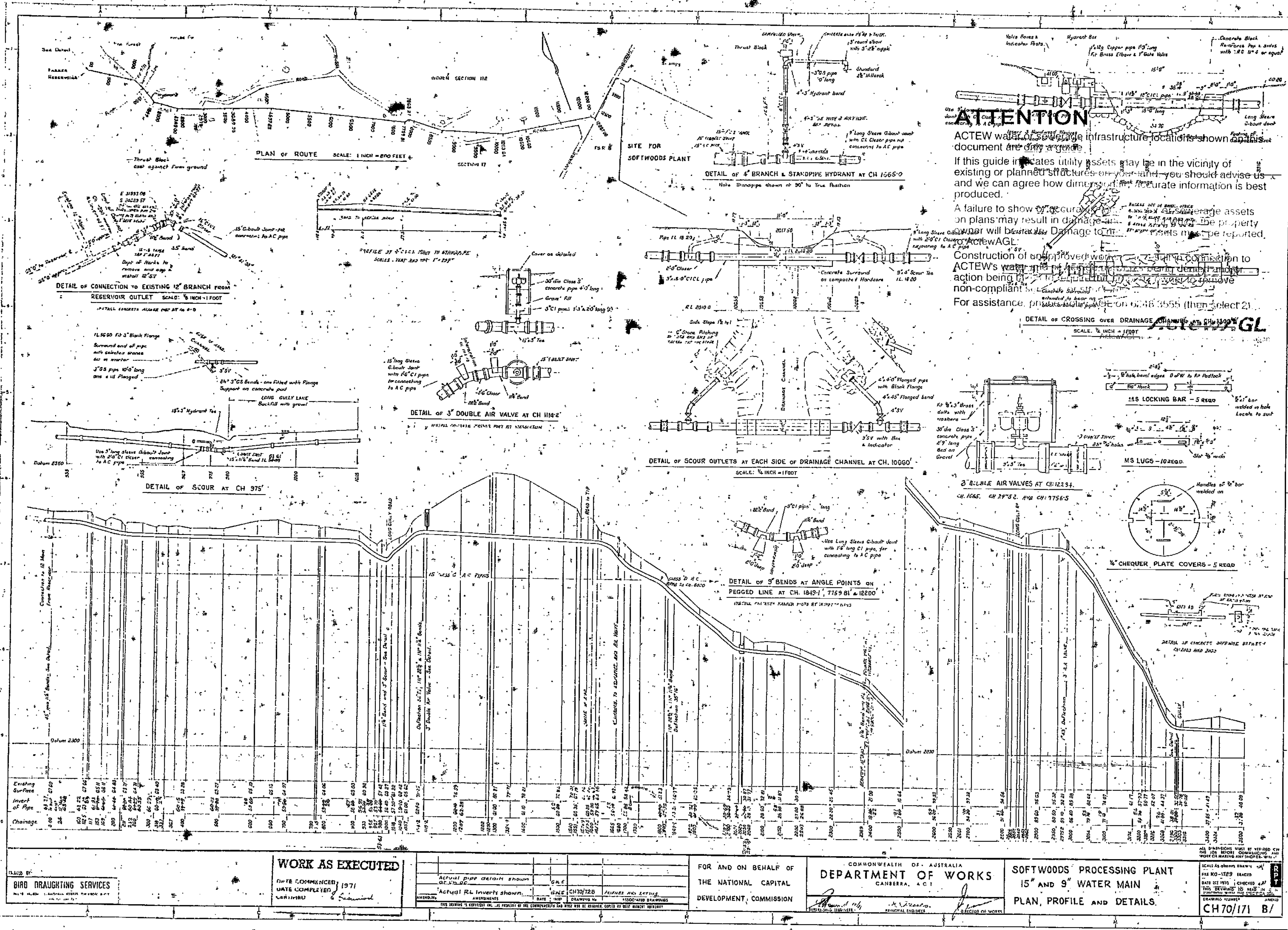
ActewAGL

ActewAGL Sewer Network

Block 177 - Tuggeranong
Sequence# 16580343

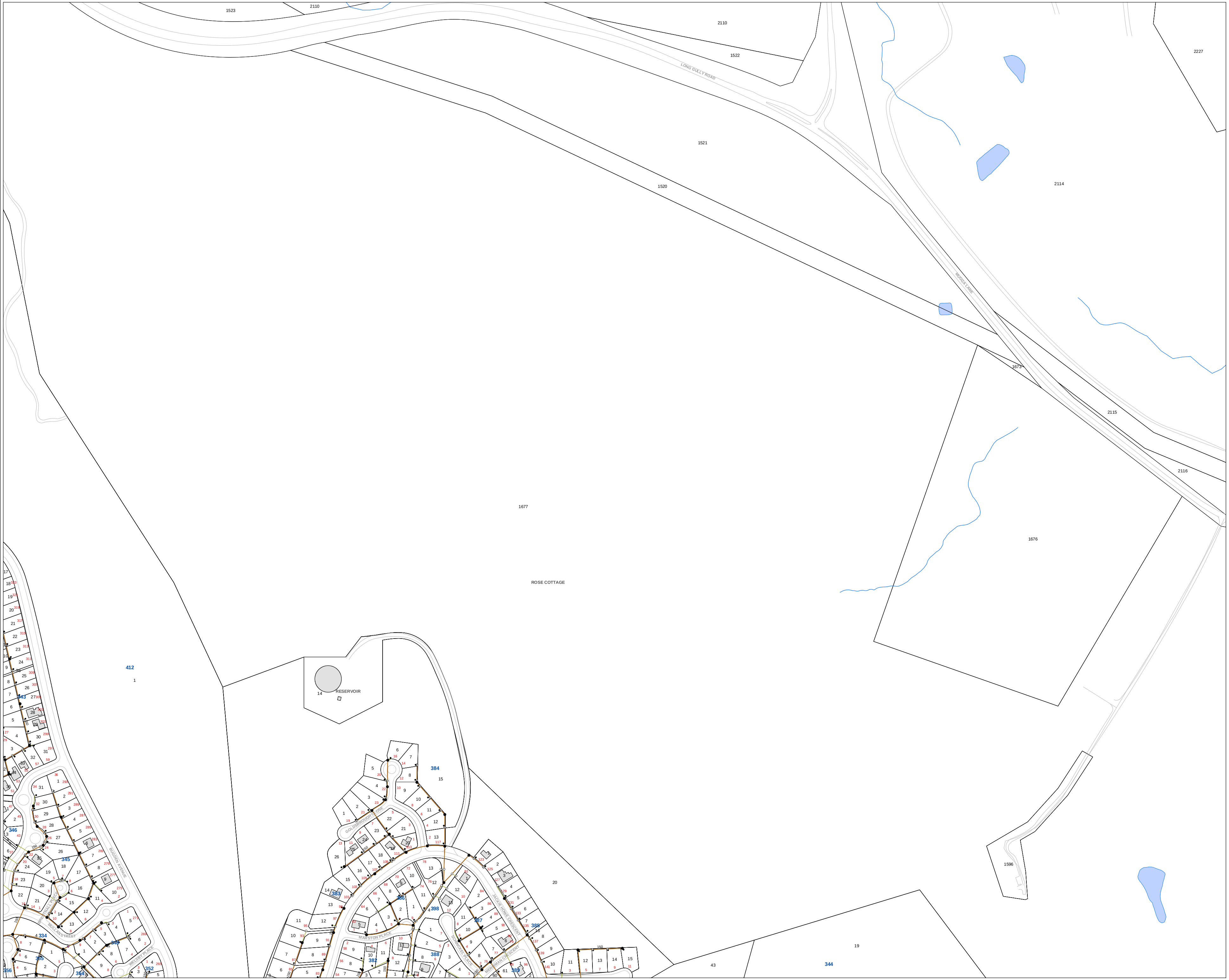


ActewAGL


ATTENTION
ACTEW water or sewerage infrastructure locations shown on this document are only a guide.
If this guide indicates utility assets may be in the vicinity of existing or planned structures
and we can agree how
produced.
A failure to show
on plans may result in damage
owner will be
ActewAGL.
Construction of
ACTEW's
action being
non-compliant
For assistance,
PLAN OF ROUTE SCALE: 1 INCH = 800 FEET
SITE FOR SOFTWOODS PLANT
DETAIL OF 4" BRANCH & STANDPIPE HYDRANT AT CH 1565'0
DETAIL OF CONNECTION TO EXISTING 12" BRANCH FROM RESERVOIR OUTLET SCALE: 1/8 INCH = 1 FOOT
DETAIL OF 3" DOUBLE AIR VALVE AT CH 1114'2
DETAIL OF SCOUR OUTLETS AT EACH SIDE OF DRAINAGE CHANNEL AT CH. 10060
SCALE: 1/4 INCH = 1 FOOT
DETAIL OF CROSSING OVER DRAINAGE CHANNEL
MS LOCKING BAR - 5 REQD
MS LUGS - 10 REQD.
3" DOUBLE AIR VALVES AT CH. 12234
1/4" CHEQUER PLATE COVERS - 5 REQD
DETAIL OF SCOUR AT CH 975'
DETAIL OF 9" BENDS AT ANGLE POINTS ON PEGGED LINE AT CH. 1849·1, 7759·81 & 12200
Datum 2300
Datum 2330
Existing Surface
Invert of Pipe
Chainage
TRACED BY
BIRD DRAUGHTING SERVICES
WORK AS EXECUTED
DATE COMMENCED
DATE COMPLETED 1971
CERTIFIED
Actual pipe details shown
Actual RL Inverts shown.
FOR AND ON BEHALF OF
THE NATIONAL CAPITAL
DEVELOPMENT COMMISSION
COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF WORKS
CANBERRA, A.C.T.
SOFTWOODS PROCESSING PLANT
15" AND 9" WATER MAIN
PLAN, PROFILE AND DETAILS.
CH70/171 B/

ActewAGL Sewer Network

Block 177 - Tuggeranong
Sequence# 16580343



0 25 50 100 150 200 M

ActewAGL

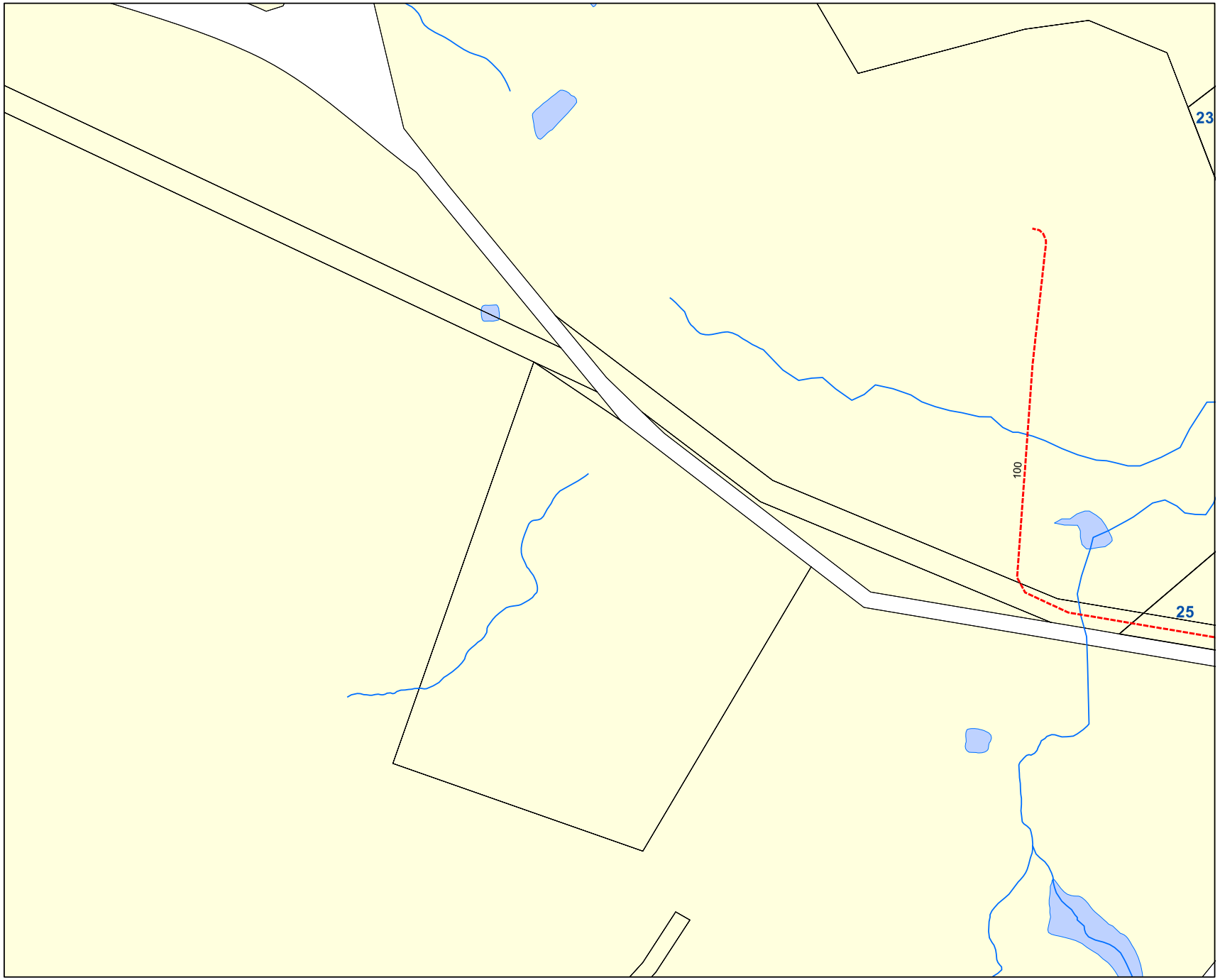
ActewAGL Sewer Network

Block 177 - Tuggeranong
Sequence# 16580843

N

0 25 50 100 150 200 M

ActewAGL



ActewAGL Sewer Network

HUME

Extractor:

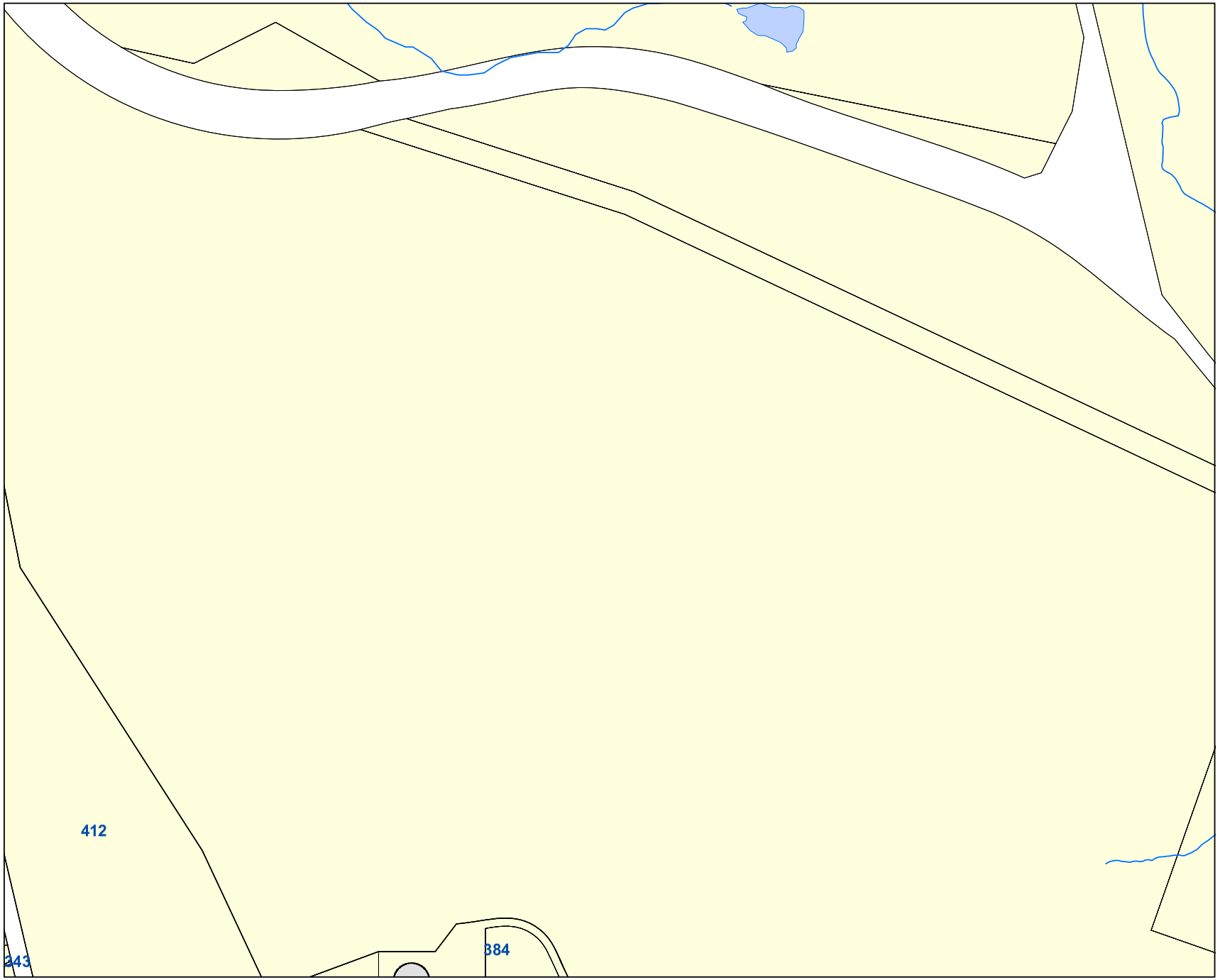
Date: 11 Aug 2009

N

0 35 70 140 210 280
M

ActewAGL

ArcMap Template: T:\ArcMAPTemplates\Sewer\SewerA3Landscape.mxt



ActewAGL Sewer Network

HUME

Extractor:

Date: 11 Aug 2009

N

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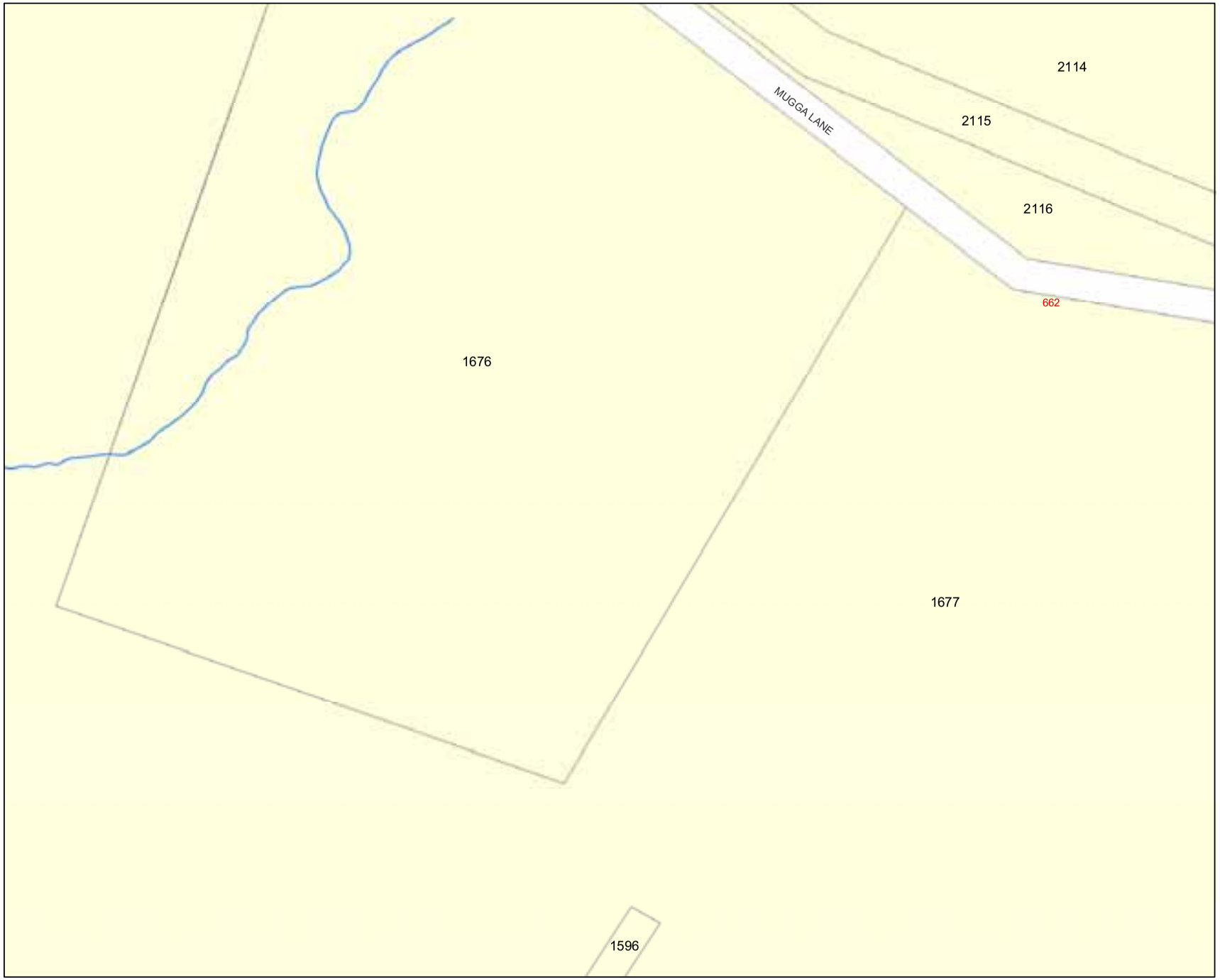
M

ActewAGL

ArcMap Template: T:\ArcMAPTemplates\Sewer\SewerA3Landscape.mxt



ActewAGL Gas Network

UBD Map Reference: 89 J5

Extractor:

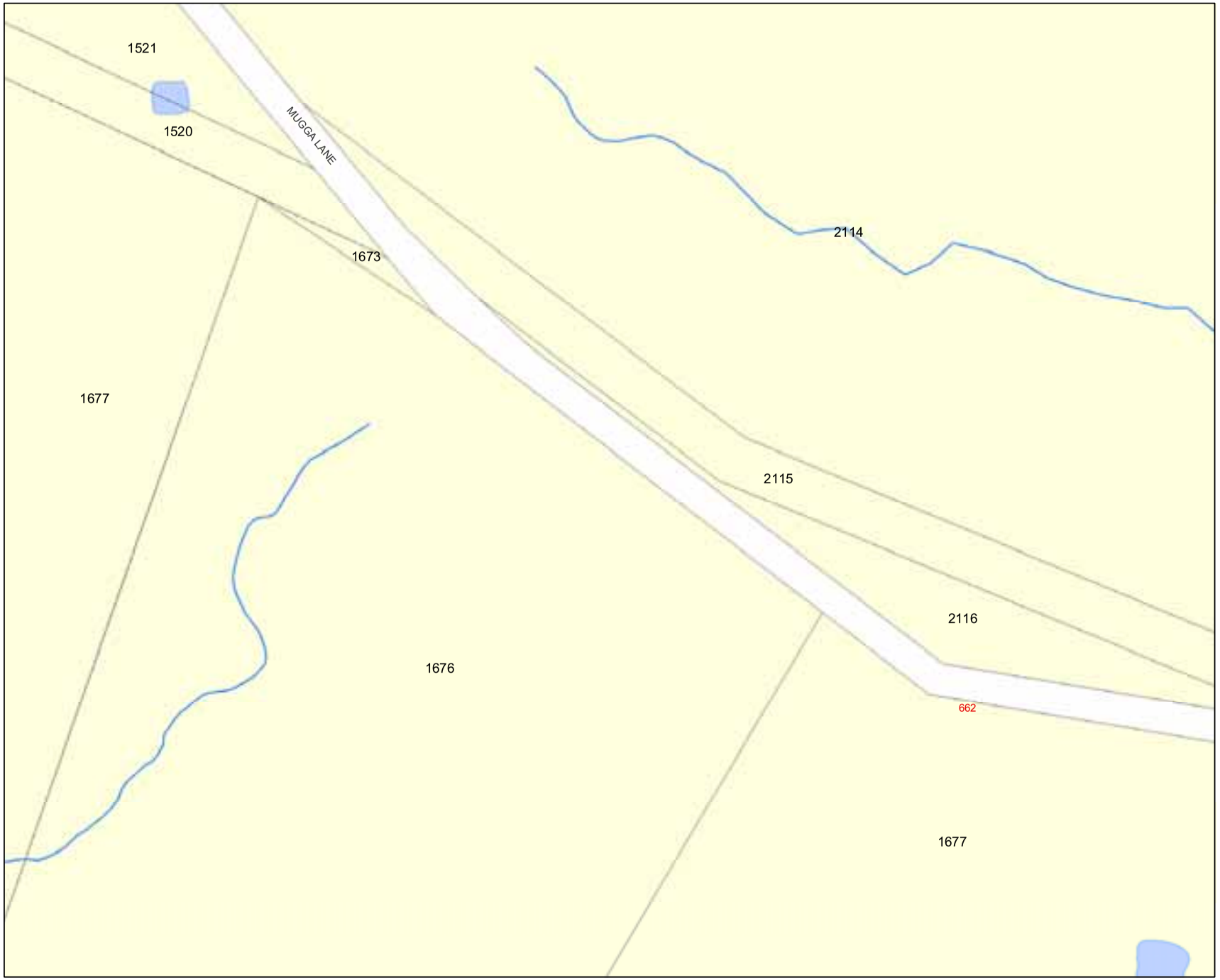
Date: 26 Aug 2009

N

0 15 30 60 90 120
M

ActewAGL

ArcMap Template: T:\ArcMAPTemplates\Gas\GasA3Landscape.mxt



ActewAGL Gas Network

UBD Map Reference: 89 J5

Extractor:

Date: 26 Aug 2009

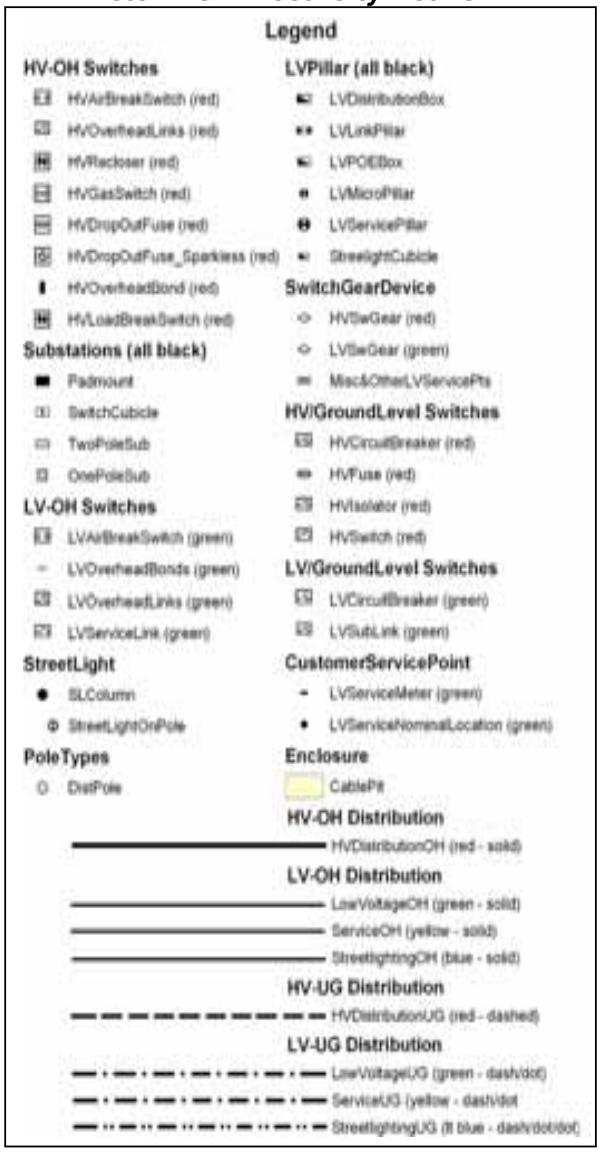
N

0 15 30 60 90 120
M

ActewAGL

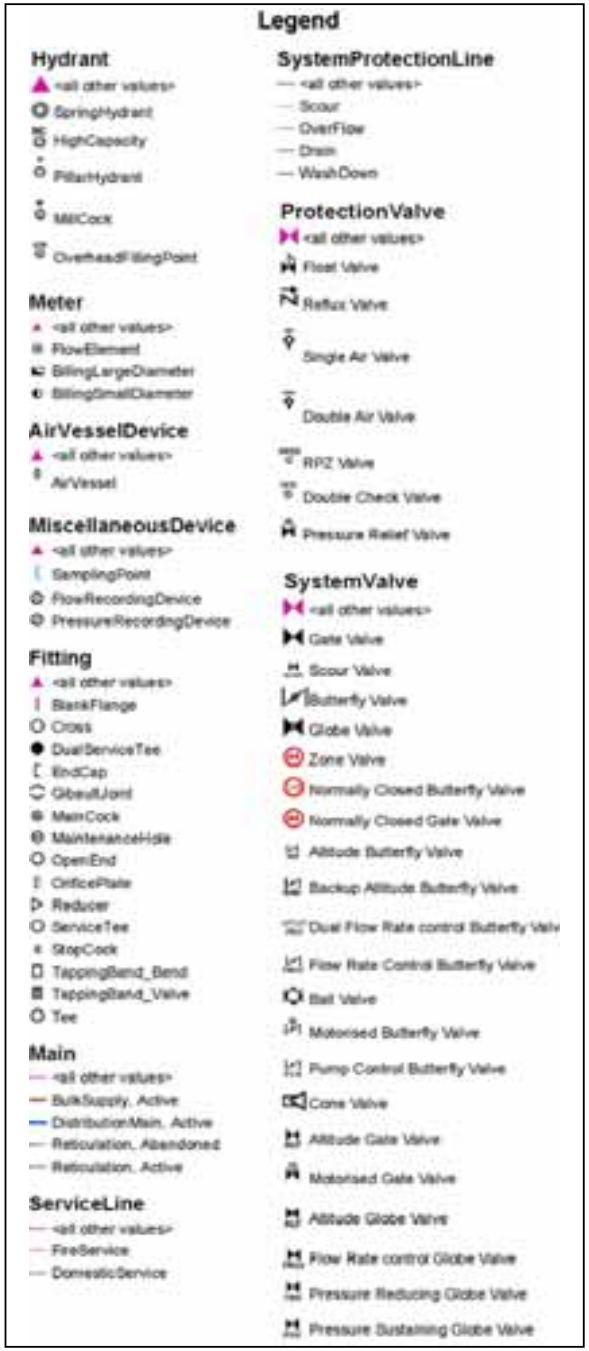
ArcMap Template: T:\ArcMAPTemplates\Gas\GasA3Landscape.mxt

ActewAGL Electricity Network

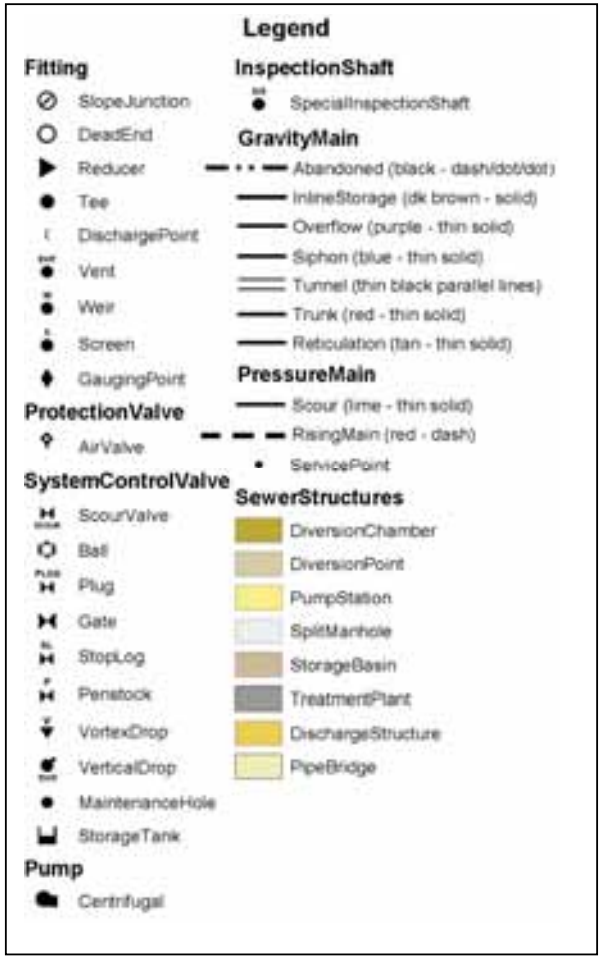


IMPORTANT NOTE: The term “ABANDONED” is utilised to identify an underground cable that has been physically disconnected from the ActewAGL electricity network, is not in service and cannot readily be put back into service without specific augmentation and/or reconnection works. Cable(s) identified by ActewAGL as “ABANDONED” have been discarded in-situ by ActewAGL. ALL Cables should be treated as “LIVE” and Dangerous until proven de-energised and safe.

ActewAGL Water Network



ActewAGL Sewer Network



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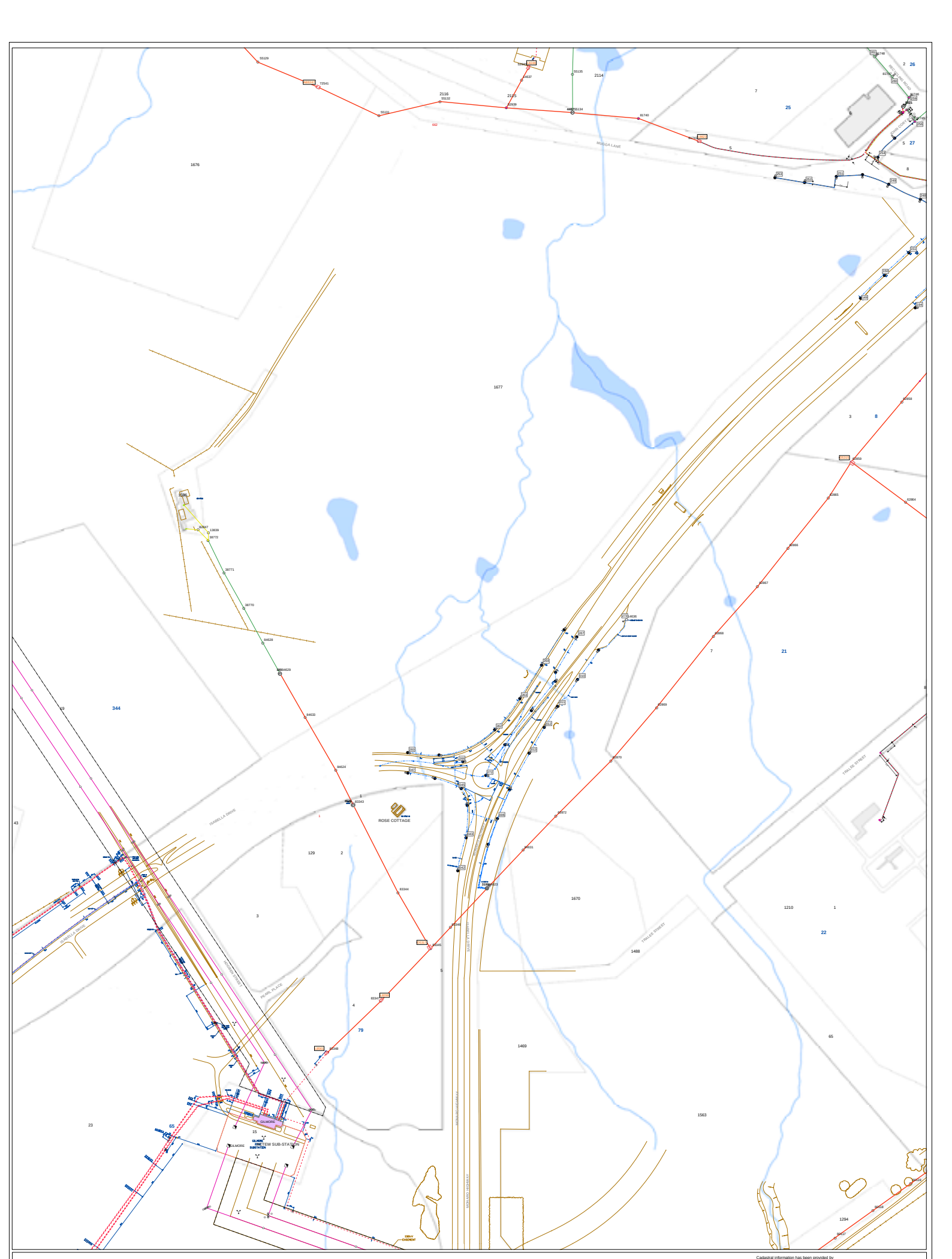

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ActewAGL Electriciy Network

Block 177 - Tuggeranong
Sequence# 16580343

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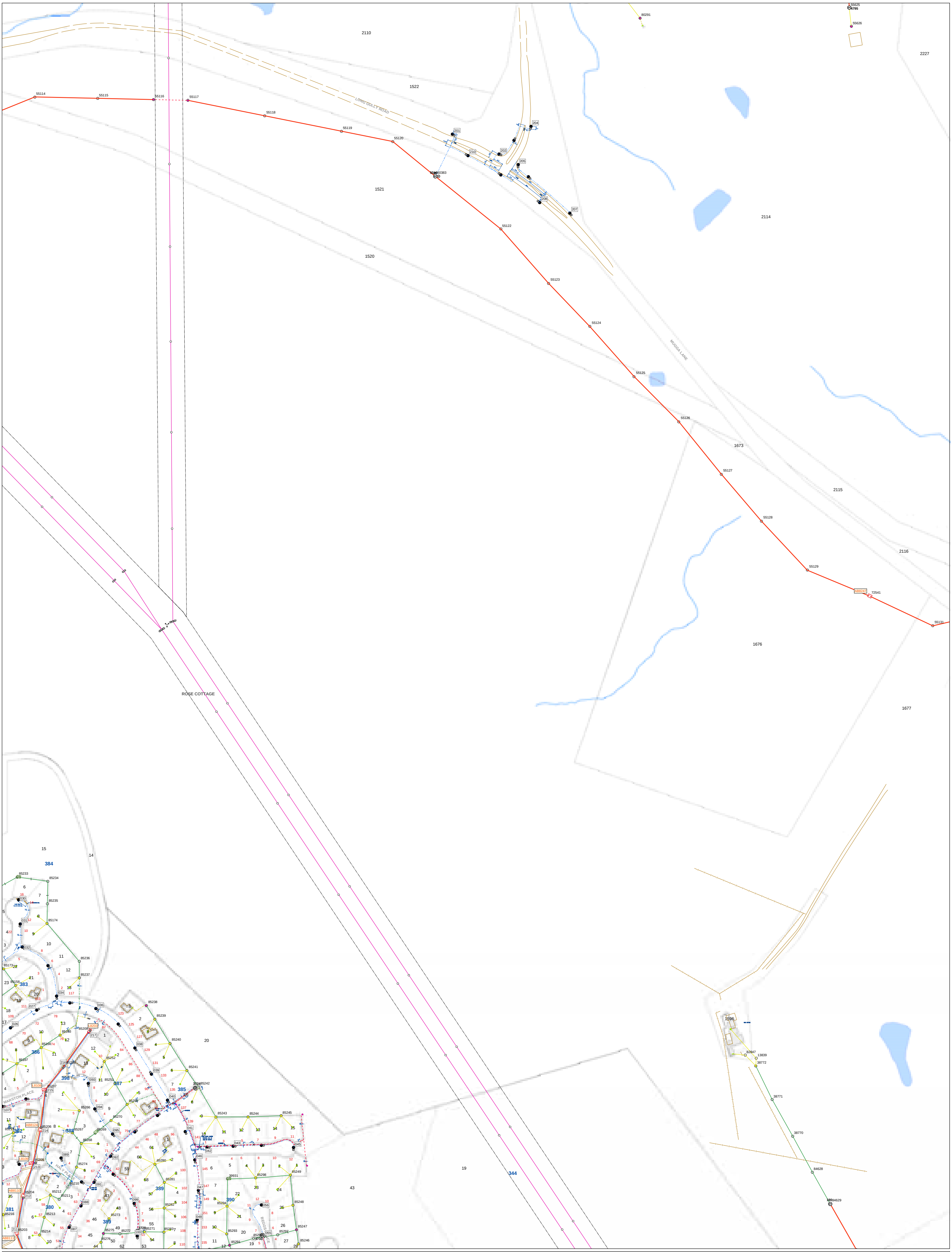

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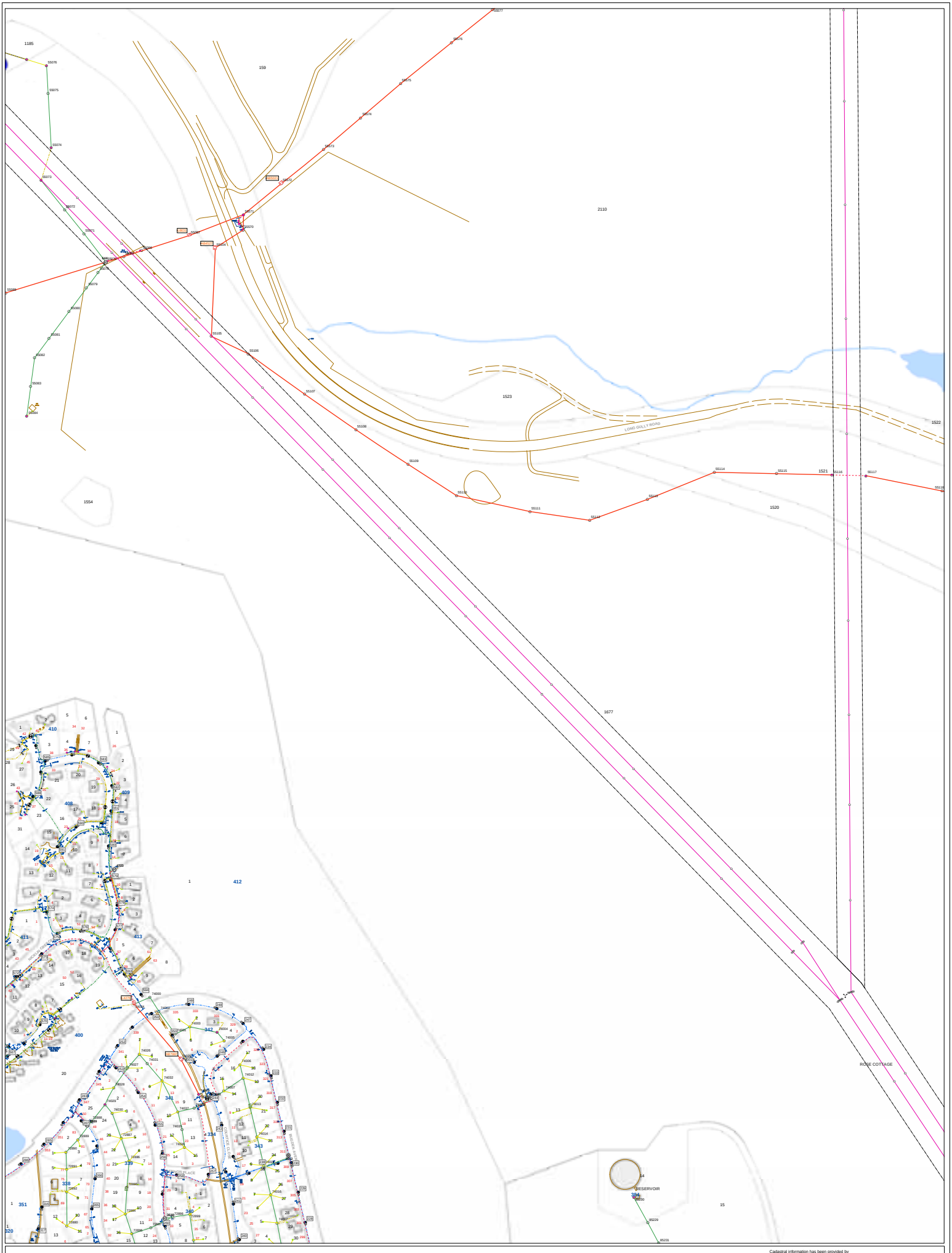

ActewAGL Electriciy Network

Block 177 - Tuggeranong
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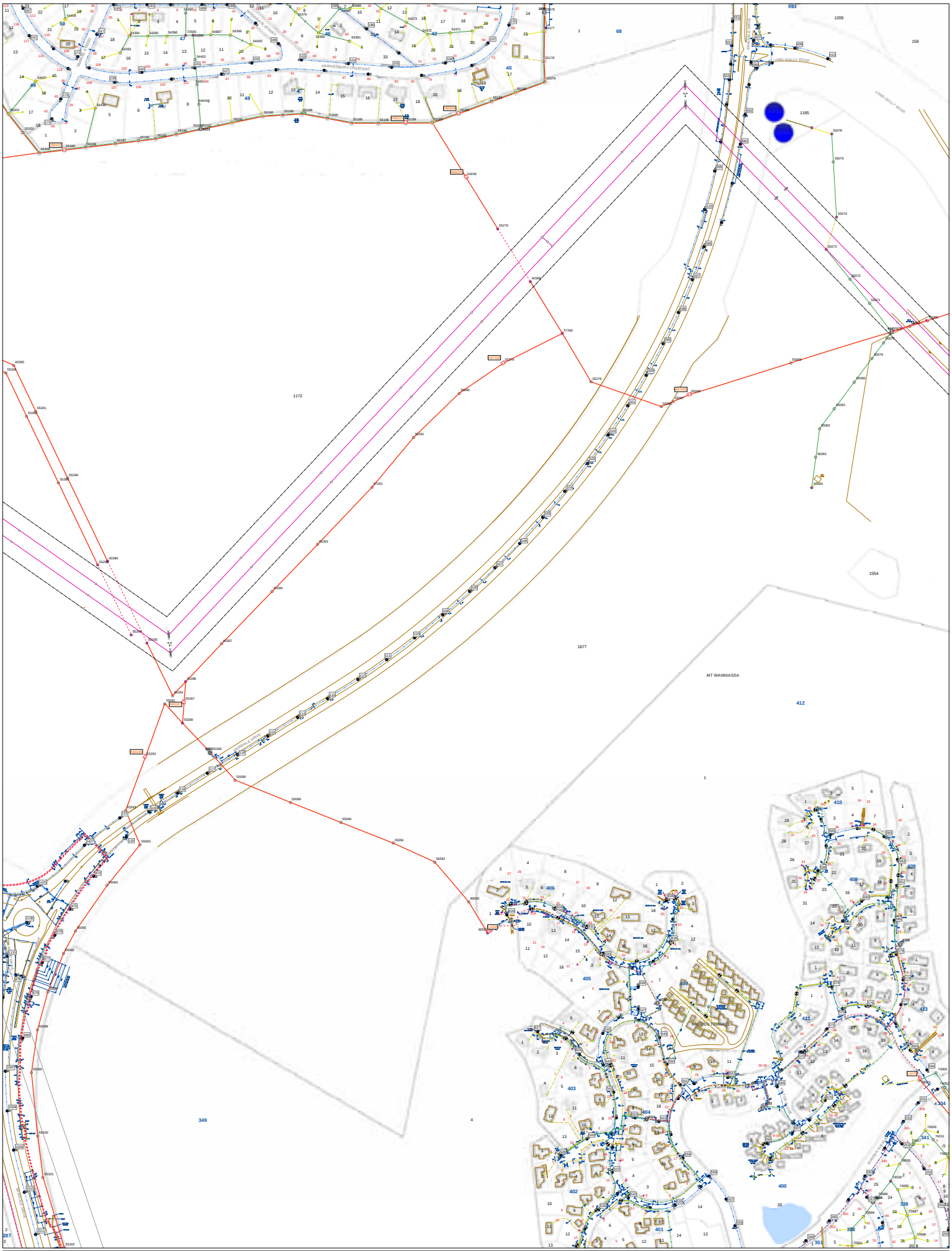

ActewAGL Electriciy Network

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0 25 50 100 150 200 m