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Brown Consulting (ACT) Pty Ltd

MOLONGLO STAGE 3: MAJOR ELECTRICAL INFRASTRUCTURE RELOCATION, ENVIRONMENTAL AND HERITAGE CONSTRAINTS

FINAL

August 2014

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Prepared by
Umwelt (Australia) Pty Limited

on behalf of
Brown Consulting (ACT) Pty Ltd

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Report No. **8061/R01/V3**
Date: **August 2014**

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Executive Summary

The ACT Economic Development Directorate (EDD) has engaged Brown Consulting (ACT) Pty Ltd (Brown Consulting) to investigate options for the relocation of existing 132kV overhead transmission lines through or around the Molonglo 3 development and to determine a preferred option. **Figure 1.1** provides a locality plan of the Molonglo 3 area (the Project Area). As part of this, Brown Consulting has engaged Umwelt (Australia) Pty Limited (Umwelt) to provide advice on environmental and heritage constraints within the Project Area.

A range of constraints and potential constraints have been identified. These areas require further consideration when determining suitable options for the relocation of existing 132kV overhead transmission lines.

Ecological Constraints

Ecological constraints pertaining to known MNES as identified in the NES Plan (ACT Government 2011) occurring within the Project Area are summarised in **Section 5.1** of this report. These include areas of box-gum woodland and habitat for pink-tailed worm lizard, swift parrot and superb parrot. Additionally, areas of natural temperate grassland are identified as a constraint within Kama Nature Reserve to the west of the Project Area.

Potential constraints have also been identified. These include areas that have been mapped by various studies as containing ecological values, however these are considered less certain based on field observations and low confidence in study results. **Figure 5.1** shows the ecological constraints determined as part of this project.

Additionally, ecological constraints relevant to the ACT's *Nature Conservation Act 1980* are identified in **Section 2.2**.

General Environment Constraints

The entire Project Area has been subjected to environmental site assessments, with a focus on identifying areas of environmental concern. These studies identify a range of localised issues which appear to be of low risk to the relocation of existing 132kV overhead transmission lines. These studies are summarised in **Section 3**.

Areas of environmental concern include contaminants such as sheep dips, former and current pine plantations where residual chemicals containing heavy metals persist, disused sewerage sludge ponds, a kangaroo burial pit and explosive ordnance waste.

Heritage Constraints

Based on desktop analysis of the available information heritage constraints were identified in relation to one Aboriginal site [redacted] Heritage constraints are detailed in **Section 5.3** [redacted].

While heritage assessments have been conducted for the majority of the current Project Area, the north-east portion of the Project Area and small areas along the northern and eastern boundaries have been identified as information gaps. Therefore the heritage values within these areas are unknown and require further investigation if this area is considered a preferred option for the relocation of existing 132kV overhead transmission lines.

Recommendations

As outlined in **Section 7**, the following recommendations should be considered in consideration of the feasibility for relocation of the existing 132kV overhead transmission lines through or around the Molonglo 3 development:

1. areas identified as potential ecological constraints should be surveyed to confirm ecological values if they are located in areas affected by any possible relocation. These include areas mapped as:

    a. potential box-gum woodland;

    b. potential natural temperate grassland;

    c. unconfirmed pink-tailed worm lizard habitat; and

    d. areas mapped as potential swift parrot and superb parrot habitat outside of confirmed box-gum woodland areas.

    Note that additional matters discussed in **Section 2.2** may also occur in these areas, and should also be surveyed for in suitable habitat to confirm ecological values.

2. areas identified as gaps in heritage information should be surveyed and assessed to identify heritage values if they are located in preferred option areas;

3. areas identified as heritage constraints should be avoided;

4. if there is potential for any heritage sites/areas to be disturbed as part of preferred options for relocating existing 132kV overhead transmission lines further advice should be sought from the ACT Heritage Council and consultation undertaken with the Representative Aboriginal Organisations (RAOs) as to determine an appropriate management strategy (refer to **Section 5.3**); and

5. should existing 132kV overhead transmission lines be relocated, it is recommended to prepare and implement a Construction Environmental Management Plan (CEMP) to ensure that construction operations do not adversely affect adjacent ecological and heritage values, release contaminants or otherwise adversely affect the environment.

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1.0 Introduction

Brown Consulting (ACT) Pty Ltd has been engaged by the ACT Economic Development Directorate to investigate options for the relocation of existing 132kV overhead transmission lines through or around the Molonglo 3 development, and to determine a preferred option.

As part of this, Brown Consulting has engaged Umwelt (Australia) Pty Limited (Umwelt) to provide advice on environmental and heritage constraints within the Molonglo 3 area (the Project Area).

This report has been prepared on the review and consolidation of GIS mapping data from a variety of sources and maps presented herein should be considered as being indicative only. Composite layers for ecological and heritage issues produced as a result of this assessment are provided to Brown Consulting in a GIS format (ESRI SHP) and should be referred to for a more complete understanding of the extent and nature of constraints as discussed.

1.1 Project Area Description

The Project Area is defined as the area of land in between the Molonglo River and William Hovell Drive, extending east to the National Arboretum and west to the eastern boundary of Kama Nature Reserve (**Figure 1.1**). Whilst outside of the Project Area, Kama Nature Reserve has been included with respect to ecological values in order to ensure that these values are considered if required as part of any proposed relocation option. Heritage and general environment constraints within Kama Nature Reserve are not considered.

Infrastructure within the project area is minimal, consisting of three house dwelling and associated farm sheds and farm dams. Remnants of agricultural practise such as sheep dipping remain, as well as a decommissioned sewerage treatment.

Historically, much of the Project Area would have contained a range of woodland communities and at lower altitudes, potentially areas of natural grasslands. Directly adjacent to the Molonglo River, riparian shrubland and river she-oak (*Casuarina cunninghamiana*) open forest communities were dominant; these now persist in a disturbed state in a mosaic with exotic riparian vegetation such as crack willow (*Salix fragilis*). Due to historic land clearing, small patches of woodland remain, generally with a non-diverse native understorey, often forming a mosaic with annual or perennial exotic pasture grasses. Most open areas are dominated by phalaris (*Phalaris aquatica*), although patches dominated by native grasses persist in some areas.

There are a number of rocky outcrops in the Project Area which are considered to represent pink-tailed worm lizard (*Aprasia parapulchella*) habitat of various quality.

There are a range of remaining heritage sites within the Project Area, including both Aboriginal and historic sites.

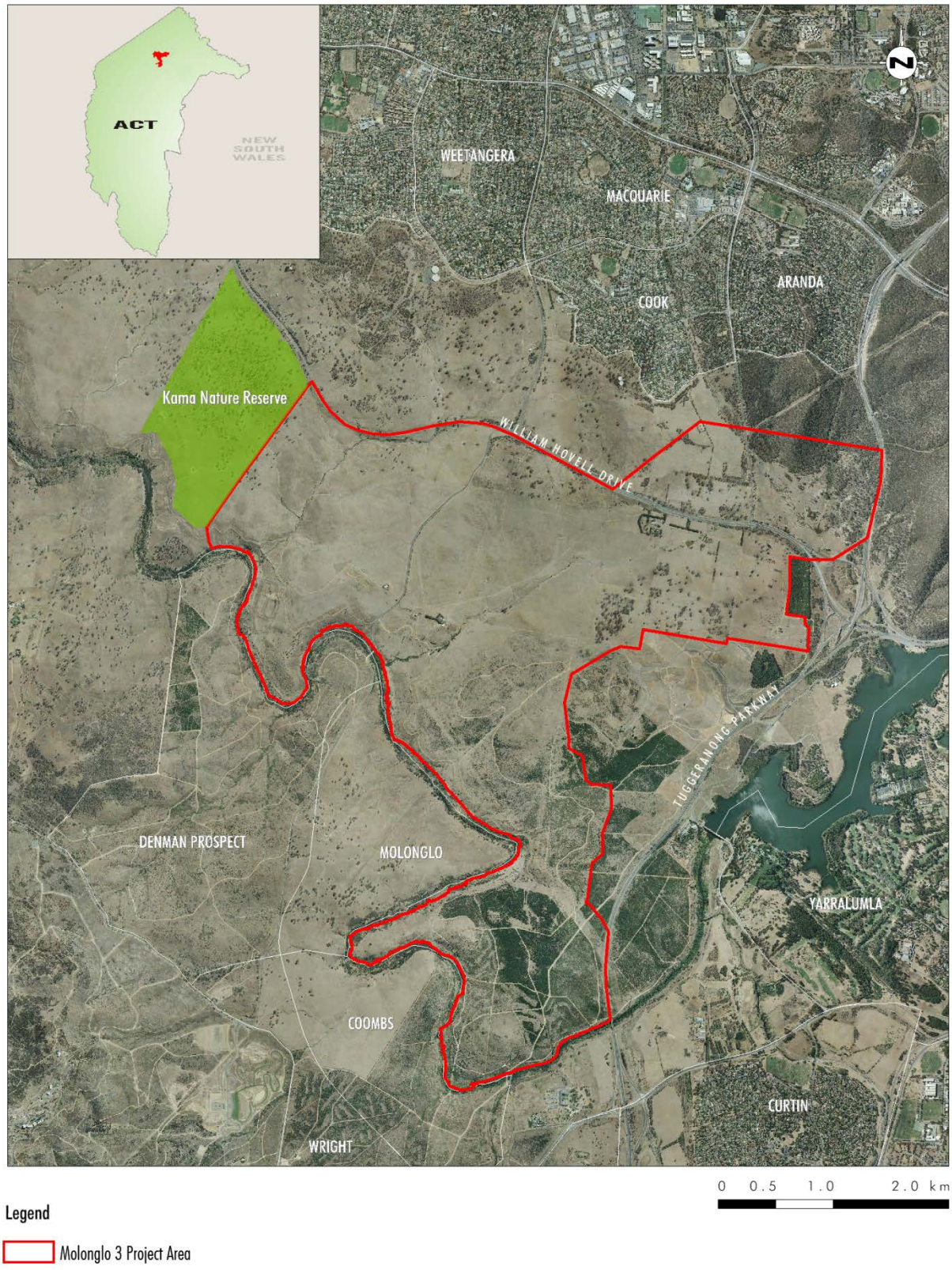


Figure 1.1 – Molonglo Stage 3 Project Area

1.2 Scope of Works and Methodology

The scope of works and methodology of the constraints and opportunities analysis included the tasks outlined below.

1.2.1 Desktop Analysis

1.2.1.1 Ecology

Desktop analysis was undertaken to review existing ecological information across the Molonglo Stage 3 area. Such information included:

- The Molonglo NES Plan (ACT Government 2011[1]);
- Kama Nature Reserve Vegetation Map (Umwelt 2013a[2]);
- Review of ACT Environmental Offsets Calculator Stage 2 (Umwelt 2013b[3]);
- Vegetation of Block 1550 Belconnen (Umwelt 2013c[4]);
- Molonglo Valley Baseline Vegetation Survey (Eco Logical Australia 2013[5]);
- Belconnen – Aranda Snow Gums/Glenloch Ecological Values and Constraints Assessment (Biosis 2014[6]);
- Pink-tailed worm lizard habitat mapped by Wong & Osborne (2010[7]);
- ACTMAPi (ACT Government 2014[8]);
- Additional literature relevant to species ecology.

Each study was reviewed to highlight known ecological and other environmental values, and used to determine opportunities and constraints for major electrical infrastructure relocation.

1.2.1.2 Heritage

Desktop analysis was undertaken to review existing heritage information available for the Project Area. Such information included:

- searches of statutory and non-statutory heritage registers, schedules and databases;

[1] ACT Government (2011) *Molonglo Valley Plan for the Protection of Matters of National Environmental Significance*. ACT Planning and Land Authority, September 2011.
[2] Umwelt (2013a) *Vegetation Mapping for Kama Nature Reserve, Molonglo*. Briefing Note to Daniel Santosuosso, ACT Land Development Agency. 11 October 2013.
[3] Umwelt (2013b) *Review of ACT Environmental Offsets Calculator Stage 2*. Final Report to the Land Development Agency, November 2013.
[4] Umwelt (2013c) *Ecological Values of Block 1550, Belconnen*. Briefing Note to Daniel Santosuosso, ACT Land Development Agency. 19 July 2013.
[5] Eco Logical Australia (2013) *Molonglo Valley Vegetation Survey: Baseline Condition Assessment*. Prepared for Territory and Municipal Services Directorate, July 2013.
[6] Biosis (2014) *Belconnen – Aranda Snow Gums / Glenloch Ecological Values and Constraints Assessment*. Prepared for the Environment and Sustainable Development Directorate, February 2014.
[7] Wong D & Osborne W (2010) *Confirmatory Surveys for Pink-tailed Worm Lizards (Aprasia parapulchella) and Additional Mapping of Habitat along the Molonglo River Corridor between Coppins Crossing and Tuggeranong Parkway, ACT*. Institute of Applied Ecology, University of Canberra. Report Commissioned by ACT Planning and Land Authority.
[8] ACT Government (2014) *ACTMAPi. Significant Plants, Animals and Registered Tree Information* [URL Accessed 3/6/14: http://www.actmapi.act.gov.au/home.html].

- Molonglo Stage 2: Detailed Heritage Assessment – Aboriginal and Historical Heritage (Biosis, 2010a9);
- Molonglo Stage 2: Surface Artefact Salvage Program – Aboriginal Heritage (Biosis 2010b10);
- Molonglo Stage 3 Future Urban Release: Detailed Heritage Assessment – Aboriginal and Historic Heritage (Biosis, 201211);
- Molonglo Stage 3 Future Urban Release: Sub Surface testing report and further studies (Biosis, 201312);
- Molonglo River Corridor, Cultural Heritage Assessment and Conservation Management Plan (Cultural Heritage Management Australia 2013a13); and
- PAD5 Misery Point, Molonglo River Corridor, Sub-surface Archaeological investigations, Conservation Management Plan (Cultural Heritage Management Australia 2013b14).

Each search and project was reviewed to highlight known heritage values, and used to determine constraints and opportunities for major electrical infrastructure relocation.

1.2.2 Field Familiarisation

Field familiarisation was undertaken to gain a rapid appreciation of constraints and opportunities across the Project Area. This included familiarisation with areas of known ecological values (constraints), possible heritage values those without (opportunities), noting that access to the majority of the Project Area was unable to be obtained due to entry constraints.

Field verification was undertaken at a range of locations on 10 June 2014. Full access into areas west of Coppins Crossing Road was gained; access to areas east of Coppins Crossing Road was limited due to a lack of internal vehicle. Within this area, observation was limited to 'over the fence' familiarisation.

Many of the ecological assets not visited as part of this Project have been surveyed by Umwelt in previous studies and as a result Umwelt has a current understanding of the range of ecological values in those areas.

Where access to the Project Area was able to be obtained, areas most likely to contain heritage sites were inspected, including, but not limited to areas adjacent to drainage lines and spur crests near drainage lines. The field familiarisation also included an inspection of the limited areas of exposure for artefacts.

[9] Biosis (2010a) *Molonglo Stage 2: Detailed Heritage Assessment – Aboriginal and Historical Heritage*. A report for ACT Planning and Land Authority.
[10] Biosis (2010b) *Molonglo Stage 2: Surface Artefact Salvage Program – Aboriginal Heritage*. A report for ACT Planning and Land Authority.
[11] Biosis (2012) *Molonglo Stage 3 Future Urban Release: Detailed Heritage Assessment – Aboriginal and Historic Heritage*. A report for Environment and Sustainable Development Directorate.
[12] Biosis (2013) *Molonglo Stage 3 Future Urban Release: Sub surface testing report and further studies*. A report for Environment and Sustainable Development Directorate.
[13] Cultural Heritage Management Australia (2013a) *Molonglo River Corridor, Cultural Heritage Assessment and Conservation Management Plan*. A report for Territory and Municipal Services Directorate
[14] Cultural Heritage Management Australia (2013b) *PAD5 Misery Point, Molonglo River Corridor, Sub-surface Archaeological investigations, Conservation Management Plan*. A report for Territory and Municipal Services Directorate.

1.2.3 Determining Constraints and Opportunities

Based on desktop analysis, statutory and non-statutory heritage registers, schedules and databases searches and field familiarisation, constraints and opportunities in the relocation of major electrical infrastructure with the Project Area were identified and described.

1.2.4 Limitations

This Project relied primarily on existing environmental and heritage survey, assessments and projects to determine constraints and opportunities for potential relocation of major electrical infrastructure within the Project Area. While field familiarisation was undertaken to gain an appreciation of the Project Area, this was not done to a level where individual constraints and opportunities were able to be verified. Access to the majority of the Project Area was unable to be obtained due to entry constraints.

However, the Project Area has been subjected to a range of studies (as outlined in **Section 2, 3** and **4**) which provide a solid basis for desktop assessment. Additionally, a gap analysis has been undertaken to determine where more information may be required should certain areas be considered favourable for the relocation of existing 132kV overhead transmission lines.

Umwelt was not provided with a digital boundary prior to undertaking GIS analysis. While the boundary digitised by Umwelt is considered to be accurate, there may be some minor discrepancies with the actual Project Area however this is unlikely to have affected the information made available in the course of undertaking the study or conclusions of the assessments.

It must also be noted that only Representative Aboriginal Organisations (RAOs) can provide comment on the cultural significance of the Project Area, and further constraints might be identified through consultation with the RAOs.

2.0 Ecological Values

2.1 Matters of National Significance Considered by the NES Plan

A number of ecological and environmental studies have been undertaken within the Project Area; most of these have been commissioned to provide information for the *Molonglo Valley Plan for the Protection of Matters of National Environmental Significance* plan (hereafter referred to as 'the NES Plan'; ACT Government 2011), or as part of subsequent studies related to urban development in accordance with the NES Plan. The NES Plan is described below, with other studies discussed in the context of specific MNES.

2.1.1 Molonglo Valley NES Plan

The Molonglo Valley NES Plan (ACT Government 2011) was completed in September 2011 as part of a strategic assessment to provide for the protection of matters of national environmental significance (MNES) listed under Part 10 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The NES Plan established the ACT Governments commitment to protecting MNES within the strategic assessment area (including all of Molonglo Stage 3). Key MNES identified within the strategy are described in **Table 2.1**. The location of values present within Molonglo Stage 3 and Kama Nature Reserve are also outlined, along with commentary on accuracy based on subsequent study.

Table 2.1 - Key MNES as Identified in the NES Plan

MNES	Location (within Molonglo Stage 3 and Kama Nature Reserve)	Comments
Box-gum woodland	Within Kama Nature Reserve. Extending east of Kama Nature Reserve into the western edge of Molonglo Stage 3. Within patches 'C' and 'H', south-east of the intersection between William Hovell Drive and Coppins Crossing Road. Patches 'J', 'GG' and 'N', north of the Arboretum.	The distribution of box-gum woodland in Kama Nature Reserve was found to be reduced by subsequent study (Umwelt 2013a). Additionally, along the western edge of Molonglo Stage 3, areas mapped in the NES Plan as box-gum woodland adjacent to Kama Nature Reserve in addition to patch 'J' are not considered to be box gum woodland under the EPBC Act.
Natural temperate grassland	Southern areas of Kama Nature Reserve.	Considered to be sufficiently accurate for the purposes of this assessment.
Pink-tailed worm-lizard	Patches as mapped by Wong and Osborne (2010), refer to **Figure 2.4** in **Section 2.6**.	Areas have been classified as high, moderate and low quality habitat, as well as unchecked habitat.
Superb parrot	As per the extent of box-gum woodland, excluding derived native grassland areas.	Will also occupy open forests and woodlands that are not consistent with the EPBC Act listed box-gum woodland community.
Swift parrot		

Further discussion on each MNES is provided in **Section 2.2** to **2.5**, including consideration of the range of studies on each value and composite information such as ACTMAPi (ACT Government 2014).

2.1.2 Box-Gum Woodland

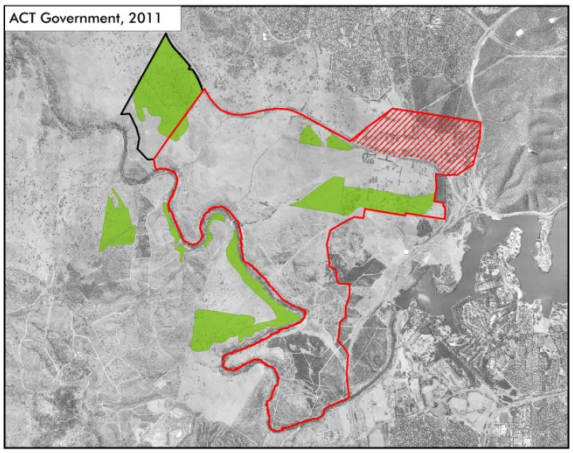
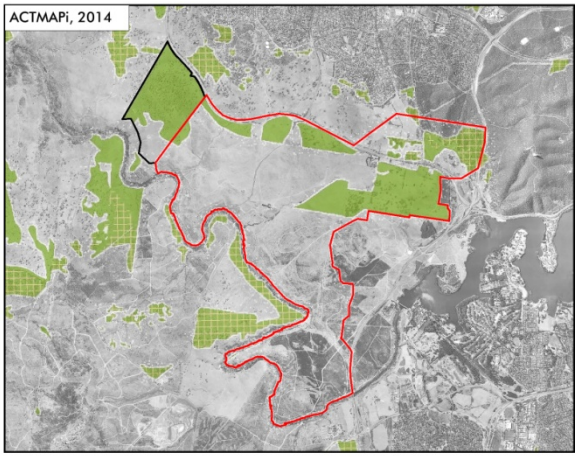
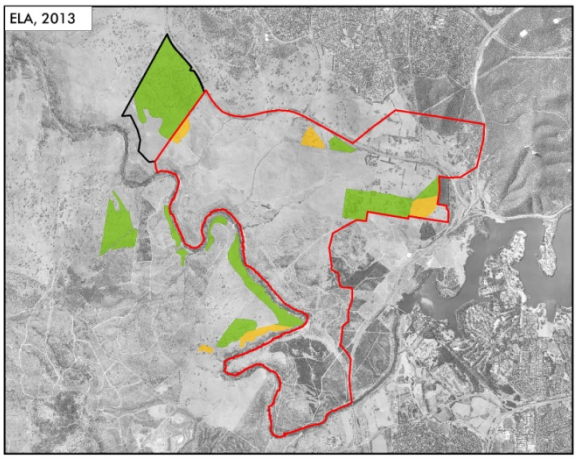
The following studies and/or products have mapped the extent of box-gum woodland and other vegetation communities within the Project Area:

- The Molonglo NES Plan (ACT Government 2011);
- ACTMAPi (ACT Government 2014);
- Molonglo Valley Baseline Vegetation Survey (Eco Logical Australia 2013);
- Kama Nature Reserve Vegetation Map (Umwelt 2013a);
- Review of ACT Environmental Offsets Calculator Stage 2 (Umwelt 2013b);
- Vegetation of Block 1550 Belconnen (Umwelt 2013c); and
- Belconnen – Aranda Snow Gums/Glenloch Ecological Values and Constraints Assessment (Biosis 2014).

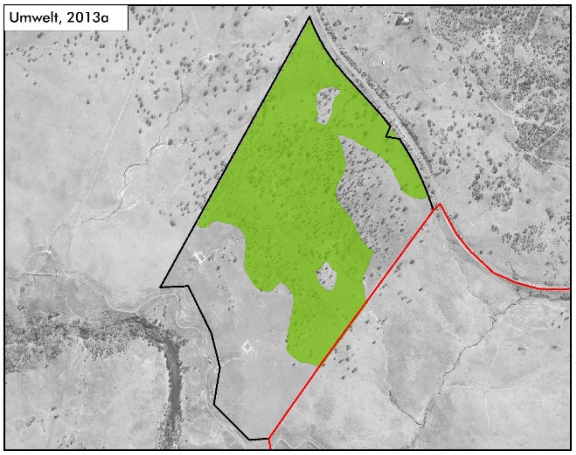
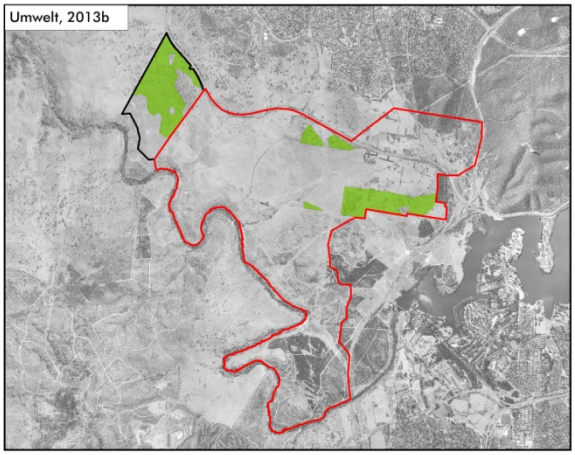
All of these products provide a different interpretation of the extent of box-gum woodland. This is most likely due to changes in condition over time, as well as varying interpretation of listing advice under the EPBC Act (TSSC 2006[15]). **Table 2.2** below outlined the areas mapped as box-gum woodland by each project, highlighting the differences in each, and limitations where relevant. **Figure 2.1** is a composite map which shows the distribution of box-gum woodland as identified in the above products, with areas known to not be box-gum woodland removed. Areas are shaded based on levels of certainty, which were determined based on field validation and an assessment of reliability of these existing products.

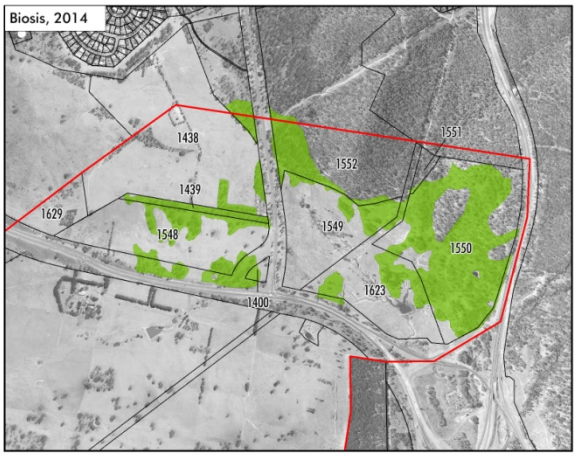
[15] TSSC (2006) *Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the List of Ecological Communities under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, prepared by the Threatened Species Scientific Committee [URL Accessed 3/6/2014: http://www.environment.gov.au/ biodiversity/threatened/communities/box-gum.html].

Table 2.2 - Box-Gum Woodland as Mapped by Individual Products

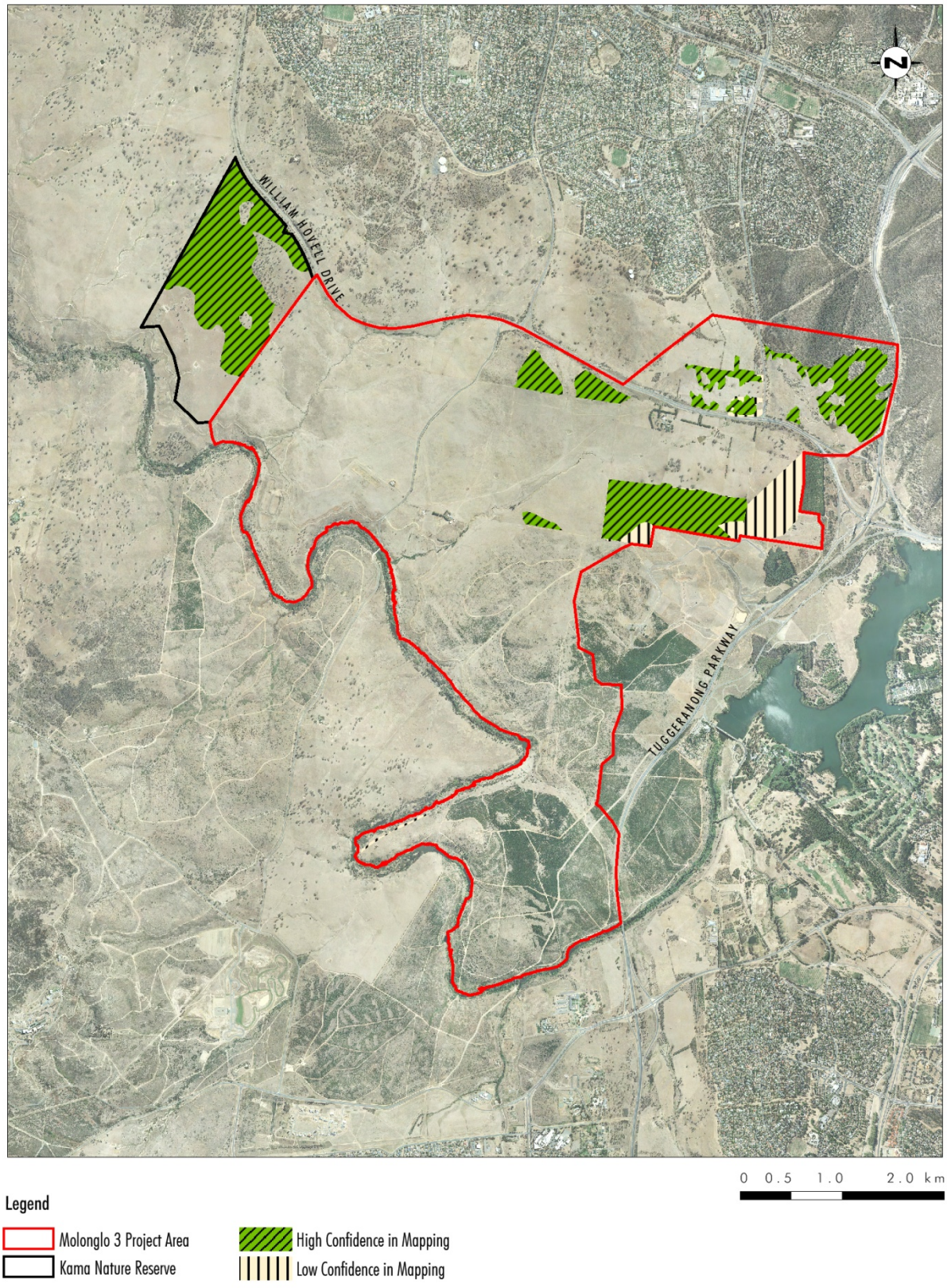
Extent of Box-Gum Woodland	Description
	Based on earlier vegetation mapping done by Eco Logical Australia (2009[16]), this map was incorporated into the NES Plan (ACT Government 2011). Subsequent survey by Eco Logical Australia (2013), Umwelt (2013a, 2013b, 2013c) and Biosis (2014) have revealed that the extent of box-gum woodland within the Project Area is substantially different to that in the NES Plan. The extent across areas south of William Hovell Drive is less, based on decline in condition and incorrect interpretation of the EPBC Act definition of box-gum woodland. Areas north of William Hovell Drive were not included in the NES Plan (hatched).
	The extent of box-gum woodland in ACTMAPi (ACT Government 2014) shows many of the areas included in the NES Plan, as well as additional areas believed to be dominated by exotic pastures. Areas considered EPBC box-gum woodland (north of William Hovell Drive within the Project Area) are significantly less than other products, and also contain areas which are known to contain other vegetation types such as northern sections of Block 1550 Belconnen. ACTMAPi does not contain metadata for much of the information presented in the adjacent map, and is inconsistent with information used in the NES Plan or other products. As such, ACTMAPi is not considered useful for determining constraints and opportunities.
	Eco Logical Australia (2013) were engaged by the ACT Territory and Municipal Services to undertake a baseline vegetation survey for MNES. This included an update of earlier work completed as part of the NES Plan preparation (Eco Logical Australia 2009), with an update of the status and condition of individual patches. This update reduced the extent of derived native grassland in central parts of the Project Area, as well as a treed area dominated by exotic pastures directly east of Kama Nature Reserve. Areas of box-gum woodland under the NC Act which do not meet EPBC criteria are displayed in yellow. Within Kama Nature Reserve, this map (as well as those above) do not recognise a large remnant of dry open forest (not box-gum woodland) within Kama Nature Reserve.

[16] Eco Logical Australia (2009) Molonglo Valley Ecological Study: EPBC Listed Flora, Ecological Communities and Golden Sun Moth Mapping in the Molonglo Valley. Prepared for ACT Planning and Land Authority.

Extent of Box-Gum Woodland	Description
	While undertaking a review of the ACT Draft Environmental Offsets Calculator (Umwelt 2013b), Umwelt undertook a detailed vegetation mapping exercise in Kama Nature Reserve (west of the Project Area) to accurately delineate box-gum woodland and other vegetation communities (Umwelt 2013a). Within the reserve, the extent and condition of box-gum woodland was mapped, as well as determining areas of dry open forest dominated by scribbly gum (*Eucalyptus rossii*). These areas were previously mapped as box-gum woodland in the earlier products as described above. This distribution of box-gum woodland in Kama nature Reserve has been endorsed by the ACT Government (Environment and Sustainable Development Directorate) as an accurate representation of the community in Kama Nature Reserve.
	A review of the draft ACT Environmental Offsets Calculator undertaken by Umwelt (2013b) on behalf of the ACT Land Development Agency included testing the draft methodology across areas identified as box-gum woodland and natural temperate grassland by Eco Logical Australia (2013). The extent and condition of box-gum woodland was updated, including incorporating information from Umwelt (2013a) and a small patch of derived native grassland central to the Project Area (note that this area and surrounds were mapped as part of derived native grassland 'Patch J' in the NES Plan, but much of the area was subsequently considered by Umwelt (2013b) to be dominated by native pastures.
	Umwelt (2013c) were engaged by the ACT Land Development Agency to map and assess the condition of vegetation within Block 1550, Belconnen (north-eastern section of the Project Area, north of William Hovell Drive). This included identifying areas of box-gum woodland and derived native grassland, and separating out large areas of dry open forest dominated by red stringybark (*E. macrorhyncha*). Areas which may not technically box-gum woodland based on understorey (e.g. small area dominated by native sedges rather than grasses) are displayed in yellow. In this area, river tussock grass (*Poa labillardierei)* is also present; The dominance of sedges may be ephemeral and represents a rare expression of this vegetation community. Note that dry open forest areas on Block 1550 are mapped as box-gum woodland in ACTMAPi (ACT Government 2014).

Extent of Box-Gum Woodland	Description
	The ACT Environment and Sustainable Development Directorate engaged Biosis to undertake an ecological values and constraints assessment of an area known as the Belconnen – Aranda snow gums / Glenloch (north-eastern parts of the Project Area, north of William Hovell Drive) (Biosis 2014). Vegetation mapping undertaken by Biosis (2014) across Block 1550 largely conforms with mapping undertaken by Umwelt (2013c). Biosis has interpreted the extent of box-gum woodland as slightly larger; Umwelt (2013c) considered this to be more like dry forest vegetation types. However, this has been incorporated by Biosis (2014) based on the precautionary principle. Biosis (2014) also maps remaining areas of box-gum woodland north of William Hovell Drive, including Blocks 1400, 1548, 1549, 1551 and 1623, and portions of other adjacent Blocks.

Of the vegetation map products described **Table 2.2**, work undertaken by Umwelt (2013a, 2013b, 2013c) and Biosis (2014) represent the most recent and reliable representation of the extent of box-gum woodland within the Project Area. Additionally, as an update of vegetation mapping in the NES Plan, vegetation mapping completed by Eco Logical Australia (2013) is considered reasonably accurate, although certain areas mapped as box-gum woodland within Kama Nature Reserve are no longer considered to be box-gum woodland based on the accepted presence of dry open forest. Earlier work incorporated into the NES Plan (ACT Government 2011) is considered out of date, and the source of some information in ACTMAPi (ACT Government 2014) is also unclear and known to be incorrect.



Note: a narrow band of box-gum woodland occurs adjacent to Molonglo River (southern part of Project Area)

Figure 2.1 – Composite Map of the Distribution of Box-Gum Woodland

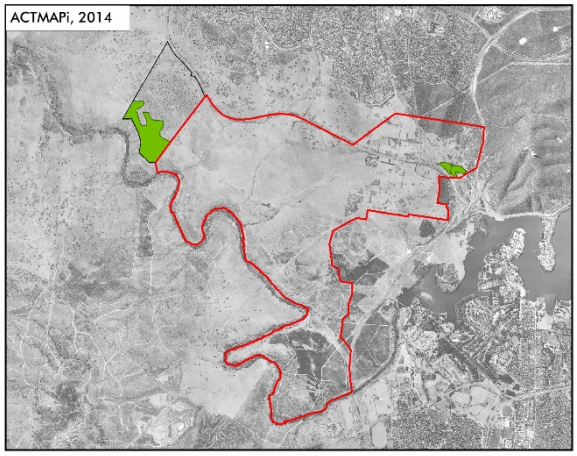
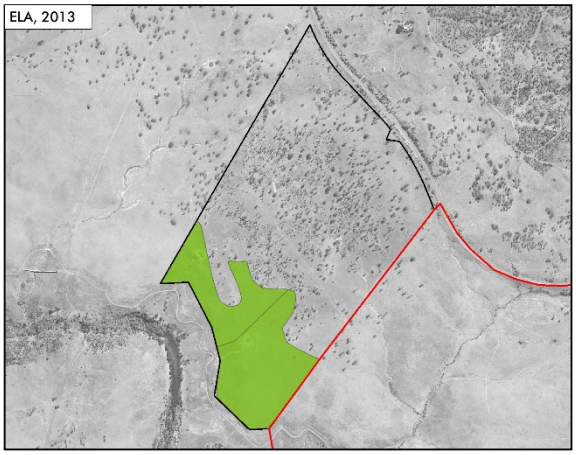
2.1.3 Natural Temperate Grassland

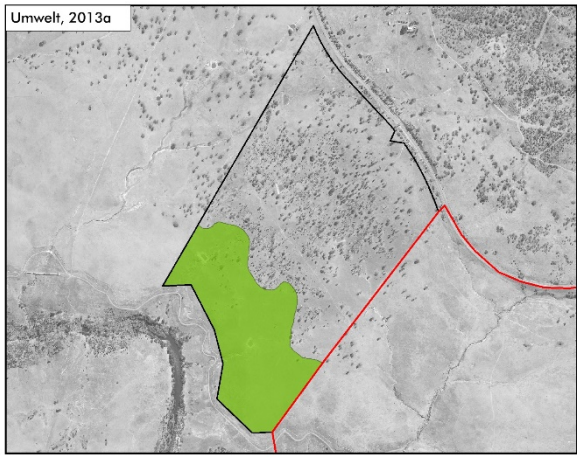
The following studies and/or products have mapped the extent of natural temperate grassland (NTG) within the Project Area:

- The Molonglo NES Plan (ACT Government 2011);
- Kama Nature Reserve Vegetation Map (Umwelt 2013a);
- Molonglo Valley Baseline Vegetation Survey (Eco Logical Australia 2013); and
- ACTMAPi (ACT Government 2014).

All of these products map a similar extent of NTG, although ACTMAPi also maps an area of natural temperate grassland north of William Hovell Drive. **Table 2.3** below outlined the areas mapped as natural temperate grassland by each project, highlighting the differences in each, and limitations where relevant. **Figure 2.2** shows the likely distribution of NTG as identified in the above products. Areas are shaded based on levels of certainty, which were determined based on field validation and an assessment of reliability of existing products.

Table 2.3 –Natural Temperate Grassland as Mapped by Individual Studies

Extent of Natural Temperate Grassland	Description
	ACTMAPi (ACT Government 2014) indicates that NTG exists in southern areas of Kama Nature Reserve as well as southern portions of Block 1550 Belconnen (in the north-east of the Project Area). Natural temperate grassland generally occurs in frosty hollows and cold open plains. As such, it is uncertain whether the area mapped within Block 1550 (in the north-east of the Project Area) is natural temperate grassland; rather it may be derived from box-gum or snow gum woodland.
	Eco Logical Australia (2013) were engaged by the ACT Territory and Municipal Services to undertake a baseline vegetation survey for MNES. This included an update of earlier work completed by the same firm as part of the NES Plan, including an update of the status and condition of individual patches. The extent of natural temperate grassland remains the same as that presented in the NES Plan (ACT Government 2011).

Extent of Natural Temperate Grassland	Description
	While undertaking a review of the ACT Draft Environmental Offsets Calculator (Umwelt 2013b), Umwelt undertook a detailed vegetation mapping exercise in Kama Nature Reserve (west of the Project Area) to accurately delineate natural temperate grassland and other vegetation communities (Umwelt 2013a). Within the reserve, the extent and condition of natural temperate grassland though include areas south of the box-gum woodland which contain isolated mature and regenerating eucalypts. The area previously mapped by Eco Logical Australia (2013) as natural temperate grassland excludes an area which contains isolated mature and regenerating eucalypts. This area was included as natural temperate grassland by Umwelt (2013a) as isolated trees are permitted within this community. This vegetation map has been endorsed by ACT Government (Environment and Sustainable Development Directorate) as an accurate representation of this community in Kama Nature Reserve.

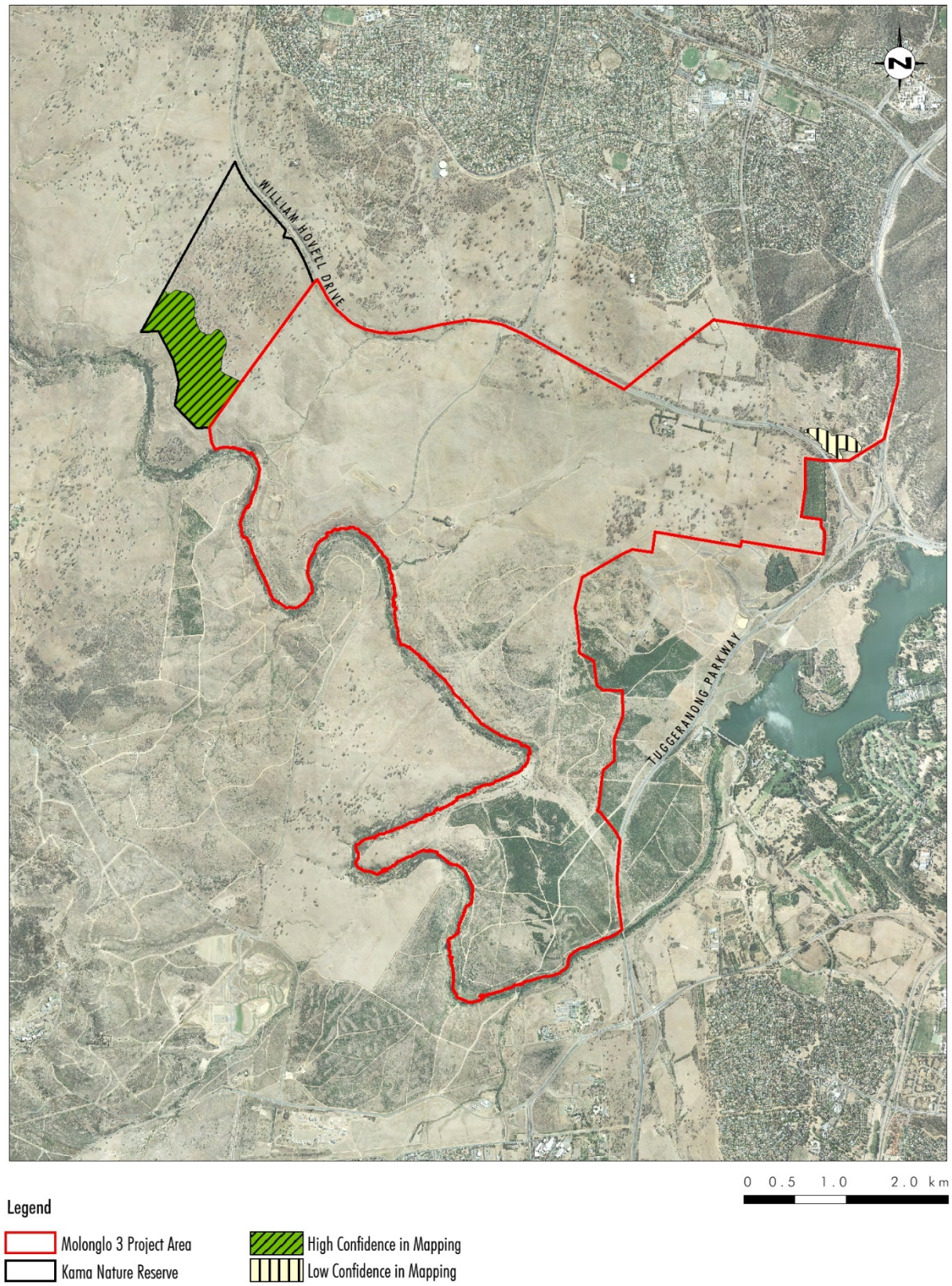


Figure 2.2 – Distribution of Natural Temperate Grassland

2.1.4 Superb Parrot and Swift Parrot

Remnant patches of box-gum woodland, particularly to the west of Kama Nature Reserve, are known to provide suitable and potential habitat for the superb and swift parrots (ACT Government 2011, ACT Government 2014). As they require mature eucalypts, areas considered as box-gum woodland with remnant trees are likely to represent foraging habitat. Additionally, areas containing mature eucalypts characteristic of box-gum woodland [i.e. yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*Eucalyptus blakelyi*)] but without the native understorey diversity to meet EPBC listing criteria are also important and should be regarded as potential habitat. Derived native grasslands and natural grassland areas are not considered habitat for these species due to a lack of mature eucalypts.

Based on analysis of the distribution of box-gum woodland containing overstorey eucalypts within the Project Area, and the inclusion of additional areas containing mature Blakely's red gum and yellow box of woodland structure with an exotic understorey, **Figure 2.3** shows the distribution of swift parrot and superb parrot habitat.

It is important to note that all trees, whether as isolated paddock trees or trees that form part of a continuously wooded community, are likely to provide some form of habitat for these species. Habitat use between the species is partitioned seasonally and also in relation to resources. For example:

- Swift parrots principally target nectar and foliage arthropods / psyllids during the cooler months;
- Superb parrots target a range of eucalypt features including vegetative elements (seed pods, mistletoe berries, etc.), psyllids in addition to native grass seeds;
- Superb parrots may also occupy suitable hollow bearing trees for breed purposes (however this has not been confirmed in the Project Area); and
- Superb parrots typically occupy the area around the Molonglo Valley in the spring-summer period in association with breeding activities. However a greater incidence of reporting of this species in Canberra over recent years suggest a larger number of over-wintering birds in the Canberra district.

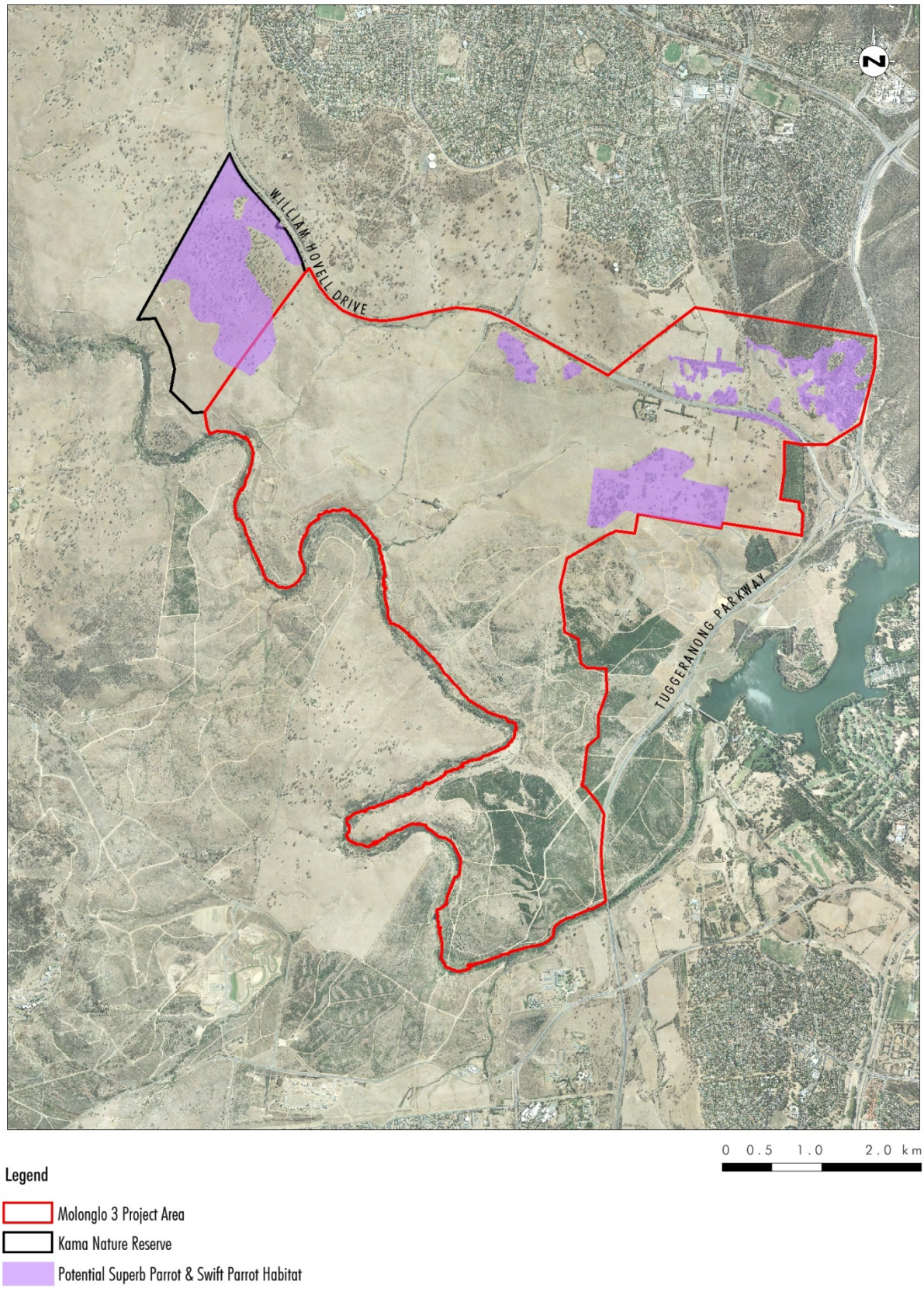


Figure 2.3 – Distribution of Potential Swift Parrot and Superb Parrot Foraging Habitat

2.1.5 Pink-tailed Worm Lizard

Pink-tailed worm lizard habitat has been mapped by Wong and Osborne (2010), classifying habitat into high, moderate and low quality, as well as unchecked habitat. This information has been incorporated into the NES Plan (ACT Government 2011), as well as ACTMAPi (ACT Government 2014).

High quality habitat mapped by Wong and Osborne is primarily within the riverine corridor. Much of this is on the southern side of Molonglo River; however there are smaller areas north of the river in southern areas of Kama Nature Reserve, and south and east of Coppins Corner. Larger areas of moderate and low quality habitat occur within the Project Area, as well as unchecked habitat.

Figure 2.4 shows the distribution of pink-tailed worm lizard habitat as identified by Wong and Osborne (2010). This includes categorising areas into habitat quality classes.

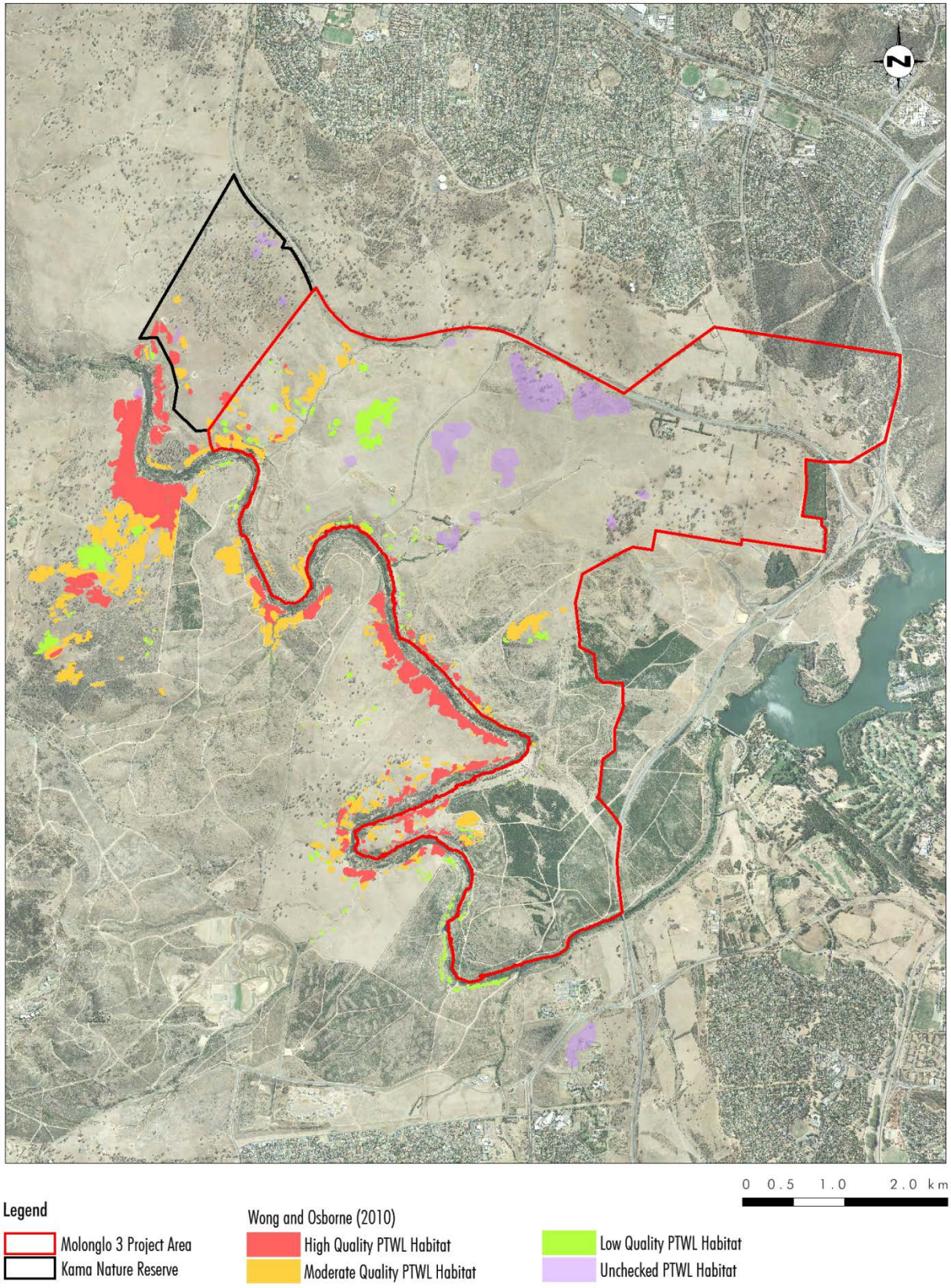


Figure 2.4 – Distribution of Pink-Tailed Worm Lizard Habitat

2.2 Matters not Considered by the NES Plan

The NES Plan considered three threatened species and two threatened ecological communities listed under the EPBC Act. Additionally, a total of 14 species listed under the *Nature Conservation Act 1980* (NC Act) have the potential to occur in natural temperate grassland, box-gum woodland or red stringybark - scribbly gum open forest in the Project Area. This includes seven species also listed under the EPBC Act not included in the NES Plan (ACT Government 2011), five of which were considered unlikely to occur as part of the Draft Strategic Assessment of the Molonglo Valley (Eco Logical Australia 2010[17]). Targeted survey for these species occurred as part of an earlier study by Eco Logical Australia (2009), with no records being found. However, absence in one survey does not discount the potential for a species occurring within the Project Area, which includes areas not covered by the NES Plan.

Table 2.4 outlines species not considered by the NES Plan which may within the Project Area, with a brief description of their habitat requirements and their likelihood of occurrence. Those given a moderate or high likelihood of occurrence are discussed in more detail below; where habitat requirements are similar, species are addressed together.

Table 2.4 Likelihood of Occurence of Species Not Considered in the NES Plan

Species	Status	Habitat	Likelihood of Occurrence
Aves			
Little Eagle (*Hieraaetus morphnoides*)	Vulnerable (NC Act)	Open eucalypt forest, woodland or open woodland, and riparian areas throughout the entire ACT. Require tall, living trees for nesting. This may include paddock trees in poor vegetation conditions.	Known to occur in the Molonglo valley
Brown Treecreeper (*Climacteris picumnus victoriae*)	Vulnerable (NC Act)	Dry woodlands and open forest below 1000m. Mainly woodlands dominated by stringybarks or other rough- barked *Eucalyptus* with an open grassy understory with few shrubs. Require hollow bearing trees, coarse woody debris, stumps or dead trees. Required land size is >5 hectares, though range may be as small as 1.1 hectares. No occupancy of poor vegetation.	Known to occur in Kama Nature Reserve, may occur in high quality red stringybark open forest north of William Hovell Drive
Hooded Robin (*Melanodryas cucullata cucullata*)	Vulnerable (NC Act)	Prefers lightly wooded country, usually open eucalypt woodland, *Acacia* scrub, and mallee. Often in or near open areas. Requires structurally diverse habitats with at least patches of dense midstorey. Doesn't occupy poor vegetation. Territories range from 10-30 hectares.	Moderate in box-gum woodland
Painted Honeyeater (*Grantiella picta*)	Vulnerable (NC Act)	Migrant species found in boree, brigalow, and box-gum Woodlands, and box- ironbark forests to feed on mistletoes growing in these environments. It will occupy low vegetation condition areas with paddock trees.	Moderate in box-gum woodland where mistletoes are prevalent
Varied Sittella (*Daphoenositta chrysoptera*)	Vulnerable (NC Act)	Woodland and dry forests containing rough-barked species, mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. A preference for red	Known to occur in Kama Nature Reserve, may occur in high quality red

[17] Eco Logical Australia (2010) *Draft Strategic Assessment Report of the Molonglo Valley Plan for the Protection of Matters of National Environmental Significance*. A Report Prepared by Eco Logical Australia Pty Ltd. for the ACT Planning and Land Authority. March 2010.

		stringybark in the ACT region.	stringybark open forest north of William Hovell Drive
White-winged Triller (*Lalage sueurii*)	Vulnerable (NC Act)	In the ACT it is found in or near open grassy woodland areas including yellow box (*E. melliodora)*, Blakely's red gum (*E. blakelyi)*, apple box (*E. bridgesiana)*, candlebark (*E. rubida)*, or less commonly snow gum (*E. rossii*) woodlands. Lightly timbered, with an open mid-storey layer and grassy understory (Australian Museum 2011[18]).	Known to occur in Kama Nature Reserve, may occur in high quality red stringybark open forest north of William Hovell Drive
Regent Honeyeater (*Anthochaera phrygia*)	Endangered (NC Act, EPBC Act); Migratory (EPBC Act)	Found in the northern ACT woodlands, open forest, and street plantings. Will occupy paddock trees in poor vegetation conditions. Preferably these woodlands have large numbers of matures trees, high canopy cover and an abundance of mistletoes.	Moderate in box-gum woodland where mistletoes are prevalent
Invertebrates			
Golden Sun Moth (*Synemon plana*)	Endangered (NC Act) Critically Endangered (EPBC Act)	Occurs in natural temperate grasslands and grassy box-gum Woodlands with an understory dominated by wallaby grasses (*Rytidosperma* spp.). May also include spear grass (*Austrostipa* spp.) or kangaroo grass (*Themeda australis*). The grasses must be open and well spaced.	Moderate in natural temperate grassland in Kama Nature Reserve (which contains a moderate cover of *Austrostipa bigeniculata*)
Perunga Grasshopper (*Perunga ochracea*)	Vulnerable (NC Act)	Found in grassland and open woodland which incorporates Natural Temperate Grassland or secondary Natural Temperate Grassland derived from grassy box woodland. Dominate grass species include wallaby grasses, kangaroo grass, and spear grasses with forbs located in the inter-tussock spaces. May also be found in native pasture in areas of poor vegetation (ACT Government 2006[19]).	Known to occur in Molonglo River corridor; moderate in natural temperate grassland in Kama Nature Reserve
Plants			
Button Wrinklewort (*Rutidosis leptorrhynchoides*)	Endangered (NC Act, EPBC Act)	Occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland. Occupies areas with little competition from herbaceous species in shallow, stony, red-brown clay loams. May colonise disturbed areas, though susceptible to grazing.	Moderate in Kama Nature Reserve, generally at ecotones between natural temperate grassland and woodland.
Canberra Spider Orchid (*Arachnorchis actensis*)	Endangered (NC Act, EPBC Act)	Occurs in transitional vegetation zones between open grassy woodland dominated by Blakely's red gum (*Eucalyptus blakelyi),* yellow box (*E. melliodora)*, and snow gum (*E. pauciflora* subsp. *pauciflora)* and dry sclerophyll forest dominated by scribbly gum (*E. rossii).* It grows on shallow, gravelly, brown clay loam soils, often	Moderate at ecotones between box-gum woodland and dry sclerophyll forest in Block 1550, Belconnen

[18] Australian Museum (2011) *White-winged Triller*. [URL Accessed 30/07/2014: http://australianmuseum.net.au/White-winged-Triller].
[19] ACT Government (2006) *Threatened Species and Communities of the ACT: Perunga Grasshopper (Perunga ochracea). Information Sheet*. Arts, Heritage and Environment Directorate.

		among rocks (Australian Government 2014[20]).	
Small Purple Pea (*Swainsona recta*)	Endangered (NC Act, EPBC Act)	Occurs in the grassy understory or woodlands and forests dominated by Blakely's red gum, yellow box, candlebark Gum (*Eucalyptus rubida)* and long-leaf box (*E. goniocalyx)*. Understory dominated by kangaroo grass, poa tussocks (*Poa* spp.), and spear-grasses.	Known to occur in Block 1550, Belconnen
Austral Toadflax (*Thesium australe*)	Vulnerable (NC Act, EPBC Act)	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with kangaroo grass. A root parasite that takes water and some nutrient from other plants, especially kangaroo grass.	Medium potential to occur in natural temperate grassland and box-gum woodland in Kama Nature Reserve and North of William Hovell Drive.
Tarengo Leek Orchid (*Prasophyllum petilum*)	Endangered (NC Act, EPBC Act)	Grows in open Natural Temperate Grasslands, grassy woodland with river tussock (*Poa labillardierei*), black gum (*Eucalyptus aggregata*) and tea-trees (*Leptospermum* spp.), as well as the grassy understory of box-gum woodland dominated by kangaroo grass. Generally occurs in high condition sites with a minimal grazing history (e.g. cemeteries, conservatively grazed TSRs).	Low, given the grazing disturbance history of box-gum woodland within the Project Area.
Hoary Sunray (*Leucochrysum albicans* var. *tricolor*)	Endangered (EPBC Act)	The Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination (Australian Government 2014b[21]).	Medium potential to occur in a variety of habitats within the Project Area.

[22]All habitat information from OEH (2014) unless otherwise specified.

2.2.1 Little Eagle

In 2005, a report into the potential impacts of proposed urban development on raptors in the Molonglo Valley was undertaken in order to determine levels of sensitivity of raptors species in the ACT (Debus 2005[23]). This report identified that little eagle is known to breed in the Molonglo Valley, that the valley population is likely to be reduced commensurate with the area of woodland converted to suburbia, and that it may retreat for woodland near expanding suburbia and habitat. Following this, E.A. Systems completed a study into the location and characteristics of raptor nesting sites in the Molonglo Valley (EAS 2006[24]). This study included two areas identified as potential raptor nesting sites within the Project Area and Kama Nature Reserve, including a box-gum woodland remnant north of the National

[20] Australian Government. (2014a) *Species Profile and Threats Database: Caladenia actensis – Canberra Spider Orchid*. Department of the Environment [URL Accessed 30/07/2014: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=76138].

[21] Australian Government. (2014b) *Species Profile and Threats Database: Leucochrysum albicans var. tricolor – Hoary Sunray*. Department of the Environment [URL Accessed 01/08/2014: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=56204#habitat].

[22] NSW OEH (2014) *Saving NSW Threatened Species* [URL Accessed 30-07-2014: http://www.environment.nsw.gov.au/threatenedspecies/].

[23] Debus, S (2005) *Potential Impacts of Proposed Urban Development on Raptors in the Molonglo Valley, ACT*. Report produced by Dr Stephen Debus, Division of Zoology, University f New England for the ACT Planning and Land Authority, February 2005.

[24] EAS (2006) *Location and Characteristics of Raptor Nesting Sites in the Molonglo Valley, ACT*. Report produced by E.A. Systems for the ACT Planning and Land Authority, January 2006.

Arboretum and remnant woodland associated with Kama Nature Reserve itself. Additional remnants were identified north of William Hovell Drive (The Pinnacles Nature Reserve), woodlands west of the Molonglo Stage 2 development, and woodland extending into the central and western Molonglo Valley.

The EAS (2006) study identified that there are '*probably one or two breeding territories in the Molonglo Valley, representing at least two thirds, if not all, of the known ACT breeding pairs*'. Additionally, there is an '*apparent derelict nest*' at Jarramlee, West Belconnen (TaMS 2013[25]) and it is also frequently observed in thermal pools above Jerrabomberra Wetlands.

The EAS (2006) survey inspected the largest box-gum woodland remnant in the Project Area as well as Kama Nature Reserve, finding no evidence of little eagle nesting sites. There have been no subsequent records of this species within the Project Area. As such, there are no known little eagle nesting sites within the Project Area, and it is considered that core areas occur further to the west. In this western area, a pair of adult little eagles were seen flying over box-gum woodland remnants west of Kama Nature Reserve, with a foraging adult little eagle and potential failed/inactive nest observed in a red stringybark (*Eucalyptus macrorhyncha*) south-east of West Molonglo. An active nest was known to occur on the confluence of the Murrumbidgee and Molonglo River at the time of the EAS (2006) report, and was known to be utilised for breeding in 2013[26].

Notwithstanding the currently known distribution, there are additional smaller areas of box-gum woodland within the Project Area which were not surveyed by EAS, and the possibility of nesting sites occurring in these areas cannot be discounted. However, the likelihood is considered low as these box-gum woodland patches persists as small remnants adjacent to William Hovell Drive, or adjacent to the Glenloch Interchange. Foraging values are unlikely to be affected by the relocation of existing 132kV overhead transmission lines; rather, the removal of cleared agricultural land where opportunistic prey such as rabbits persists is likely to be of greater detriment to the little eagle. Removal of this foraging habitat has been approved under the Molonglo Strategic Assessment (ACT Government 2011).

2.2.2 Woodland Birds

Six woodland bird species listed as threatened under the NC Act have the potential to occur within the Project Area: brown treecreeper (*Climacteris picumnus victoriae*), hooded robin (*Melanodryas cucullata cucullata*), painted honeyeater (*Grantiella picta*), varied sittella (*Daphoenositta chrysoptera*), white-winged triller (*Lalage sueurii*), and regent honeyeater (*Anthochaera phrygia*). With the exception of the regent honeyeater, all of these are listed as vulnerable under the NC Act, and not listed under the EPBC Act. The regent honeyeater is listed as endangered under both the NC Act and the EPBC Act, as well as migratory under the EPBC Act. Brown treecreeper, varied sitella and white-winged triller are known to occur in Kama Nature Reserve, with the remainder considered moderately likely to occur in this area and woodland north of William Hovell Drive.

Within the Project Area, all of these woodland birds utilise dry woodland or open forest with a grassy understory. The brown treecreeper and the white-winged triller prefer an open midstorey with few shrubs, whilst the hooded robin requires at least patches of dense shrub cover. Within these habitats, the white-winged triller and the hooded robin will also generally be found in or near open areas (Australian Museum 2011, OEH 2014).

Certain habitat features that are preferentially used by individual species. These include:

[25] TaMS (2013) *Jarramlee Offset Management Plan*. Prepared by Territory and Municipal Services on Behalf of the ACT Government. May 2013.
[26] http://bioacoustics.cse.unsw.edu.au/archives/html/canberrabirds/2013-11/msg00172.html

- Brown treecreeper: rough-barked eucalypts, woody debris, stumps, hollows in dead and live trees
- Hooded robin: woody debris, stumps, patches of dense shrub cover.
- Painted honeyeater: mistletoes.
- Regent honeyeater: large numbers of mature trees with mistletoes
- Varied sittella: rough-barked eucalypts.
- White-winged triller: open woodland (lightly timbered habitats).

These habitat provisions occur in all woodland and open forest patches within the Project Area, and disruption to these values should be minimised. Six varied sittella (observed) and one brown treecreeper (heard) were recorded in Kama Nature Reserve on July 19 2014[27]. White-winged triller were recorded as a 'potential' record as part of the same survey, with a confirmed observation from January 18 2014[28]. Habitat attributes for these species should be avoided should any development occur as part of relocation of existing 132kV overhead transmission lines within the Reserve, and disturbance to general habitat provisions outlined above avoided as far as possible.

2.2.3 Grassland Invertebrates

Golden sun moth (*Synemon plana*) and perunga grasshopper (*Perunga ochracea*) occur in natural temperate grassland, native pasture and grassy open woodland. Golden sun moths require C3 grasses such as wallaby grasses and spear grasses as these species form an essential part of the larval diet. Both species may also be found in native pasture where appropriate grass species and structure are present (ACT Government 2006, Richter *et al.* 2010[29]).

Inter-tussock space is important for golden sun moth breeding as it is used by females at display sites (OEH 2014). The perunga grasshopper prefers inter-tussock spaces occupied by grassland forbs (ACT Government 2006). The implication of this need for a grassy layer with inter-tussock spaces is that dense grassy patches are unlikely to be suitable habitat for these species.

There is some potential for these species to occur in natural temperate grassland in southern areas of Kama Nature Reserve. Perunga grasshopper has been recorded in the southern banks of the Molonglo River corridor downstream of Coppins Point, among pink-tailed worm lizard habitat (Wong & Osborne 2010, ACT Government 2014). These records were observed as part of pink-tailed worm lizard surveys adjacent to the Project Area, and it is feasible that this cryptic species also occurs in suitable habitat within the Project Area.

2.2.4 Threatened flora

There are five threatened flora with the potential to occur within the Project Area. Of these, Tarengo look orchid (*Prasophyllum petilum*) is considered to have a low likelihood due to the high sensitivity of this species to grazing, and the historic management of suitable habitat in the Project Area. The remaining four species are discussed below.

[27] http://ebird.org/ebird/view/checklist?subID=S19140997.
[28] http://ebird.org/ebird/view/checklist?subID=S16443426.
[29] Richter A, Osborne W & Traugott M (2010) *Dietary specialisation in the Golden Sun Moth Synemon plana – the key to understanding habitat requirements and site rehabilitation for this critically endangered species*. Final report to Biodiversity and Programs Branch, Department of Sustainability and Environment (Victoria).

Button wrinklewort (*Rutidosis leptorrhynchoides*) occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland, often at the natural ecotone between grassland and woodland. It grows on shallow, stony, red-brown, clay loams. It may colonise areas disturbed by roads, erosion, or fire, however it is susceptible to grazing disturbance and only appears in areas that are lightly grazed (OEH 2014). Within the Project Area, suitable habitat occurs at the ecotone boundary between box-gum woodland and natural temperate grassland within Kama Nature Reserve (refer to northern boundary of natural temperate grassland area in **Figure 2.2**). Given the conspicuous nature of this daisy and the survey effort undertaken for a variety of flora and fauna without it being detected within the reserve, it is unlikely that this species occurs. However, should any development occur as part of relocation of existing 132kV overhead transmission lines within the Reserve, and particularly the ecotonal area, targeted survey for button wrinklewort should be undertaken.

The Canberra spider orchid (*Arachnorchis actensis*) is found in dry sclerophyll open forest areas, generally at the transition zone with grassy woodland (Australian Government 2014). Potential habitat for this species occurs at the ecotone between dry sclerophyll open forest types and box-gum woodland in Kama Nature Reserve and Block 1550 Belconnen.

Small purple pea (*Swainsona recta*) may be found in box-gum woodland and requires an understory of tussock grasses such as kangaroo grass, poa tussocks, and spear-grasses (OEH 2014). This species is known to occur in box-gum woodland at Block 1550 Belconnen, and may potentially occur in similar habitats in Kama Nature Reserve.

In the southern highlands, Austral toadflax (*Thesium australe*) occurs in grassland and grassy woodland. It is a parasitic plant, generally sourcing water and nutrients from kangaroo grass. Suitable habitat for this species occurs throughout Kama Nature Reserve, and also potentially in areas of box-gum woodland within the Molonglo River corridor.

Hoary sunray (*Leucochrysum albicans* var. *tricolor*) occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat (Australian Government 2014b). Suitable habitat may occur in all areas containing native vegetation across the Project Area, particularly box-gum woodland and natural temperate grassland.

In 2008, Eco Logical Australia undertook targeted survey for button wrinklewort, hoary sunray, small purple-pea and Austral toadflax within the Molonglo NES Plan Area with no records being found (Eco Logical Australia 2009). However, absence in one survey does not discount the potential for these species occurring within the Project Area, which includes areas not covered by the NES Plan. Tarengo leek orchid was not considered in the 2008 survey, perhaps because of the prolonged grazing history within suitable habitat in the Molonglo Valley. It is also notable that the weather conditions during these earlier surveys were typified by drier conditions associated with drought and as such surveys undertaken in more favourable conditions may result in substantially different findings.

2.2.5 Mapping of Matters not Considered by the NES Plan

Mapping of constraints for species discussed in **Section 2.2** is not included as all of the suitable habitat features occur inside existing ecological constraints mapped as part of MNES in **Section 2.1**.

2.3 Gap Analysis

Based on desktop analysis of values and field familiarisation, it was concluded the information on ecological values within the Project Area was reasonable with some

augmentation. Information gaps were primarily related to the extent and condition of box-gum woodland, with areas of lower confidence within Block N, part of Block GG (as identified in the NES Plan) and smaller areas within Belconnen Rural Blocks 1438 and 1548.

Existing box-gum mapping generally did not include areas with an exotic understorey, which swift parrot and superb parrot can still utilise. While existing mapping was used as a base for predicting potential habitat, additional digitising was undertaken to incorporate areas of at least open woodland structure. This goes some way to addressing information gaps.

There is a lack of threatened flora records within the Project Area. This may be due to absence or a lack of adequate survey effort. However, targeted survey should be undertaken for threatened flora should any development occur as part of relocation of existing 132kV overhead transmission lines within Kama Nature Reserve or Block 1550, Belconnen.

3.0 General Environment

3.1 General Condition and Disturbance

Since pastoralisation of the Canberra district and to the present day, the Project Area has been managed as grazing properties. However the intensity and duration of such activities is likely to have varied between different land parcels. Prior to pastoralisation, the majority of the area would have contained woodland communities, with natural grasslands occurring in cold air drainage depressions. Much of the natural vegetation has been removed and been replaced with exotic pastures, with the exception of areas mapped as native vegetation communities (refer to **Section 2**). Along the river gorge, areas of river she-oak woodland and riparian shrubland still remain.

Due to removal of native vegetation and a history of grazing, creek lines are generally degraded with historic erosion; this erosion is particularly pronounced in Deep Creek and Coppins Creek. While this erosion may be active during high rainfall events after heavy grazing or extended drought, they are currently relatively stable due to the presence of exotic pastures. Blackberry (*Rubus fruticosus* agg.) is present in some areas, particularly at the confluence between creeks and the Molonglo River, and extending upstream into creeks in parts. Exotic trees such as willows (*Salix* spp.) and Lombardy poplar (*Populus nigra*) are present in areas. Both blackberry and crack willow are considered weeds of national significance (WoNS)[30].

Directly east of Kama Nature Reserve (within 40 metres of the boundary), a pit used to bury kangaroo carcasses from ACT Government culling events is present.

3.2 Contamination

Coffey (2005[31]) identified three sheep dips within the Project Area (**Table 3.1**, georeference data in GDA94z55). Sheep dips SD117 and SD118 are located within 25 metres of each other. Chemicals previously used for sheep dips included arsenic and organochlorine pesticides. In view of the persistence of both these chemicals, residues of both may occur and are of concern. However, Coffey (2005) concluded that all of these areas could be remediated if required, and do not pose a significant constraint to development planning.

Table 3.1 – Sheep Dip Sites within the Project Area

Sheep dip number	Type	Location	Easting	Northing
SD117	Sprays sheep dip	Block 181 Belconnen	685801	6093436
SD118	Plunge sheep dip		685776	6093436
SD123	Plunge sheep dip	Block 1546 Belconnen	687782	6094190

Coffey (2005) also identified that areas used for radiata pine (*Pinus radiata*) plantations were routinely sprayed with chemicals containing heavy metals such as arsenic, cadmium, chromium, copper, lead, nickel and zinc; organochlorine pesticides; organophosphate pesticides; and trazine herbicides. While these chemicals do not break down in the environment, the risk of significant contamination was considered low by Coffey (2005).

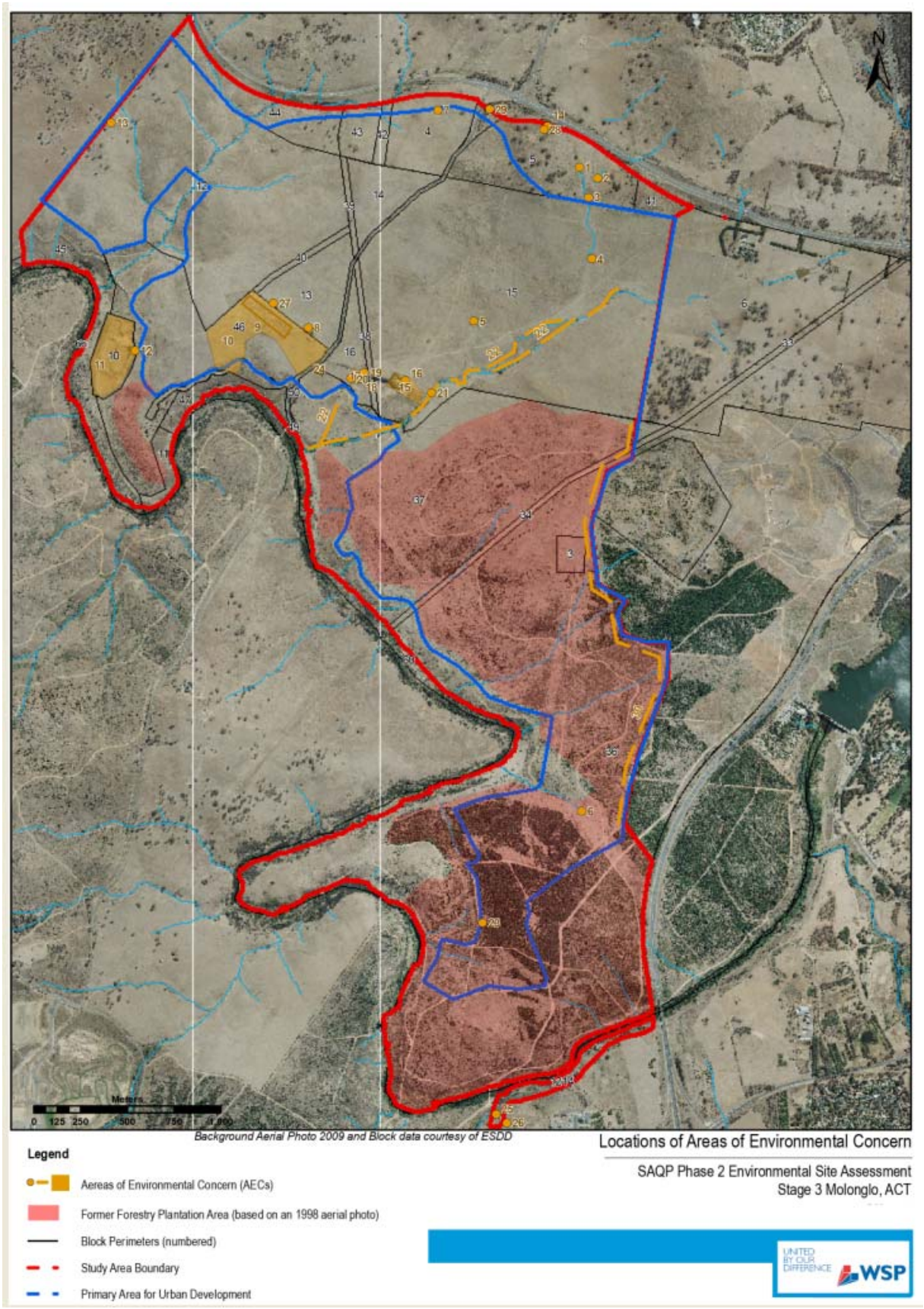
[30] http://www.weeds.org.au/WoNS/
[31] Coffey (2005) *Molonglo Valley Preliminary Geotechnical and contamination Constraints Study: Molonglo Valley*. Report to the ACT Planning and Land Authority. C7742/1-AC, 11 May 2005.

Coffey (2005) identified the sewage sludge ponds near Coppins Crossing as a potential source of contamination, based on the potential for elevated concentrations of heavy metals and polycyclic aromatic carbons, which may have been produced during though combustion the 2003 fires.

Robson (2014a[32], 2014b[33]) recently undertook an environmental site assessment to identify potential contaminants and areas of environmental concern within parts of the Project Area along Deep Creek (the westernmost creek in the Project Area), between the Arboretum and Molonglo River, and areas adjoining William Hovell Drive. Areas including the Coppins Crossing sewerage sludge ponds, radiata pine plantations and sheep dips identified by Coffey (2005).

Additional to the above contamination areas, WSP (2012[34]) identified kangaroo burial pits and a range of smaller contaminated sites including relict farm sheds (potentially containing heavy metals), isolated petrol drums, car bodies, and ordnance (**Section 3.3**). A map produced by WSP (2012) showing contamination issues covers much of the project area (**Figure 3.1** – Figure 3 in WSP 2012). Additionally, Robson (2014a, 2014b) contains maps covering the portions including the north-eastern portion. These maps are not presented in this report due to size restrictions.

[32] Robson (2014a) *Phase 1 Environmental Site Assessment: Areas A and B, Molonglo Valley Stage 3, ACT*. Report to the Land Development Agency, February 2014.
[33] Robson (2014b) *Phase 1 Environmental Site Assessment: Area C, Molonglo Valley Stage 3, ACT*. Report to the Land Development Agency, February 2014.
[34] WSP (2012) *Sampling and Analysis Quality Plan (SAQP) for Phase 2 ESA. Molonglo Valley Stage 3, ACT*. A report to the ACT Environment and Sustainable Development Directorate, September 2012.



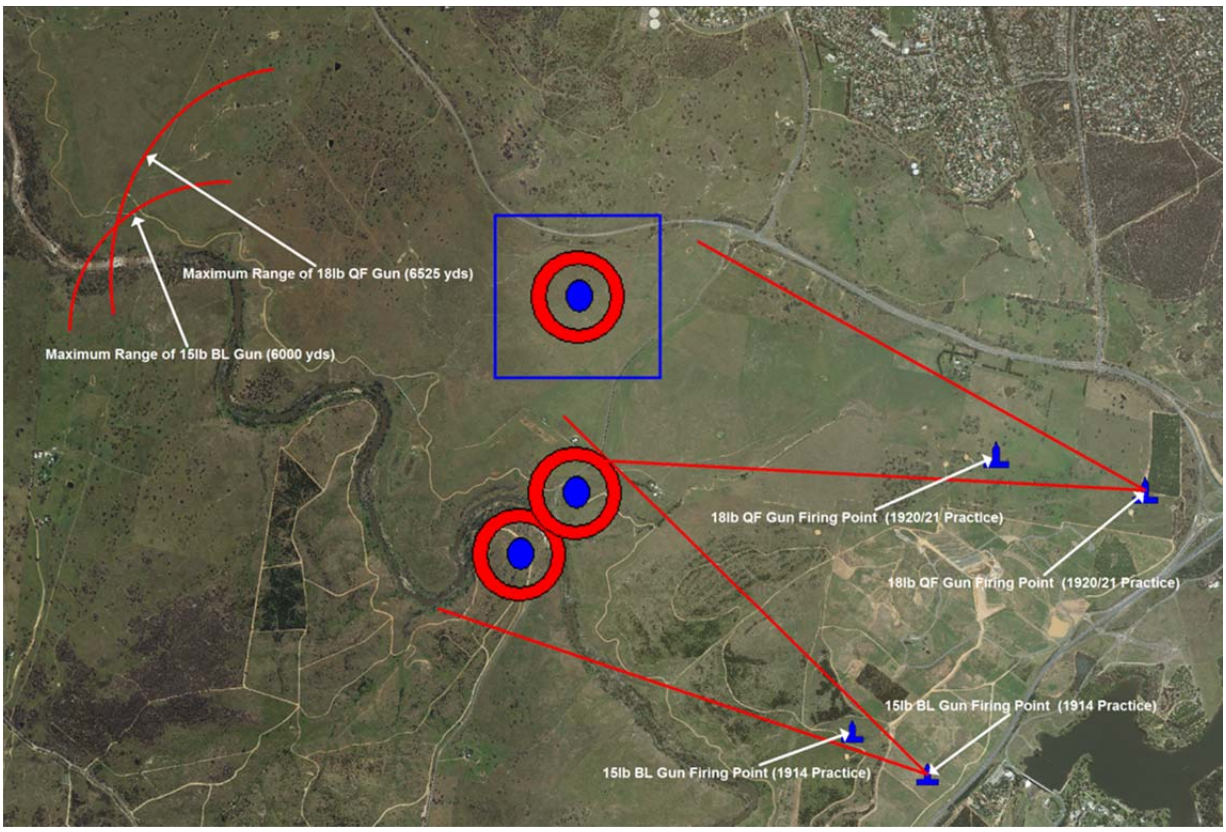
Source: WSP (2012)

Figure 3.1 – Areas of Environmental Concern within the Western Two-Thirds of the Project Area

3.3 Explosive Ordnance Waste

Much of the Project Area was used as a training site for artillery soldiers from 1915 until the mid 1920's. This involved the firing of 15 pound and 18 pound artillery projectiles from four locations in the east of the Project Area and within the current National Arboretum site. Artilleries were fired west into the Project Area, as shown in **Figure 3.2**. While most projectiles were expected to fall within the Project Area, it is possible that some exceeded this into Kama Nature Reserve and beyond.

Currently, surveys are being completed to find unexploded ordnance (UXO – ordnance that has failed to function for various reasons) and explosive ordinance waste (EOW – remnant material from explosive ordnance such as packaging, fragmentation etc.). Interim surveys undertaken across 10 per cent of the Project Area have revealed a large number of EOWs. No UXOs have been uncovered to date, however prior to any construction it is important to seek an update on this information. UXOs will be disarmed and removed upon discovery.



Source: Milsearch Pty Ltd

Figure 3.2 – Estimated fields of artillery fire in the Project Area

3.4 Gap Analysis

Studies by WSP (2012), Robson (2014a, 2014b) and Coffey (2005) appear to be comprehensive in describing the distribution and risks associated with contaminants across the entire Project Area. The WSP (2012) study covers the majority of the Project Area, with Robson (2014a, 2014b) covering remaining areas east of the WSP study, as well as overlapping areas along the Molonglo River Corridor and along Deep Creek. These have updated information presented in the Coffey (2005) report, which covers most of the Project Area south of William Hovell Drive.

Based on existing survey information, the distribution of general ecological disturbance is well understood. It is possible that noxious weed outbreaks not described in **Section 3.1** exist in some areas; however agricultural management appears to have generally restricted these in order to promote favourable exotic pasture grasses.

4.0 Heritage

Sections 4.1 to **4.3** provide the results of the desktop analysis drawn from the searches of statutory and non-statutory heritage registers, schedules and databases and the review of other existing heritage information available for the Project Area.

4.1 Heritage Search Results

4.1.1 The Heritage Register

The Heritage Register is a public list containing registration details of each recognised heritage place or object in the ACT, including natural, indigenous and built. Records of provisionally registered, as well as nominated, places and objects are maintained on the register by the Heritage Council.

A search of the ACT Heritage Register was undertaken on 6 June 2014. The search identified four Aboriginal archaeological sites that have management constraints within or in the vicinity of the Project Area; two artefact scatters and two scarred trees. [redacted] Two previously recorded isolated finds [redacted] have been salvaged and no heritage constraints remain and have therefore not been mapped or described.

The ACT Heritage register lists one historic structure in the immediate vicinity of the Project Area; Riverview (Issac and Emily Blundell hut). A second historic structure, the Kallenia Woolshed, was identified during the register search as being located within the Project Area. The Kallenia Woolshed does not have a statutory heritage listing however it is identified by the ACT Heritage Council as meeting the criteria for listing on the register. [redacted]

A further two areas are listed on the ACT Heritage Register near the Project Area; Kama Nature Reserve and Lower Molonglo Geological Site, Stromlo. The Kama Nature Reserve is listed due to native species diversity and the endangered ecological communities present. The Lower Molonglo Geological Site is an outcrop of limestone that includes specimens of Middle Silurian (425 million BP) marine fossils. Heritage guidelines adopted under S25 of the *Heritage Act 2004* are applicable to this site. [redacted]

4.1.2 Native Title Vision

A search of the National Native Title Tribunal's online server, Native Title Vision was undertaken on 4 June 2014 and showed no Indigenous Land Use Agreements, Native Title Applications, Registrations or Determinations in the ACT.

4.1.3 Australian Heritage Database

A search of the Australian Heritage Database, incorporating the Commonwealth Heritage List, National Heritage List, Register of the National Estate and World Heritage List was undertaken on 4 June 2014.

No items are listed on the Commonwealth Heritage Register or National Heritage List for the Project Area.

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

4.1.4 Register of the National Estate

The Register of the National Estate (RNE) was closed in 2007 and is no longer a statutory list. The RNE is now an archive of 13,000 places in Australia that includes places of local and state significance. Many places in the RNE are now included in other statutory lists, such as state heritage lists, or local government heritage registers. As a result, those places receive protection under the relevant federal, state, territory or local legislation. RNE places can be protected under the EPBC Act if they are included in another Commonwealth statutory heritage list or are owned by the Commonwealth.

There are no items within the Project Area listed on the RNE.

4.1.5 National Trust of Australia (ACT) Heritage Register

The National Trust of Australia (ACT) Heritage Register is not a statutory list. Furthermore in 2004 the *National Trust Act* ceased classifying heritage sites and instead nominates them to the ACT Heritage Register (local), National Heritage List (national significance) and Commonwealth Heritage List (heritage sites controlled by Commonwealth Government).

No items are listed on the National Trust of Australia (ACT) Heritage Register for the Project Area or within the immediate vicinity.

4.2 Aboriginal Context

4.2.1 Previous Archaeological Research (Regional)

[redacted]

All of the sites are low density artefact scatters [low numbers of sites with potential archaeological deposit (PAD)] or isolated finds except for one grinding groove site. Sites are most commonly recorded on mid and upper slopes. The most common artefact type is flakes but retouched flakes, broken flakes, hammerstone, cores and an anvil have also been recorded. The dominant raw materials recorded are chert and quartz with lower numbers of artefacts being produced using hornfels, silcrete, tuff, granite, jasper and quartzite.

Table 4.2 – Previous Archaeological Research (Regional)

Year	Author	Project Area	[redacted]	Landform	Artefact Type	Raw Material	[redacted]
2010a	Biosis	Molonglo Stage 2 – Heritage Assessment	[redacted]	Modified lower slopes and midslopes	Flake, broken flakes, retouched flakes, cores, hammerstone, anvil	Chert, hornfels, quartz, silcrete, tuff, granite, jasper, quartzite	[redacted]
2010b	Biosis	Molonglo Stage 2 – Surface Artefact Salvage	[redacted]	Modified lower midslope	Core	Silcrete	[redacted]

4.2.2 Previous Archaeological Research (Project Area)

The areas subject to prior archaeological research that have incorporated part of the current Project Area are shown in **Figure 4.2** and an overview of the research is provided in **Table 4.3**.

The Molonglo Stage 3 Cultural Heritage Assessment involved the survey of the majority of the current Project Area (Biosis 2012) and the salvage of the recorded sites and the subsurface testing of the PADs (Biosis 2013). [redacted] The heritage advice issued by the ACT Heritage Council for the Cultural Area has identified this as a development constraint and has stated that the area should be avoided. Refer to **Appendix 1** for the complete heritage advice issued for the Cultural Area as part of the Biosis project on 23 July 2013.

The Molonglo Stage 3 area assessment and salvage fulfilled the management requirements for the previously recorded sites within the Project Area, and for the new sites recorded during the process (Biosis 2012, 2013). Refer to **Appendix 1** for the complete heritage advice issued for these Biosis projects on 23 July 2013.

The current Project Area also incorporates part of the Molonglo River Corridor assessed by Cultural Heritage Management Australia (CHMA; 2013a, 2013b). These areas include the four Aboriginal sites that still have management requirements on the ACT Heritage register [redacted] Aside from these sites all previously recorded sites in the Project Area were salvaged and have no further management recommendations. Refer to **Appendix 1** for the complete heritage advice issued for the CHMA projects on the 20 August 2013.

The previously recorded sites within or immediately adjacent to the Project Area include artefact scatters, isolated finds, scarred trees and PADs. The most common artefact type is flakes; however broken flakes, retouched flakes, cores, hammerstones, a grinding stone, flaked pieces and an anvil have also been recorded. The dominant raw materials used are chert and volcanics with a lower number of artefacts being produced using quartz, basalt, silcrete and quartzite.

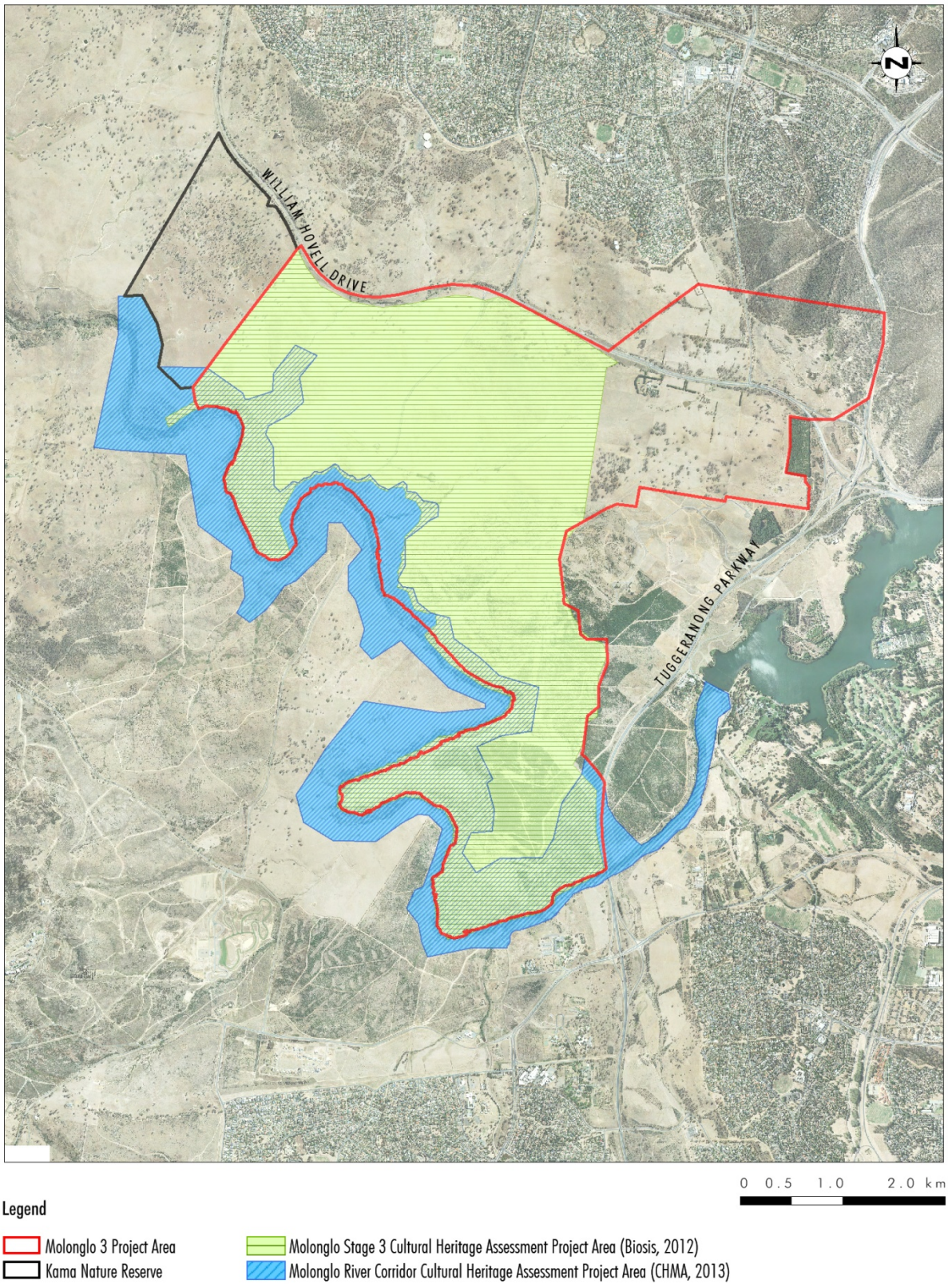


Figure 4.2 – Previous Cultural Heritage Assessment Project Areas

Table 4.3 – Previous Archaeological Research Project Area

Source	Project Area	[redacted]	Landform	Artefact Type	Raw Material	[redacted]
Biosis (2012)	Molonglo Stage 3 - Cultural Heritage Assessment	[redacted]	Midslope, lower slope [redacted]	Flake, flaked piece, core, hammerstone, blade and possible grindstone	Chert, quartz, volcanic, silcrete and granite	[redacted]
Biosis (2013)	Molonglo Stage 3 – Test pitting and salvage report	[redacted]	Midslope, lower slope [redacted]	Flake, broken flake, core, flaked piece, retouched flake, backed blade, blade, hammerstone	Chert, silcrete, quartz, basalt, tuff, quartzite	[redacted]
Cultural Heritage Management Australia (2013a)	Molonglo River Corridor – Cultural Heritage Assessment	[redacted]	[redacted] midslopes, creek bank, upper slope	Flakes, broken flakes, Cores, Hammerstones, anvil, grinding stone and flaked pieces	Grey volcanic, quartz, chert, basalt quartzite and silcrete	[redacted]
Cultural Heritage Management Australia (2013b)	[redacted]	[redacted]	[redacted]	Flakes, flaked pieces, retouched flakes and Hammerstone	Quartz, volcanic, chert and quartzite	[redacted]

4.3 Historical Context

As part of heritage assessment procedure it is essential to have a full understanding of an area based on its historical and physical context. This section of the report comprises a brief historical background for the Project Area and its broader locality to provide an understanding of the potential significance of any historic heritage sites within the Project Area. The sources utilised to prepare the historical context discussed below include:

- Regional Histories [Heritage Office and Department of Urban Affairs and Planning (1996)[35]].
- Parish and historical maps - searched through the NSW Lands and Property Information website.
- The National Library of Australia repository of Australian research material - accessed through Trove.

The early history of Canberra is closely linked to the early history of the Southern Tablelands of NSW. Exploration of the NSW Southern Tablelands from 1817 to 1820 was undertaken by Hamilton Hume, Charles Throsby, James Meehan and John Oxley and opened up the region to European settlement through the 1820s. Goulburn, Yass and Queanbeyan become key towns. The early development of Canberra was similar to that of rural NSW, where settlement was made up of absentee landholders and a convict labour force to clear the land and build farming infrastructure.

In 1820, Charles Throsby Smith, Joseph Wild and James Vaughn reached the Molonglo River while defining the line of a road to Goulburn Plains. They discovered the Murrumbidgee River in 1821 and settlement began shortly after, with Robert Campbell selecting the land forming his estate at Duntroon by 1823. In 1826, George Thomas Palmer established Ginninderra Station, while his father established Jerrabomberra (Gillespie 1992: 6)[36].

The district was settled by 1860, and with the *Robertson Land Act 1861* new settlers arrived. Based on the available 1904 Historical Parish Map of Weetangera, the Project Area is located in an area in which a number of historic land grants had been selected, including Francis Mowatt, A. Gibbes, William Young, James Young, Donald McDonald, Thomas Kinlyside, George Thomas Palmer, Richard Schumack, G. E. Schumack and William Matheson.

On 1 January 1911 the Federal Capital Territory came into existence and over the following years the land within the Federal Capital Territory boundary, including the Project Area, was acquired by the Commonwealth.

4.3.1 Previously Identified Historic sites

The Kallenia Woolshed is a historic woolshed identified in the Molonglo 3 Area [redacted] Although not marked on the 1904 Parish Map the woolshed is located within land which was owned by George Thomas Palmer in the early twentieth century. The woolshed is a timber framed structure with a corrugated iron roof, the construction also includes vertical split

[35] Heritage Office and Department of Urban Affairs and Planning (1996) *Regional Histories.* Department of Urban Affairs and Planning and Heritage Council of New South Wales.

[36] Gillespie, L. (1992) *Ginninderra: Forerunner to Canberra*. Canberra Local History Series, Canberra.

timber slabs reused from a previous structure; reported to have been John Coppin's Hut. The slabs have fragments of wall paper and newspaper pasted from the period of initial use including some slabs with wall paper on both sides indicating internal use (Biosis 2013). There is no known date for construction of the Woolshed. The Kallenia Woolshed does not have a statutory heritage listing however it is identified by the ACT Heritage Council as meeting the criteria for listing on the register. It is a good example of its type and is an unusual example with material incorporated into its fabric from an earlier structure demonstrating the innovation and material reuse of the settlers of the period. The woolshed is assessed as being in excellent condition (CHMA 2013a).

John Coppin was born in 1840 in Kent and arrived in Sydney in 1857. He is listed as a resident of Ginninderra from 1867, although he may have been a resident since 1859. After a stint at the Kiandra Goldfields the Coppins came to the district having been told that work was available at Ginninderra. John Coppin was offered the shepherd position at Goat Gully Station on the southern banks of the Molonglo River after the squatter Davis discovered that he could play cricket (Biosis 2012). The Coppin family lived in a three bedroom hut at Goat Gully Station from 1860. An upright timber slab hut belonging to Coppin is reported to have been dismantled and incorporated into the Kallenia Woolshed (Biosis 2012). Although the exact location of the site of John Coppin's hut is not known, it was not located within the Project Area.

Riverview, the remains of the home of Isaac and Emily Blundell from c. 1870 to 1913 (CHMA 2013a) was identified on the western side of the Molonglo River outside the current Project Area [redacted] and registered on the ACT Heritage register. The site included remains of the homestead and historic plantings.

Based on the land use history of the area, potential heritage significance that may occur include:

- The remains of nineteenth-century structures, such as farm dwellings and stock yards; these may survive as standing buildings, ruins or archaeological deposits;
- Fence lines; these may occur along road easement boundaries or border fences; and
- Early tracks, stock routes and roads; these may be associated with early cadastral road reserves, watershed ridgelines, and may be related to early river and creek crossing points.

With the exception of the Kallenia Woolshed area, no other areas of potential historical heritage significance were identified within the current Project Area during desktop analysis.

4.4 Gap Analysis

Based on the desktop analysis a number of information gaps were identified. These areas were not subject to assessment through the previous works conducted by Biosis (2012, 2013) and CHMA (2013a, 2013b) which encompass portions of the current Project Area. As previously stated there are two remaining sites, [redacted] Kallenia Woolshed and an Aboriginal Cultural Area that still require further management within those areas assessed.

The information gaps [redacted] include:

- the north east portion of the Project Area; and

- small areas along northern and eastern boundaries of the Project Area 37.

If any impacts are proposed for those areas with information gaps a heritage assessment will need to be completed to determine if there are any heritage constraints.

The ACT Heritage Council has advised that a Conservation Management Plan (CMP) is currently in preparation for the Kallenia Woolshed. The CMP (or draft CMP) should be reviewed in relation to the appropriate management of the Woolshed and any proposed impacts to the area of the Woolshed.

[37] Please note that the small areas identified as information gaps along the eastern border of the current Project Area may be a reflection of digitisation of boundaries and may not represent actual gaps.

5.0 Constraints and Opportunities

5.1 Ecological

Figure 5.1 represents a composite map of ecological values listed under the NES Plan which are known to occur within the Project Area, as well as Kama Nature Reserve. Known ecological constraints include:

- Box-gum woodland (both under the EPBC and NC Act);
- natural temperate grassland;
- known pink-tailed worm lizard habitat; and
- potential habitat for swift parrot and superb parrot where it coincides with box-gum woodland.

Additionally, the following ecological constraints which are not addressed by the NES Plan but have the potential to occur where habitat provisions allow in all areas where native vegetation occurs:

- Little eagle and woodland birds in woodland and open forest environments (where habitat provisions allow);
- golden sun moth and perunga grasshopper in natural temperate grassland areas (although no populations of this conspicuous species have been confirmed, and as such, this is not mapped as a constraint);
- Threatened flora (if detected) in all areas containing native vegetation, including a known record of *Swainsona recta* within box-gum woodland in Block 1550 Belconnen.

Matters not considered by the NES Plan (i.e. species listed under the NC Act but not under the EBPC Act, and additional species under the EPBC Act) are discussed in **Section 2.2**. Consideration of issues relating to these species fall within the ecological constraints areas mapped in **Figure 5.1**, with specific habitat features within these areas described in **Section 2.2**. While it is plausible that birds including little eagle and numerous woodland birds may utilise dry open forest types north of William Hovell Drive, these areas are not mapped as constraints. However, these species should be surveyed for, and if recorded, important habitat features as described in **Section 2.2** should be avoided.

Natural temperate grassland has been confirmed to occur within Kama Nature Reserve (Umwelt 2013a). An area of NTG has been discussed by Hodgkinson (2009)[38] north of William Hovell Drive in consideration of mapping presented in Action Plan 28. There is concern regarding the classification of this area as NTG based on landscape position, however if this area is to be impacted its conservation status and consistency with the listed community definition should be verified through further detailed analysis.

The Project Area and Kama Nature Reserve also contain a number of *potential* ecological constraints which have not been confirmed through this project. These areas are considered as potential constraint based on being identified in previous studies as having ecological values, but requiring confirmation. These are considered of lesser certainty based on observed ecological condition or doubts about information quality. These include:

[38] Hodkginson K (2009) *Future-proofing Natural Temperate Grasslands in Urban and Peri-urban Canberra*. Report Prepared by Dr Kenneth Hodgkinson for the Commissioner for Sustainability and the Environment, ACT.

- potential box-gum woodland and derived native grassland which may or may not be dominated by exotic pastures;
- unconfirmed pink-tailed worm lizard habitat;
- natural temperate grassland north of William Hovell Drive, which is unlikely to occur in that particular topographic position;
- areas mapped as swift parrot and superb parrot habitat which occur outside areas mapped as box-gum woodland. These areas are considered as potential based on a lack of survey data supporting the presence of these species within the Project Area. Note that areas within box-gum woodland are identified as constraints due to being identified as habitat in the NES Plan (ACT Government 2011); and
- potential little eagle nesting sites within box-gum woodland (low likelihood).

Should any feasibility study determine that relocation of existing 132kV overhead transmission lines may potentially occur in these potential constraint areas, the presence or absence of these values should be verified.

For areas where existing approvals exist that would result in the removal of ecological values, identified ecological constraints are unlikely to be a limitation. For further information on existing approvals, refer to **Section 6**.

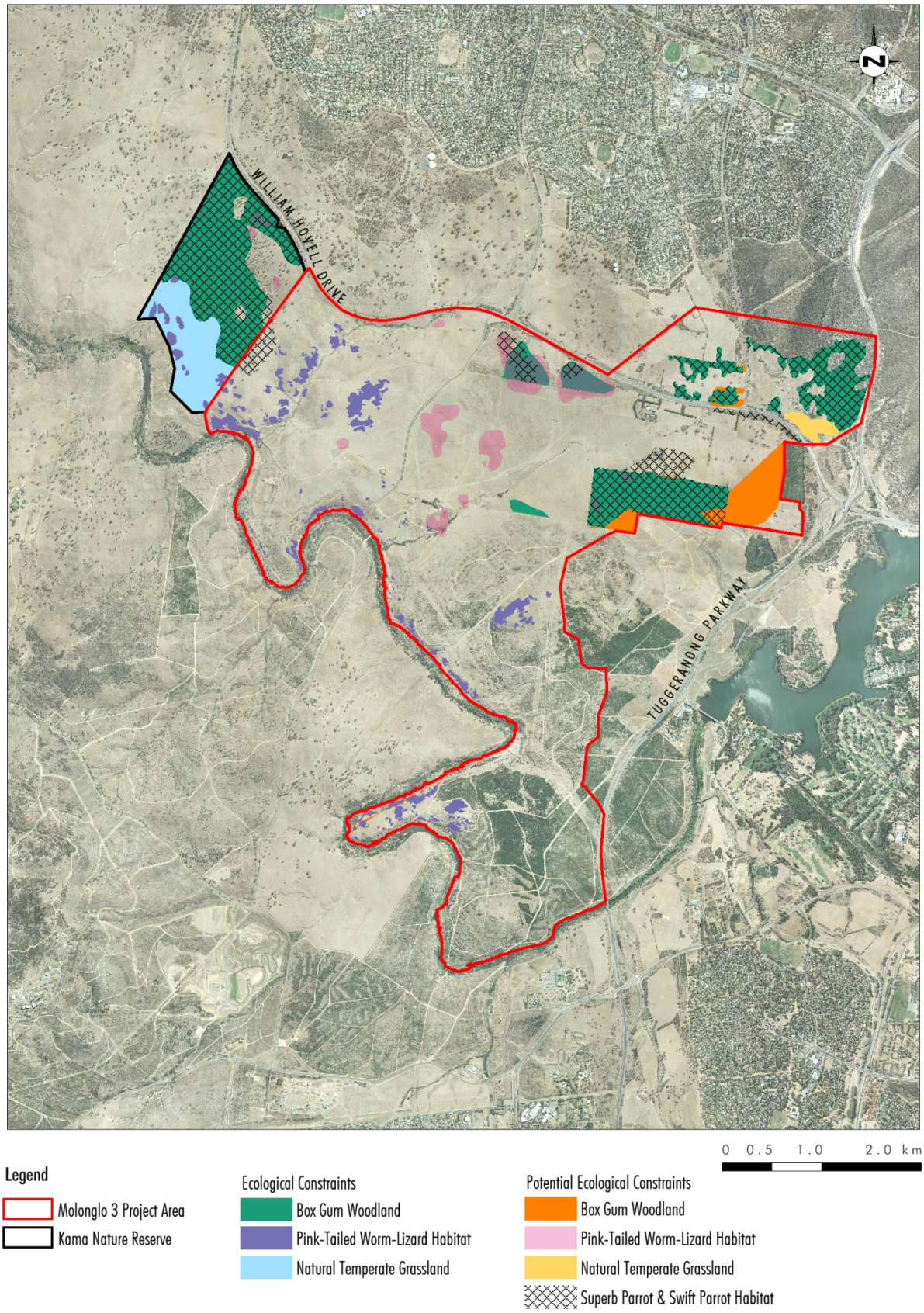


Figure 5.1 – Ecological Constraints

5.2 General Environment

General environmental issues, particularly those related to contaminants, are usually localised and well known however, in certain circumstances the true extent of contaminants is only completely understood once detailed investigations or earthworks have commenced. The distribution of known contaminants is shown in **Figure 3.1** (produced by WSP 2012), as well as maps produced in previous information gaps by Robson (2014a, 2014b). Maps produced by Robson (2014a, 2014b) were not able to be reproduced in this report due to size restrictions; this report should be referred when determining constraints and opportunities.

No contaminants were identified by WSP (2012), Robson (2014a, 2014b) or Coffey (205) which posed a significant problem to development. However, issues such as potential release of contaminants from sheep dips as part of earthworks should be considered when scoping any potential relocation of existing 132kV overhead transmission lines.

5.3 Heritage

Based on desktop analysis of the available information the following constraints were identified.

Site Specific:

- one [redacted] is located within the current Project Area. The existing management requirement is to conserve the site in situ (D Chaston 2014 pers.comm.). If impacts to this site are required further advice should be sought from the ACT Heritage Council and consultation undertaken with the RAOs to determine an appropriate management strategy;

- the Cultural Area identified during the Biosis (2013) works [redacted] is located within the current Project Area. The previously issued heritage advice for the Cultural Area identifies it as a development constraint and states that impacts to the area should be avoided. The following advice was also issued (refer to **Appendix 1**):

    - in the event that impacts to the Cultural Area cannot be avoided advice should be sought from the ACT Heritage Council as to an appropriate management strategy for the impacts;
    - consultation with Aboriginal community will need to be undertaken if the Cultural Area is to be impacted; and
    - the current use (pastoral agistment) of the Cultural Area is compatible with its heritage values.

- one historical site, the Kallenia Woolshed, is located within the current Project Area. Although not yet nominated for listing on the ACT Heritage Register, it is identified by the ACT Heritage Council as meeting the criteria for listing and as such impacts to the southern sections of Blocks 15, 16 and 38 should be avoided. As discussed, the ACT Heritage Council advised that a CMP is currently in preparation for the Kallenia Woolshed. If impacts to this area are proposed review of the CMP (or draft CMP) should be undertaken in relation to the heritage curtilage of the woolshed and any associated features located within its vicinity. Further advice should be sought from the ACT Heritage Council as to an appropriate management strategy.

General:

- if previously unidentified archaeological artefacts or sites are located during the course of the development within the Biosis (2012, 2013) project areas, the process outlined within the Unanticipated Discovery Plan (UDP) (produced as part of Biosis 2013) should be followed. This advice was issued by the ACT Heritage Council and is shown in full in Appendix 1. The UDP is only relevant for the Biosis project areas (2012, 2013) [redacted]. If the information gap areas are required to be impacted for the current project and are subject to a future heritage assessment it is suggested that the current UDP be modified and updated to include the entirety of the current Project Area.

[redacted]

6.0 Existing Approvals

Environmental and planning approvals for the Project Area will require consideration under both ACT and Commonwealth Legislation. Key pieces of legislation for the development are the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth), the *Planning and Development Act 2007* (PD Act) (Territory), and the *Heritage Act 2004* (Territory).

6.1 Environment Protection and Biodiversity Conservation Act 1999

The Molonglo Valley Plan for the Protection of Matters of National Environmental Significance (the NES Plan) (ACT Government 2011) sought approval under the EPBC Act for the implementation of the Molonglo and North Weston Structure Plan (the Structure Plan) (ACT Government 2008[39]), which would permit urban development and associated infrastructure within the strategic assessment area without any further assessment or approval requirements under the EPBC Act.

The NES Plan established a range of commitments for the protection of MNES within the strategic assessment area. On 7 October 2011, the federal environment minister endorsed the NES Plan, and on 20 December 2011 approved actions associated with urban development in East Molonglo as described in the endorsed Plan.

The approval applies to all actions associated with urban development in Molonglo 3 included in the strategic assessment area. The Belconnen Parcels in the north-east of Molonglo 3 were not included in the original NES Plan. Any impact to MNES within these areas, or any other areas outside the strategic assessment area will require separate consideration under the EPBC Act.

6.2 Planning and Development Act 2007

Under Schedule 4 of the PD Act, there are a number of listed 'triggers' for an impact track assessment. Any applicable items have the potential to trigger assessment through an Environmental Impact Statement, unless exemption is granted.

The development of Molonglo 2 was largely completed under Section 211 (S211) Exemptions [exemption from the need to prepare an Environmental Impact Statement (EIS)], due to an adequate level of understanding of the environmental risks and conditions based on previous assessments.

No approvals under the PD Act are known to have been sought for Molonglo 3 at this stage; however there are a number of applicable items which will trigger impact track assessment. These triggers are, in summary:

- proposal that is likely to have a significant adverse impact on an endangered, vulnerable or protected species or ecological community (Part 4.3, Item 1);
- proposal that is likely to result in the clearing of more than 5.0 hectares of native vegetation (Part 4.3, Item 2);

[39] ACT Government (2008) *Structure Plan: Molonglo and North Weston. NI2008-27*, 19 December 2008.

- proposal that is likely to have a significant adverse impact on a place or object registered under the Heritage Act 2004 (Part 4.3, Item 6); and

- proposal involving land included on the register of contaminated sites under the Environment Protection Act 1997 (Part 4.3, Item 7).

Of particular relevance to this project however, is Part 4.2, Item 2, "*a proposal that involves electricity line construction outside an existing easement or exceeding 500m in length... with a voltage of 132 kV or more*". In order to seek a S211 Exemption, it must be demonstrated that sufficient environmental research and studies have been undertaken for the site such that no further research is required to understand and assess potential project impacts, otherwise an EIS may be required.

6.3 Heritage Act 2004

The *Heritage Act 2004* (ACT Government 2004[40]) is Territory legislation providing for the recognition, registration and conservation of natural and cultural heritage values, including Aboriginal places and objects. The Heritage Council is the representative body responsible for regulating the management of Aboriginal and European cultural heritage places and objects under the Act. Part 13 section 74 and section 75 of the Act relate to offences that result in the damage or diminishing of significance of Aboriginal objects and Places. Part 13 section 76 allows for exemption to these offences if a person is acting in accordance with a heritage guideline, a heritage direction, a heritage agreement, a conservation management plan approved by the Act Heritage Council or a development approval under the *Planning and Development Act 2007*.

Heritage directions under Part 13 section 76 of the Act were issued to allow the salvage of sites within the assessment areas of the Molonglo River Corridor (CHMA 2013a) and the Molonglo Stage 3 Assessment and salvage conducted by Biosis (2012, 2013). These Heritage directions were issued for the project areas assessed (**Figure 4.2**) only and endorse the recommendations in the assessments that the previously recorded Aboriginal archaeological sites within the project areas have no further management requirements aside from those identified in **Section 4.1.1**.

[40] ACT Government (2004). *Heritage Act 2004*. Accessed online at: http://www.legislation.act.gov.au/a/2004-57/current/pdf/2004-57.pdf. February 2013.

7.0 Recommendations

The following recommendations should be considered in consideration of the feasibility for relocation of the existing 132kV overhead transmission lines through or around the Molonglo 3 development:

1. areas identified as potential ecological constraints (**Figure 5.1**) should be surveyed to confirm ecological values if they are located in areas affected by any possible relocation. These include areas mapped as:

    a. potential box-gum woodland;

    b. potential natural temperate grassland;

    c. unconfirmed pink-tailed worm lizard habitat; and

    d. areas mapped as potential swift parrot and superb parrot habitat outside of confirmed box-gum woodland areas.

    Other matters as discussed in **Section 2.2** may also occur in these areas, and should also be surveyed for in suitable habitat to confirm ecological values.

2. areas identified as gaps in heritage information should be surveyed and assessed to identify heritage values if they are located in preferred option areas;

3. areas identified as heritage constraints should be avoided;

4. if there is potential for any heritage sites/areas to be disturbed as part of preferred options for relocating existing 132kV overhead transmission lines further advice should be sought from the ACT Heritage Council and consultation undertaken with the RAOs as to determine an appropriate management strategy (refer to **Section 5.3**); and

5. should existing 132kV overhead transmission lines be relocated, it is recommended to prepare and implement a Construction Environmental Management Plan (CEMP) to ensure that construction operations do not adversely affect adjacent ecological and heritage values, release contaminants or otherwise adversely affect the environment.

8.0 References

ACT Government (2004). *Heritage Act 2004*. [URL Accessed 02/2014: http://www. legislation.act.gov.au/a/2004-57/current/pdf/2004-57.pdf. February 2013].

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D Chaston 2014, ACT Heritage Council pers.comm. 5 June 2014.

APPENDIX 1

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