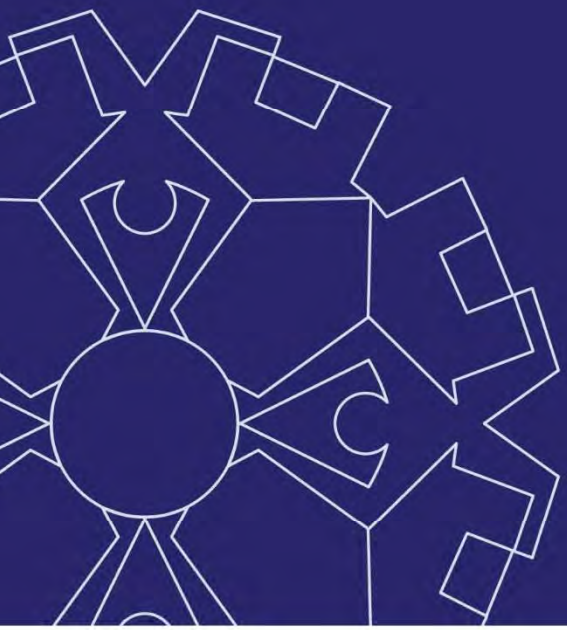
PLANNING PROPOSAL
AMENDMENT TO TEMORA LOCAL ENVIRONMENTAL PLAN 2010

PREPARED FOR

NSW SPORTING SHOOTERS ASSOCIATION

NOVEMBER 2017



PLANNING PROPOSAL

AMENDMENT TO TEMORA LOCAL ENVIRONMENTAL PLAN 2010

PROPOSED ADDITIONAL PERMITTED USE FOR RECREATION FACILITY (OUTDOOR) – SPORTING SHOOTERS FACILITY

– PART LOT 941 DP 130014

PREPARED FOR:

NSW SPORTING SHOOTERS ASSOCIATION

NOVEMBER 2017

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Report Title:	*Planning Proposal*
Project:	*Amendment to Temora Local Environmental Plan 2010*
Client:	*NSW Sporting Shooters Association*
Report Ref.:	*217381_PP_001C.docx*
Status:	*Final*
Issued:	*17 November 2017*

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

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ABBREVIATIONS

Abbreviation	Full Name
PP	Planning Proposal
DP&E	NSW Department of Planning and Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
SEPP	State Environmental Planning Policy
LEP	Local Environmental Plan
AHD	Australian Height Datum
LGA	Local Government Area

Background

1.1 INTRODUCTION

Geolyse has been commissioned by the NSW Sporting Shooters Association to prepare a planning proposal to amend the *Temora Local Environmental Plan 2010* (LEP) to add an additional permitted use to Schedule 1 of that plan to enable development of a recreation facility (outdoor) at proposed Lot 2 located in the eastern extent of existing Lot 941 DP130014 for the purposes of establishing a sporting shooters facility.

Lot 941 is located within the RU1 – Primary Production zone pursuant to the LEP and recreation facilities (outdoor) are prohibited in the RU1 zone.

A recreation facility (outdoor) is defined as:

> *recreation facility (outdoor) means a building or place (other than a recreation area) used predominantly for outdoor recreation, whether or not operated for the purposes of gain, including a golf course, golf driving range, mini-golf centre, tennis court, paint-ball centre, lawn bowling green, outdoor swimming pool, equestrian centre, skate board ramp, go-kart track, rifle range, water-ski centre or any other building or place of a like character used for outdoor recreation (including any ancillary buildings), but does not include an entertainment facility or a recreation facility (major).*

Concurrently to the preparation of this planning proposal, a development application has been prepared for the proposed subdivision of the site to form two lots, together with the proposed use of proposed Lot 2 as a sporting shooters facility, incorporating car parking, an amenities building, a club house, a combined pistol and rifle range, walk through sporting clay ranges, a primitive camp site and an archery range. All of these uses, excluding a primitive camp site, are currently prohibited in the RU1 zone on the basis that they satisfy the definition of a recreation facility (outdoor). Proposed Lot 1 will remain in use for primary production purposes.

Section 72J of the *Environmental Planning and Assessment Act 1979* states:

> *Nothing in this Act prevents:*
>
> *(a) the making of a development application to a consent authority for consent to carry out development that may only be carried out if an environmental planning instrument applying to the land on which the development is proposed to be carried out is appropriately amended, or*
>
> *(b) the consideration by a consent authority of such a development application,*
>
> *subject to this Division.*

On the basis of the above, this planning proposal is supplied in conjunction with a DA to develop the land.

Intent and Provisions

2.1 OBJECTIVE

To enable the development of a recreation facility (outdoor) to be utilised for the purpose of a small scale sporting shooters facility on proposed Lot 2, formed of the eastern extent of existing Lot 941 DP130014, Schlunkes Road, Reefton within the Temora Local Government Area (LGA).

2.2 EXPLANATION OF PROVISIONS

This is simple planning proposal to amend Schedule 1 of the LEP to include proposed Lot 2 Lot 941 DP130014 as an additional permitted use on which the carrying out a recreation facility (outdoor) is permissible with consent. Schedule 1 would be amended as follows (proposed text in red):

Schedule 1 Additional permitted uses

(Clause 2.5)

1 Use of certain land at Narraburra Street, Temora

(1) This clause applies to all lots at Narraburra Street, Temora that are within Zone IN1 General Industrial.

(2) Development for the purpose of a dwelling house is permitted with consent, if:

(a) the consent authority is satisfied that the design and siting of the proposed development is unlikely to interfere with the residential amenity of Narraburra Street, and

(b) the dwelling house is on the same lot as an industrial use that is being carried out and that is permitted in the zone, and

(c) the lot has frontage to Narraburra Street, and

(d) the setback of the dwelling house does not exceed 50m.

2 Use of certain land at Schlunkes Road, Reefton

(1) This clause applies to part Lot 941 DP130014 identified as "2" on the Additional Permitted Uses Map.

(2) Development for the purposes of a recreation facility (outdoor), consisting of a small scale sporting shooters facility and ancillary facilities, is permitted with development consent

Justification

3.1 NEED FOR THE PLANNING PROPOSAL

A planning proposal is required as an amendment to Schedule 1 of the LEP is proposed including the inclusion of an Additional Permitted Uses Local Environmental Plan map (refer **Drawings**).

This is an administrative change proposed to enable the development of a sporting shooters facility at proposed Lot 2 located at the subject site. The site is located within the RU1 zone and recreation facilities (outdoor) are currently prohibited. A sporting shooters facility is considered to satisfy the definition of a recreation facility (outdoor).

It is understood Temora Council intend to undertake a housekeeping amendment to the LEP and that the development of a recreation facility (outdoor) within the RU1 zone would be made permissible with consent. However, the timing of this amendment is unable to be confirmed. The NSW Sporting Shooters Association seeks to develop the site for this purpose and as such have agreed with Council and regional Department of Planning & Environment staff that the most timely solution is for the preparation of a concurrent planning proposal to amend Schedule 1 and preparation of a development application for the development of the land as a sporting shooters facility.

It is expected that the additional permitted use proposed via this amendment would be removed as an element of the future housekeeping amendment on the basis that the proposed change to the RU1 land use table to permit recreation facilities (outdoor) would render the additional permitted use unnecessary.

3.2 RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

The proposed amendment is enable a specific development on the subject site. It is not linked specifically to the Temora strategic planning framework.

A review of environmental planning instruments (EPI) applying to the site identifies the following state planning policies as relevant:

Table 3.1 – Review of applicable SEPPs

State Environmental Planning Policy	Assessment
State Environmental Planning Policy 21 – Caravan Parks	The development is consistent with SEPP21 on the basis that it proposes to provide a primitive camp site on the land. The proposal is consistent with the objectives of the SEPP.
State Environmental Planning Policy No. 44 – Koala Habitat Protection	The LGA of Temora is not listed in Schedule 1 of SEPP44 and SEPP44 is therefore not applicable.
State Environmental Planning Policy No. 55 – Remediation of Land	SEPP55 seeks to ensure that the potential contamination status of land is considered at rezoning stage (cl.8). A site walkover and review of historic land uses has confirmed that the site is not considered contaminated and as such remediation is not required. SEPP55 is therefore not further applicable.
State Environmental Planning Policy (Rural Lands) 2008	The Rural Lands SEPP seeks to ensure that proposal land use sin the rural zone are compatible with the prevailing primary production use of the land. The subject site is not currently utilised for any purpose and the proposed shooting range would not inhibit or impact on the continued primary production use of adjacent land. The proposal supports primary production use by providing enhanced recreation opportunities for residents.
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	The site is affected by Exploration Licence 8613 and as such the Mining SEPP can be considered to have applicability by reference to clause 2(b). The proposal involves minor impacts to the land in the context of the scale of the site and does not preclude the future use of the site for mining or extractive purposes.

On the basis of the above, it is confirmed that the planning proposal does not conflict with the principles of any EPI.

A review of the Section 117 Ministerial Directives identifies that the planning proposal has the potential to be affected by six directions; these are:

- Directive 1.2 - Rural zones;
- Directive 1.5 – Rural Lands
- Directive 3.2 – Caravan Parks and Manufactured Home Estates;
- Directive 3.6 – Shooting Ranges;
- Directive 4.4 – Planning for Bushfire Protection; and
- Direction 5.10 – Implementation of Regional Plans.

3.2.1 DIRECTIVE 1.2 – RURAL ZONES

The objective of this direction is to protect the agricultural production value of rural land.

A planning proposal must:

(a) not rezone land from a rural zone to a residential, business, industrial, village or tourist zone.

(b) not contain provisions that will increase the permissible density of land within a rural zone (other than land within an existing town or village).

This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural zone (including the alteration of any existing rural zone boundary).

The planning proposal affects land that is within a rural zone and therefore the directive is applicable.

A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are:

(a) justified by a strategy which:

(i) gives consideration to the objectives of this direction,

(ii) identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and

(iii) is approved by the Director-General of the Department of Planning, or

(b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or

(c) in accordance with the relevant Regional Strategy or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or

(d) is of minor significance.

Given the nature of the proposal, and the Council's stated intent to update the LEP to provide for the carrying out of recreation facilities (outdoor) in the rural zone, the planning proposal is considered to be of minor significance and is therefore consistent with the above terms.

3.2.2 DIRECTION 1.4 – RURAL LANDS

The objectives of this direction are to:

(a) protect the agricultural production value of rural land,

(b) facilitate the orderly and economic development of rural lands for rural and related purposes.

This direction applies when:

> *(a) a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural or environment protection zone (including the alteration of any existing rural or environment protection zone boundary) or*
>
> *(b) a relevant planning authority prepares a planning proposal that changes the existing minimum lot size on land within a rural or environment protection zone.*

The planning proposal affects land zoned RU1 but does not affect zone boundaries or amend minimum lot sizes.

The substantive effect of the change would be to allow for the carrying out of a recreation facility (outdoor) on a specific parcel of land. By virtue of the assessments carried out in the preparation of this planning proposal, the proposal would not affect the usability of adjacent land nor affect the capacity of surrounding land to continue to be used for a productive primary production purpose.

A planning proposal must be substantially consistent with the following terms of the direction:

> *A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are:*
>
> *(a) justified by a strategy which:*
>
> *i. gives consideration to the objectives of this direction,*
>
> *ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites, and*
>
> *iii. is approved by the Director-General of the Department of Planning and is in force, or*
>
> *(b) is of minor significance.*

The planning proposal is considered to be of minor significance and is therefore consistent with the above terms.

3.2.3 DIRECTIVE 3.2 – CARAVAN PARKS AND MANUFACTURED HOME ESTATES

This direction applies to development seeking to provide for caravan parks and manufactured home estates. The objectives of the directive are:

> *(a) to provide for a variety of housing types, and*
>
> *(b) to provide opportunities for caravan parks and manufactured home estates.*

As this planning proposal does not specifically relate to the rezoning of land to facilitate (or prohibit) the use of land for the purposes of a caravan park or manufactured home state, this direction is not considered to be explicitly relevant to this project.

SEPP21 enables the use of a portion of the land as a primitive camp site subject to the gaining of development consent, including the need to demonstrate compliance with the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 (LG Regs). This would be addressed via a separate DA.

3.2.4 DIRECTIVE 3.6 – SHOOTING RANGES

Directive 3.6 applies when a planning proposal is prepared that will:

> *.. affect, create, alter or remove a zone or a provision relating to land adjacent to and/ or adjoining an existing shooting range.*

As the subject application relates to development of a new shooting range, and not affecting land near an existing shooting range, the directive is not considered to be directly applicable to the project.

3.2.5 DIRECTIVE 4.4 – PLANNING FOR BUSHFIRE PROTECTION

This directive applies where a planning proposal is prepared that relates to, or is close proximity to, land that is mapped as bush fire prone. The subject site is mapped as bush fire prone land and therefore the directive applies.

In the event the directive applies, the following requirements apply to the preparation of a planning proposal:

> *(4) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made,*
>
> *(5) A planning proposal must:*
>
> *(a) have regard to Planning for Bushfire Protection 2006,*
>
> *(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and (c) ensure that bushfire hazard reduction is not prohibited within the APZ.*
>
> *(6) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:*
>
> *(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:*
>
> *(i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and*
>
> *(ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,*
>
> *(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,*
>
> *(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,*
>
> *(d) contain provisions for adequate water supply for firefighting purposes,*
>
> *(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,*
>
> *(f) introduce controls on the placement of combustible materials in the Inner Protection Area.*

Consultation would be expected to be carried out with the RFS post receipt of a Gateway determination.

The provisions of PBFP, together with the relevant matters outlined at (6)(a)-(f) of the directive, are considered in **Section 3.3** of this planning proposal.

A planning proposal may be inconsistent with this directive only where:

> *the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service, to the effect that, notwithstanding the noncompliance, the NSW Rural Fire Service does not object to the progression of the planning proposal*

By reference to the information provided within **Section 3.3**, the planning proposal is considered to be generally compliant with the objectives and specific provisions of the directive. Consultation with the RSF would ensure that all matters are adequately addressed to the satisfaction of the RFS. The concurrent subdivision would require consideration against the provisions of 100B of the Rural Fires Act 1997 and this would provide further confidence as to the suitability of the site for the proposed purpose and the general compliance with PBFP.

3.2.6 DIRECTION 5.10 – IMPLEMENTATION OF REGIONAL PLANS

Direction 5.10 seeks to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans.

The direction applies to land to which a Regional Plan has been released by the Minister of Planning.

The Riverina Murray Regional Plan 2036 (RMRP) applies to the Temora LGA and therefore to the subject site.

The RMRP notes the following specific objectives for the Temora LGA:

- *Support the ongoing growth opportunities presented by agriculture and value-add manufacturing.*
- *Take advantage of tourism opportunities, focusing on heritage, aviation, agriculture, sport and recreation.*
- *Provide facilities, services and housing options to support diverse community needs, including for seniors.*
- *Grow awareness, appreciation and enjoyment of the shire's natural environment.*

The proposal is not considered to be antipathetic to these objectives.

The vision of the RMRP is to provide:

> *A diversified economy founded on Australia's food bowl, iconic waterways and a network of vibrant connected communities.*

This vision is supported by the following goals:

- *A growing and diverse economy*
- *A healthy environment with pristine waterways*
- *Efficient transport and infrastructure networks*
- *Strong, connected and healthy communities*

Each of the above goals is supported a range of specific directions. The following directions are considered to be applicable to the proposal:

Table 3.2 – Riverina Murray Regional Plan 2036

Direction	Comment
Goal 1	
1. Protect the region's diverse and productive agricultural land	The proposal does preclude or impact on the continued use of the surrounding land for primary production purposes. The proposal makes use of currently un-utilised land that is not viable for primary production purposes.
2. Promote and grow the agribusiness sector	The proposal diversifies activities in the rural zone and provides for a land use that supports surrounding primary production activities.
7. Promote tourism opportunities	The proposal provides for tourism opportunities by encouraging visitors to the region.
Goal 2	
15: Protect and manage the region's many environmental assets	The proposal enables the protection of environmental features through careful design and effective integration. Specialist studies confirm that the proposal would not lead to degradation of environmental features.
16: Increase resilience to natural hazards and climate change	The proposed development makes effective use of land that is currently underutilised. Natural hazards can be managed to ensure the safety of users. The nature of the use means that, in the event of a hazard event, such as a bushfire, use of the site would be abandoned, thus ensuring patron safety, but with minimal impacts to the facility.
Goal 3	
22: Promote the growth of regional cities and local centres	By providing a further tourism drawcard for the region, Temora as a local centre is supported and growth is encouraged.

Table 3.2 – Riverina Murray Regional Plan 2036

Direction	Comment
23: Build resilience in towns and villages	Diversity builds resilience.
29: Protect the region's Aboriginal and historic heritage	A due diligence assessment confirms that the development is unlikely to lead to detrimental impacts to Aboriginal heritage

Source: Riverina Murray Regional Plan 2036

The proposal is considered to be generally consistent with the vision and goals of the regional plan and is therefore considered to be consistent with this directive.

3.3 ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACTS

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, would be adversely affected as a result of the proposal?

An ecological assessment of the site has been completed by OzArk to investigate the above matters.

OzArk determined that the site contains one mapped area of Endangered Ecological Communities (EEC) in the north-western corner of the subject site, as mapped in Figure 3-6 of **Appendix C**. The EEC comprises the Inland Grey Box Woodland. The development has been designed to avoid impact to the Inland Grey Box Woodland and as such there will be no significant impact to this EEC.

Eighteen threatened fauna species were identified as having potential to occur within the study area. No threatened fauna species were recorded within the study area. Eleven native fauna species and two invasive species were identified during the field survey.

The design of the development has minimised the potential impact to biodiversity by:

- Minimising the size and extent of access roads and car parks.
- Clustering the club house and amenities buildings with the proposed shooting ranges.
- Designing the proposed shooting ranges over the previously quarried area to minimise vegetation removal.

A range of suitable mitigation measures are proposed by OzArk to ensure the development does not result in significant or unreasonable impacts. These are outlined in

By virtue of this assessment, Council and DP&E can be satisfied that the proposal would not result in adverse impacts to critical habitat or threatened species, populations or ecological communities, or their habitats.

Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

Other potential environmental impacts associated with the project are related to:

- Potential noise impacts due to the nature of the use;
- Potential impacts to sites of Aboriginal heritage significance due to disturbance of the land;
- Hazard associated with the bush fire prone nature of the land; and
- The potential for contamination associated with the use of bullets and shotgun cartridges.

Specialist assessments of each of the above matters have been prepared and provide confidence that the specific potential impacts are manageable and that any residual risks can be appropriately managed. Specifically:

- In relation to noise:
  - Noise and Sound Services have prepared a Noise Impact Assessment (**Appendix A**) which included the acoustic testing of a variety of firearms/calibres at the site on 5 July 2017, representative of 'reasonable worst-case' types that will be used at the proposed site. The report concluded (in part) that:

    It is concluded that the sound level at the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666 will meet the NSW EPA guideline for noise compliance as given in the Application Note entitled "Target Shooting Ranges: Application Note for Assessing Noise Compliance" (2015), for two or three day per week. This is based on the open field firing. Alternatively for five day per week based on the successful construction of firing line structures as described in Section 6 above.
  - On the basis of the above, it is proposed that the range area would be designed to satisfy the requirements of Section 6 of the Noise and Sound Services NIA and would therefore be used up to five days per week and one night per week. Sporting clay areas would be used no more than three days per week. An operational management plan would be prepared post receipt of development consent setting out these restrictions which would be adhered to by the operators.
- In relation to Aboriginal heritage:
  - A due diligence assessment of the site by OzArk Pty Ltd (**Appendix B**) confirms that the site does not contain any Aboriginal sites or sensitive landforms by virtue of the site inspection carried out on the 15-16 June 2017, and provides the following outcome:

    AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH (Office of Environment and Heritage). If human remains are found, stop work, secure the site and notify NSW Police and OEH.

    The OzArk report makes the following recommendations which would be adopted during construction:

    1) *The proposed work may proceed within the study area without further archaeological investigation under the following conditions:*

       All land and ground disturbance activities must be confined to within the study area. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.

       All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.
    2) *This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. However, during the course of works, if Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the Unanticipated Finds Protocol (Appendix 2) should be followed;*
    3) *Work crews should undergo cultural heritage induction to ensure they recognise Aboriginal artefacts (see Appendix 3) and are aware of the legislative protection of Aboriginal objects under the NPW Act and the contents of the Unanticipated Finds Protocol.*

    On the basis of the above, Council and DP&E can be satisfied that the obligations with respect to Aboriginal heritage are satisfied and the development may proceed with caution, subject to the adoption of the above recommendations.
- In relation to bush fire management:
  - Geolyse has completed an assessment of the site in relation to the provisions of Section 79BA of the EP&A Act, the requirements of the Rural Fire Service document *Planning for Bush Fire Protection 2006* (PBFP), the 2010 review of Appendix 3 to PBFP and Clause 44 of the Rural Fires Regulation 2013. The following recommendations are identified and would be incorporated into the final design:

- Implementation of a fuel managed area of not less than 100 metres surrounding all buildings;
- Provision of a 20 metre wide fuel management corridor to each side of the main access road;
- Management of the entirety of the proposed primitive camp site as an APZ inner protection area;
- Provision of a 50 metre APZ around the primitive camp site, managed as an inner protection area by reference to the above.
- Construction of the clubhouse in accordance with Section 3 and 5 of AS3959-2009 (BAL 12.5);
- Construction/upgrade of the main access road (connecting as far as the club house and initial car parking area) to a minimum width of 6.5 metres with a carrying capacity of 28 tonnes gross vehicle mass;
- Provision of internal access roads with a minimum width of 4 metres with a carrying capacity of 15 tonnes GVM together with a 10 metre wide fuel management corridor to each side of the road;
- Portable Fire Extinguishers shall be installed in accordance with A.S. 2444 – 2004.
- Overhead electrical transmission lines are to be installed with short pole spacing and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia – NS179 – 2002.
- Bottled gas is installed and maintained in accordance with A.S. 1596. Metal piping is to be used. Release valves are to be directed away from the building/s and at least 2 metres from any combustible material.

- In relation to contamination:
  - Geolyse' environmental scientist conducted a review of historical information in relation to the site together with a site walkover on the 19 July 2017. As a result of these investigations it was concluded that the use of the subject site appears to be limited to quarrying activity and some use in conjunction with primary production activities (such as grazing of stock). This research and site walk over did not reveal any indications of likely site contamination requiring remediation. It is concluded that the site is suitable to accommodate the proposed land use without the need for remediation. Consideration of the contamination status pursuant to the requirements of clause 6 of SEPP55 has been adequately completed. The obligations of SEPP55 are therefore adequately satisfied.
- In relation to future or ongoing contamination associated with the proposed use due to spent firearm cartridges/casings it is concluded that the risk of leaching of heavy metals from the bullet-catchers and range areas is considered to be low. Adopting the management approaches provided in the management plan will further reduce such risks to negligible and acceptable levels. The recommendations noted in Table 5.1 of the **Appendix D** would therefore be adopted.

By virtue of the above, impacts associated with the proposal are considered manageable.

Social and economic impacts would be positive by virtue of providing a viable land use that is both an enhancer for local users and an attractor of tourists to the region.

3.4 STATE AND COMMONWEALTH INTERESTS

It is not considered that the minor change proposed via this planning proposal would conflict with any State or Commonwealth interests. The views of State and commonwealth public authorities would be ascertained via the Gateway Determination.

Community Consultation

4.1 TYPE OF COMMUNITY CONSULTATION REQUIRED

Given the minor nature of the proposal, and the relative localised nature of any impacts, it is considered that the planning proposal is a low impact proposal and that a public exhibition period of 14 days is required. It is recommended that the planning proposal be publically exhibited for 14 days via the local newspaper and/or the Council's website, and via targeted correspondence to neighbouring properties.

References

NSW Department of Planning & Environment (DP&E). 2016a, *A Guide to Preparing Local Environmental Plans*, DP&E, Sydney.

NSW Department of Planning & Environment (DP&E). 2016b, *A Guide to Preparing Planning Proposals*, DP&E, Sydney.

Drawings

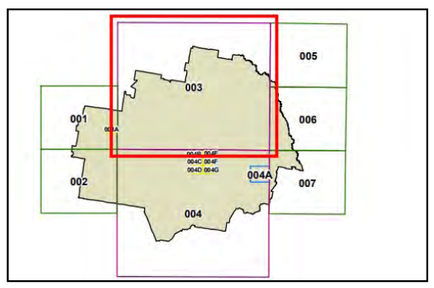
Temora Local Environmental Plan 2010

Additional Permitted Uses Map - Sheet APU_003

2 Additional Permitted Uses

Cadastre

Cadastre 13/11/2017 © LPI



N

0 2 4 6 8 km

Scale: 1:160,000 @ A3

Projection: GDA 1994
MGA Zone 55

Map identification number: 7350_COM_UPA_003_160_20171113

2

Appendix A

NOISE IMPACT ASSESSMENT

Noise and Sound Services

Noise Impact Assessment for the Proposed Temora Shooting Complex 217381

At Schlunkes Road, Reefton NSW 2666.

September 2017

Report No. nss 22639 – Final – Rev A

Prepared at the request of:-

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C O N T E N T S

EXECUTIVE SUMMARY

A noise assessment for the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666 has been carried out. The noise assessment is to provide an independent and accurate assessment of the suitability of the site for a shooters complex when compared to NSW Environment Protection Authority (EPA) guidelines.

The proposed site at Temora Shooting Complex is approximately 20 km northeast of Temora and the nearest residential premsies are approximately 2.4 kilometres from the proposed shooting area.

Proposed are a variety of firearms and calibres to be used. However exactly what will be used depends upon limitations placed on the range by the NSW Police Firearms Registry. The rifle and shotgun tested on Wednesday 5th July 2017 are representative of 'reasonable worst-case' types that will be used at the proposed site.

The NSW EPA has developed guidance to assist consent authorities when determining compliance with consent requirements as detailed below. There is no obligation for a consent authority to use the approach below and compliance assessment requirements should be confirmed with the consent authority. The number of days and nights the range is under usage is limited; to correspond with the measured Peak hold (linear i.e. - L_Z Peak) at the most affected residential boundary.

Freefield noise measurements were taken at three locations two on the site, at approximately 400 to 600, 1000 and one at the nearest residential premises, 2400 metres from the shoot. At the nearest residential premises the shots were audible and measureable, during lulls in the wind conditions, as the ambient background in the area is very quiet. The average measured gunshot sound pressure levels (L_Z Peak) were 82 dB for the rifle and 76 dB for the shotgun.

It is concluded that the sound levels at the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666 will meet the NSW EPA guideline for noise if the number of days per week are limited. According to the NSW EPA guidelines, the number of days the range is under usage should be limited to two to four days per week and night firing is not permitted. If the construction of a firing line structure is carried out, the number of days for rifle fire could be increased, possibly to five days per week.

1. INTRODUCTION

Noise and Sound Services was requested by Sporting Shooters Association of Australia (NSW) Inc of PO Box 1001, St Marys, NSW 1790 to carry out a noise assessment for the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666.

The purpose of the noise assessment is to provide an independent and accurate assessment of the suitability of the site for a shooters complex when compared to NSW Environment Protection Authority (EPA) guidelines.

2. SITE AND DEVELOPMENT DESCRIPTION

2.1 Site Description

The proposed site at Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666 is approximately 20 km north of Temora, an approximate 15 minutes drive.

Figure 1: Site Location (Source: Google Earth).

The nearest residential premsies are Trungley Hall 346 Gidginbund Road which is approximately 2.4 kilometres from the proposed shooting area as shown in Figure 1 above.

2.2 Development Use

A variety of firearms and calibres are proposed to be used but exactly what will be used depends upon the limitations placed on the range by the NSW Police Firearms Registry. The firearms/calibres tested on Wednesday 5th July 2017 were therefore representative of 'reasonable worst-case' types that will be used at the proposed site.

Appendix A below shows three photos of locations – two show locations of the three firing points used and one with firing points and neighbouring residences. Appendix B below shows photos representing the two firearms used for the noise assessment.

Location and direction of fire –

- Rifle/pistol range firing was conducted at -34.26226, 147.512899 at a heading of 145°
- Shotgun location #1 firing was conducted at -34.263920, 147.514017 at a heading of 180°
- Shotgun location #2 firing was conducted at -34.266122, 147.511748 at a heading of 180°

Firearms used in noise assessment –

- Rifle/pistol range firing was conducted using a Centrefire rifle
    - Make: Marlin
    - Type: bolt action
    - Calibre: .270 win
    - Barrel length: 22"
    - Ammunition used –
        - Make: Browning
        - Bullet weight: 130gr

- Shotgun location #1 and location #2 firing was conducted using a shotgun
    - Make: Giuseppe Tonolini
    - Type: side by side break action
    - Calibre: 12 Gauge
    - Barrel length: 30"
    - Ammunition used –
        - Make: Winchester
        - Bullet weight: 28 gram
        - Shot size: 7.5

3. NOISE CRITERIA

The NSW Environment Protection Authority (EPA) has developed guidance to assist consent authorities when determining compliance with consent requirements as detailed below. There is no obligation for a consent authority to use the approach below and compliance assessment requirements should be confirmed with the applicable consent authority.

3.1 EPA 2015 Application Note

For a commissioning assessment, compliance is assessed against the noise prediction scenario included with the development consent application. This would typically be a 'reasonable worst-case' scenario, presented in a noise impact statement submitted in support of the application for approval.

For a range where a number of different calibre firearms could be fired from different locations within the range, the noise impact component of the environmental impact assessment might be based on noise levels for the operational combination of firearm calibre, ammunition and firing location for which the spread of the noise envelope results in the highest noise levels at potentially affected residential receiver locations.

Development consent or project approval from a consent authority for a shooting range may require a noise compliance assessment within a three or six-month time frame, from commencement of operations, to demonstrate that noise from operation of the range will not exceed a noise limit condition. Such a requirement is called a commissioning compliance assessment.

Development consent may be granted by a local government authority (Council) or the Department of Planning and Environment.

3.2 NSW EPA (1994) Noise Control Guideline

NSW EPA (1994) Noise Control Guideline, Target Shooting Ranges, Chapter 164, Environmental Noise Control Manual, EPA 94/31 ISBN 0 7310 1230 5. (Amended to reflect legislative changes).

The guideline specifies criteria for assessing the effect on nearby residences of pistol, rifle or gun club shooting ranges when the propellant is explosive. Criteria may be used for guidance and less stringent figures could be used if site details and topography are very favourable. Measurement should be made at the worst affected location and consideration should be given to any neighbouring vacant land zoned as residential. Air rifle and air pistol competitions are not covered as

the projectile is not propelled by an explosion. Such competitions are usually held indoors and seldom present a noise problem.

3.2.1 Time of Day Restrictions.

Daytime operation is considered as being from 10:00 am to 5:00 pm. Night operations normally extends from 5:00 pm to 10:00 pm. To cater for special events such as state or national championships or charity shoots, the EPA may consider an extension of the times on both nights in one weekend provided such events occur no more than two or three times a year.

3.2.2 Restricted Number of Days

Peak hold (linear i.e. - L_Z Peak) readings are taken at the most affected residential boundary. The number of days and nights the range is under usage should be limited to correspond with the measured levels as shown in Table 1 below.

TABLE 1: RECOMMENDED NUMBER OF DAYS AND NIGHTS OF RANGE USAGE CORRESPONDING TO SHOOTING NOISE LEVEL.

	Residential level (linear (L_Z Peak) hold, decibels)										
	60	65	70	75	80	85	90	95	100	105	over 105
	Maximum usage days (nights) per week										
Future range daytime use	7	5	5	4	3	2	1	_	_	_	_
Future range night-time use	3	2	1	_	_	_	_	_	_	_	_

4. NOISE MEASUREMENTS

4.1 Instrumentation

The instrumentation used during the noise source survey consisted of three Brüel and Kjær sound level meters model 2250 (serial numbers 3011239, 3008564 and 2685757). These meters conform to Australian Standard AS IEC 61672.1-2004 : '*Electroacoustics - Sound level meters – Specifications*' as class 1 precision sound level meters and have an accuracy suitable for both field and laboratory use. The calibration of the meters was checked before and after the measurements with a Brüel and Kjær acoustical calibrator model 4231 (serial no. 3011545). No significant system drift occurred over the measurement period.

The sound level meters were checked, adjusted and aligned to conform to the Brüel and Kjær factory NATA specifications and issued with conformance certificates within the last 24 months as required by the regulations. The internal test equipment used is traceable to the National Measurement Laboratory at C.S.I.R.O., Lindfield, NSW, Australia.

The calibrators were checked, adjusted and aligned to conform to the Brüel and Kjær factory NATA specifications and issued with conformance certificates within the last 12 months as required by the regulations. The internal test equipment used is traceable to the National Measurement Laboratory at C.S.I.R.O., Lindfield, NSW, Australia.

4.2 Measurement Procedure

The acoustical measurements were carried out in accordance with Australian Standards AS 1055. 'Acoustics –Description and Measurement of Environmental Noise', (1997) and EPA 2015 Application Note entitled "*Target Shooting Ranges: Application Note for Assessing Noise Compliance.*"

The measurements were carried out on Wednesday 5th July 2017. The 'Z' frequency weighting and 'Peak' time weighting were used exclusively. The weather was mild and sunny with mostly negligible wind during measurement periods. There was however occasional wind gusts averaging 1.5 m/s.

Figure 2: Photograph of the Site Location.

Freefield noise measurements were taken on the site at a distance of approximately 400 metres and 1000 metres from the shoot and at the entrance gate to the nearest residential premises to the proposed shooting complex being 'Trungley Hall' 346 Gidginbund Road at approximately 2400 metres. At the nearest residential premises the shots from the Marlin bolt action .270 rifle were audible and measureable when there was a quiet ambient background.

The microphones used to measure the noise was placed at a height of approximately 1.4 metres above ground level and fitted with a windscreen according to the manufacturer's specification for outdoor measurements. The microphones were placed at least 5 metres from any sound reflecting surface other than the ground as shown in Figure 2 above.

4.3 Measurement Results

The arithmetical average sound level (L_Z Peak) from the firearm shots was 82 dB for the rifle and for the shotgun at the nearest residential a premises (approximately 2400 metres). Full measurements details are given in Appendix C below.

4.4 Peak Sound Levels

It is very important to note that peak sound levels are very different to maximum sound levels which are based on a root-mean-squared (rms) level. The difference is normally between 10 to 30 dB with an average of about 20 dB as shown in Table 2 below. A very quiet outdoor rural environment where the background ($L_{AF\ 90}$) would be 25 dB and a maximum (L_{AF} max) of 30 dB, would still be difficult to measure a peak sound levels (L_Z Peak) of less than 60 dB.

The noise level (L_Z Peak) of an average sized truck was previously measured at 102 dB at a distance of 10 metres and a car passing was 92 dB. These and other examples are shown in Table 2 below.

TABLE 2: EXAMPLES OF TYPICAL NOISE LEVELS - COMPARISON OF PEAK WITH MAXIMUM LEVELS.

Area	Indoors/ outdoors	L_Z Peak (dB)	L_{AF} max (dB)	Difference (dB)
Quiet Office/Home	indoors	60	30	30
Quiet Outdoor Area	outdoors	75	50	25
Computer Keyboard	indoors	82	58	24
TV at Normal Volume	indoors	82	64	18
Normal Speech at 1 metre	indoors	84	69	15
Car bypass at 10 metres	outdoors	92	74	18
Raised Speech at 1 metre	indoors	92	78	14
Truck bypass at 10 metres	outdoors	102	84	18
Loud Shout at 1 metre	indoors	108	97	11
Average Difference				19

5. NOISE SOURCE MODELS

This section provides details of the calculations used for predicting noise levels and the resulting noise levels at the nearest residential boundaries.

5.1 Noise Modelling Specifications

The source noise has been modelled using the International Standard ISO 9613-2 (1996(E)) '*Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation'*. This Standard specifies methods for the description of noise outdoors in community environments. The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of attenuation. The method allows for downwind propagation conditions namely:-

- wind direction within an angle of ± 45° of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and
- wind speed between approximately 1 m/s and 5 m/s measured at a height of 3 to 11 metres above the ground.

5.2 Basic Noise Modelling Equations

The equivalent continuous downwind sound pressure level (L_{Aeq}) at each receiver point has been calculated for each point source using the equation below:-

$$\mathbf{L_{Aeq} = L_w + D_c - A}$$

Where:
- L_w is the sound power level of the noise source;
- D_c is directivity correction; and
- A is the attenuation that occurs during the propagation from source to receiver.

The attenuation term A in the equation above is given by:-

$$\boldsymbol{A = A_{div} + A_{atm} + A_{gr} + A_{bar} + A_{misc}}$$

Where:
- A_{div} is the attenuation due to geometric divergence;
- A_{atm} is the attenuation due to atmospheric absorption;
- A_{gr} is the attenuation due to the ground effects;
- A_{bar} is the attenuation due to a barrier; and
- A_{misc} is the attenuation due to miscellaneous other effects.

5.3 Noise Models

Based on the on-site firearm sound measurements and the above formulae and site firing locations as shown in Figure 3 below, sound levels with distance are predicted as given in Figure 4 below.

Figure 3: Site Location with Firing Locations.
(Source: Google Earth).(See Appendix A below for Additional Views)

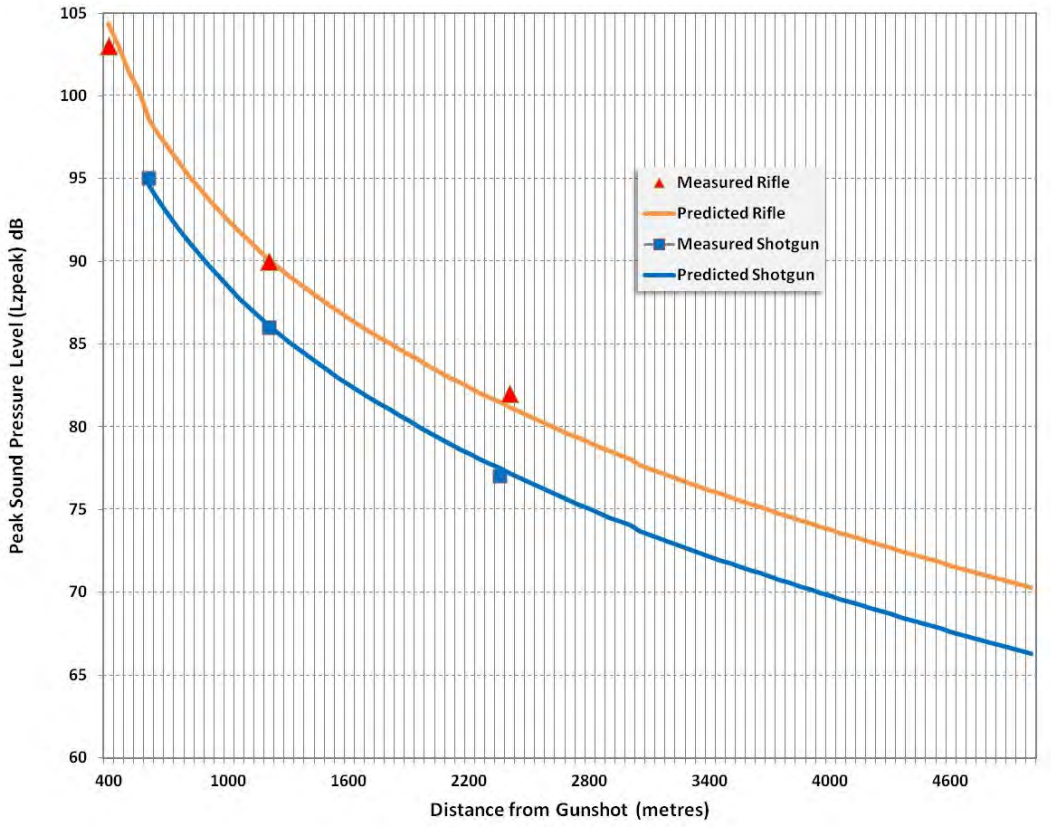

Figure 4: Prediction of Sound Level (L_Z Peak) with Distance based on the International Standard ISO 9613-2 (1996(E)) and on site Measurements.

6. SOUND LEVEL ASSESSMENT

Based on the open field, on-site measurements, subjective assessment and the predicted model, the firearm sound level (L_Z Peak) will not exceed 85 dB at any residential premises during the operation of the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666. According to the NSW EPA guidelines, the number of days the range is under usage should be limited to three per week (see Table 2 above) and night firing is not permitted.

However, if range structures are proposed to be constructed and if the firing line structure is designed to mitigate sound issues with solid (tilt up concrete) walls with internal baffing with sound absorbent material, a concrete slab floor and a solid roof, the number of days the range is under usage should, then be limited to five per week (see Table 2 above) and one night firing per week. This is according to the NSW EPA guidelines.

7. CONCLUSIONS

It is concluded that the sound level at the proposed Temora Shooting Complex 217381 at Schlunkes Road, Reefton, NSW 2666 will meet the NSW EPA guideline for noise compliance as given in the Application Note entitled "*Target Shooting Ranges: Application Note for Assessing Noise Compliance"* (2015), for two or three day per week. This is based on the open field firing. Alternatively for five day per week based on the successful construction of firing line structures as described in Section 6 above.

Status	**Date**	**Prepared by:**
Draft	19th July 2017	Ken Scannell MSc MAAS
Status	**Date**	**Prepared by:**
Final	31st July 2017	Ken Scannell MSc MAAS
Status	**Date**	**Prepared by:**
Final- Rev A	23rd September 2017	Ken Scannell MSc MAAS

Important Note. *All products and materials suggested by 'Noise and Sound Services' are selected for their acoustical properties only. All other properties such as air flows, aesthetics, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, grout or tile cracking, loading, shrinkage, smoke, ventilation etc are outside of 'Noise and Sound Services' field of expertise and* ***must be*** *checked with the supplier or suitably qualified specialist before purchase.*

APPENDIX A – SITE LOCATIONS OF FIREARMS TESTED

Below are site plans showing firing locations (Source: Google Erath and Sporting Shooters Association of Australia (NSW) Inc)

APPENDIX B – PHOTOGRAPHS OF THE FIREARM TYPES TESTED

(Source: Sporting Shooters Association of Australia (NSW) Inc)

Figure B1. Marlin bolt action .270 win Barrel length: 22" Ammunition used Browning Bullet weight: 130gr.

Figure B2: Giuseppe Tonolini ***side by side break action Calibre: 12 Gauge Barrel length: 30" Ammunition used Winchester Bullet weight: 28 gram Shot size: 7.5.***

APPENDIX C– FIREARM SHOT COMPLIANCE ANALYSIS AND RESULTS

Inaudible shots by definition have been excluded from compliance analysis. Audible shots are classified as Category A or Category B.

A Category A shot is a clear shot that has a distinctive peak level which is markedly higher than the peak level immediately prior to, and sometimes after, the sound of the shot. It cannot be attributed to other sound such as a wind gust or extraneous noise. A peak level attributed to a Category A shot is considered to be an accurate measurement of the noise contribution from the shot.

A Category B shot is a shot that has a peak level that may have been elevated to some extent by a wind gust or extraneous noise. A peak level attributed to a Category B shot is considered to be an upper estimate of the contribution from the shot. However, shots that are clearly contaminated by extraneous noise such as birds, insects, dogs, near or far motor vehicles, aircraft, or the activities of the attendant operator such as rustling note paper or moving around on dry leaves or bark, were discarded.

If the difference between the last pre-shot L_Z Peak and the shot L_Z Peak is at least 3 dB the shot may be annotated as a Category A shot. If the difference between the shot L_Z Peak and the last pre-shot L_Z Peak is greater than zero but less than 3 dB then the shot is a Category B shot. Where there was no difference the measurement result was noted as not valid and a new measurement is commenced.

Full results are shown in Tables C1 to C6 below:-

TABLE C1. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. MARLIN BOLT ACTION, .275 CALIBRE RIFLE AT 2400 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	74, 78, 81	84	3	A
2	64, 70,78.4	78.6	0.2	B
3	76, 80, 81	81	0	Not Valid
4	71, 77	80	3	A
5	77, 80	82	2	B
6	75, 80	83	3	A
7	66, 69, 72	79	7	A
8	66, 71, 72	78	6	A
9	72, 77, 79	83	4	A
10	68, 71, 76	80	4	A
11	66, 67	79	10	A
12	73, 85	86	1	B
13	72, 75, 77	81	4	A
14	76, 77	77	0	Not Valid
15	69, 71, 73	81	8	A
16	74, 81	83	2	B
17	67, 70, 83	84	2	B
18	70, 77	80	3	A
19	74,77, 80	80	0	Not Valid
20	77, 79	83	4	A
21	76, 80, 81	84	3	A
22	72, 75, 77	83	6	A
23	66, 69,72	80	8	A
24	69, 73, 79	81	3	A
25	72, 75, 77	82	5	A
Total number of category A and B shots				**22**
Final noise level (arithmetic average of category A and B shots)				**82**

TABLE C2. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. SIDE BY SIDE BREAK ACTION, 12 GAUGE, GIUSEPPE TONOLINI SHOTGUN AT 2400 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	64, 67, 76	82	8	A
2	66, 71, 77	80	3	A
3	67, 72, 77	78	1	B
4	74, 76	78	2	B
5	67, 69	75	6	A
6	62, 70, 72	74	3	A
7	64, 69, 70	73	3	A
8	63, 70 , 71	72	1	B
9	69, 73, 76	79	3	A
10	72, 73, 75	77	2	B
11	71, 74, 76	84	8	A
12	69, 73, 77	79	2	B
13	65, 71, 76	77	1	B
14	69, 72, 73	73	0	Not Valid
15	72, 74	77	3	A
16	69, 70, 75	76	1	B
17	62, 67, 73	79	6	A
18	70, 71, 73	75	2	B
19	67, 68, 70	70	0	Not Valid
20	66, 67, 69	74	5	A
21	62, 64, 68	72	4	A
Total number of category A and B shots				**19**
Final noise level (arithmetic average of category A and B shots)				**76**

TABLE C3. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. MARLIN BOLT ACTION, .275 CALIBRE RIFLE AT 400 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	81, 84	101	17	A
2	77, 82	103	21	A
3	75, 78, 83	103	20	A
4	72, 73, 80	102	22	A
5	73, 79, 84	102	18	A
6	78, 83	104	21	A
7	79, 84, 95	104	9	A
8	75, 84, 86	106	20	A
9	95, 102	103	1	B
10	79, 80	104	24	A
11	82, 85, 93	101	8	A
12	70, 76	104	28	A
13	82, 89	103	14	A
14	76, 84	107	23	A
15	70, 75	104	29	A
16	69, 75, 77	105	28	A
17	75,79, 84	102	18	A
18	78, 89, 91	102	11	A
19	75, 77, 82	103	21	A
20	88, 90	101	11	A
21	81, 90	102	12	A
22	81, 85	103	18	A
23	84, 85	102	17	A
24	89, 91	104	13	A
25	78, 83, 88	108	20	A
Total number of category A and B shots				**25**
Final noise level (arithmetic average of category A and B shots)				**103**

TABLE C4. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. SIDE BY SIDE BREAK ACTION, 12 GAUGE, GIUSEPPE TONOLINI SHOTGUN AT 400 TO 600 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	82, 92	95	3	A
2	87, 89	92	3	A
3	84, 86, 89	95	4	A
4	77, 93	98	5	A
5	90, 93	97	4	A
6	85, 87	95	8	A
7	87, 92	92	0	Not Valid
8	81, 86, 102	102	0	Not Valid
9	89, 90	97	7	A
10	83, 85	90	5	A
11	84, 87	91	4	A
12	88, 91	92	1	B
13	78, 89, 93	95	2	B
14	88, 92	94	2	B
15	84, 86	89	3	A
16	80, 81	85	4	A
17	82, 85	88	3	A
18	72, 77, 86	87	1	B
19	78, 82, 83	85	2	B
20	67, 78, 81	86	5	A
21	69, 72, 84	86	1	B
Total number of category A and B shots				**19**
Final noise level (arithmetic average of category A and B shots)				**92**

TABLE C5. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. MARLIN BOLT ACTION, .275 CALIBRE RIFLE AT 1000 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	missed			Not Valid
2	missed			Not Valid
3	84, 89	93	4	A
4	76, 77, 79	82	3	A
5	83. 86	88	2	B
6	82, 85	87	2	B
7	87, 89	91	2	B
8	84, 86	89	3	A
9	83, 85	91	6	A
10	81, 84	86	2	B
11	82, 86	87	1	B
12	84, 87	92	5	A
13	88, 90	90	0	Not Valid
14	81, 83	88	5	A
15	81, 87	93	6	A
16	83, 84	87	3	A
17	78, 85	91	6	A
18	82, 84	87	3	A
19	80, 85	88	3	A
20	84, 87	90	3	A
21	81, 86	92	6	A
22	80, 86	88	2	B
23	76, 82	82	0	Not Valid
24	78, 82	84	2	B
25	77, 84	86	2	B
Total number of category A and B shots				**21**
Final noise level (arithmetic average of category A and B shots)				**89**

TABLE C6. RESULTS USING THE MANUAL METHOD TO ASSESS SHOT NOISE. SIDE BY SIDE BREAK ACTION, 12 GAUGE, GIUSEPPE TONOLINI SHOTGUN AT 1000 METRES.

Measurement Number	Pre-Shot Lz Peak	Shot Lz Peak	Shot /Pre-Shot Difference	Shot Category
1	84, 85	87	2	B
2	83, 85	88	3	A
3	82, 87	90	3	A
4	84, 87	91	3	A
5	85, 87	88	1	B
6	84, 86	88	2	B
7	78, 80	82	2	B
8	76, 81	82	1	B
9	86, 87	88	3	A
10	81, 83	84	1	B
11	83, 87	88	1	B
12	80, 82	85	3	A
13	79, 81	83	2	B
14	79, 80	85	5	A
15	84, 85	88	3	A
16	82, 85	88	3	A
17	81, 82	84	2	B
18	81, 85	88	3	A
19	79, 82	83	1	B
20	80, 83	87	4	A
21	79, 84, 86	88	1	B
Total number of category A and B shots				**21**
Final noise level (arithmetic average of category A and B shots)				**87**

APPENDIX D – GLOSSARY OF TECHNICAL TERMS

'A' Frequency Weighting – The most widely used sound level frequency filter is the A scale, which roughly corresponds to the inverse of the 40 dB (at 1 kHz) equal-loudness curve. Using this filter, the sound level meter is less sensitive to very high and, in particular, very low frequencies. Sound pressure level measurements made with this filter are commonly expressed as **dBA.**

Ambient Sound – The all-encompassing sound associated with that environment being a composite of sounds from many sources, near and far. Measured as an energy average ($L_{Aeq, T}$).

Background Noise Level ($L_{AF90, T}$) – A statistical parameter used for assessments of constantly varying noise levels. The L_{AF90} is the 'A' frequency weighted noise level that is exceeded for 90 % of the measurement period, 'T'. The measurement period is normally 15 minutes. The background noise is therefore the lowest noise level that occurs for 1.5 minutes in any 15 minute period.

Decibel (dB) – The logarithmic ratio of any two quantities and relates to the flow of energy (power). A scale used in acoustical measurement related to power, pressure or intensity. Expressed in dB, relative to standard reference values.

Energy Average Noise Level ($L_{Aeq, T}$) – The L_{Aeq} noise level is also known as the equivalent continuous sound pressure level. This is the 'A' frequency weighted logarithmic average of the sound energy of the measurement time 'T'. When measured over a 15 minute time period the symbol $L_{Aeq, 15\ minute}$ is used. This is the standard descriptor used for source noise measurements and ambient noise measurements.

Maximum – The maximum level when averaged over a root-mean-square (r.m.s) of a sound signal based on a 1/8 of a second logarithmic average (F - Fast) or a 1 second logarithmic average (S - Slow).

Peak - The maximum of an impulsive sound signal as opposed to an r.m.s. average level.

Sound Pressure Level (SPL) – 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure of 20 micro Pascals.

'Z' Frequency Weighting – Z for 'zero' frequency weighting, which implies no frequency weighting. The applicable range is 10 Hz to 20 kHz ±1.6 dB (or better) from 40 Hz to 4 kHz inclusive. Introduced (IEC 61672 2003) to replace the flat or linear filters.

Appendix B

ABORIGINAL HERITAGE DUE DILIGENCE

View of the study area along a sloping landform.

ABORIGINAL DUE DILIGENCE ARCHAEOLOGICAL ASSESSMENT

Trungley Hall Shooters Complex near Temora

Temora LGA

November 2017

Report Prepared by

OzArk Environmental & Heritage Management Pty Ltd

for

Sporting Shooters Association (NSW) Pty Ltd

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Proponent	Sporting Shooters Association (NSW) Pty Ltd		
Client	Geolyse Pty Ltd		
Project No / Purchase Order No			
Document Description	Aboriginal Due Diligence Archaeological Assessment: *Trungley Hall Shooters Complex near Temora, Temora LGA.*		
	Name	Signed	Date
Clients Reviewing Officer			
Clients Representative Managing this Document		OzArk Person(s) Managing this Document	
Location		OzArk Job No.	
Document Status **V3.0 FINAL**		Date 9 November 2017	
Draft V1.1 Author to Editor OzArk 1st Internal (Series V1._ = OzArk internal edits)		V1.0: SR author 6/7/17 V1.1 BC edit 6/7/17 V1.2 SR incorporate edits 7/7/17	
Draft V2.0 Report Draft for release to client (Series V2._ = OzArk and Client edits)		V2.0 OzArk to Client 19/7/17	
FINAL V3._once latest version of draft approved by client		V3.0 OzArk to Client 9/11/17	
Prepared For		Prepared By	
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Acknowledgement

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

EXECUTIVE SUMMARY

OzArk Environmental & Heritage Management (OzArk) has been engaged by Geolyse (the client), on behalf of the Sporting Shooters Association (NSW) (the proponent) to complete an Aboriginal Due Diligence archaeological assessment of Lot 941 DP130014 on Schlunkes Road, Trungley Hall, NSW (the study area). This report examines proposed works associated with the proposed Trungley Hall Sporting Shooters Complex (the proposal). The proposal is situated within the Temora Shire Local Government Area.

The visual inspection of the study area was undertaken by OzArk Project Archaeologist, Stephanie Rusden, on Thursday 15 and Friday 16 June 2017. No Aboriginal sites or sensitive landforms were recorded as a result of the inspection.

The undertaking of the Due Diligence process resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

> *AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH (Office of Environment and Heritage). If human remains are found, stop work, secure the site and notify NSW Police and OEH.*

To ensure the greatest possible protection to the area's Aboriginal cultural heritage values, the following recommendations are made:

1) The proposed work may proceed within the study area without further archaeological investigation under the following conditions:
    a) All land and ground disturbance activities must be confined to within the study area. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
    b) All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.
2) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. However, during the course of works, if Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed;
3) Work crews should undergo cultural heritage induction to ensure they recognise Aboriginal artefacts (see **Appendix 3**) and are aware of the legislative protection of Aboriginal objects under the NPW Act and the contents of the *Unanticipated Finds Protocol.*

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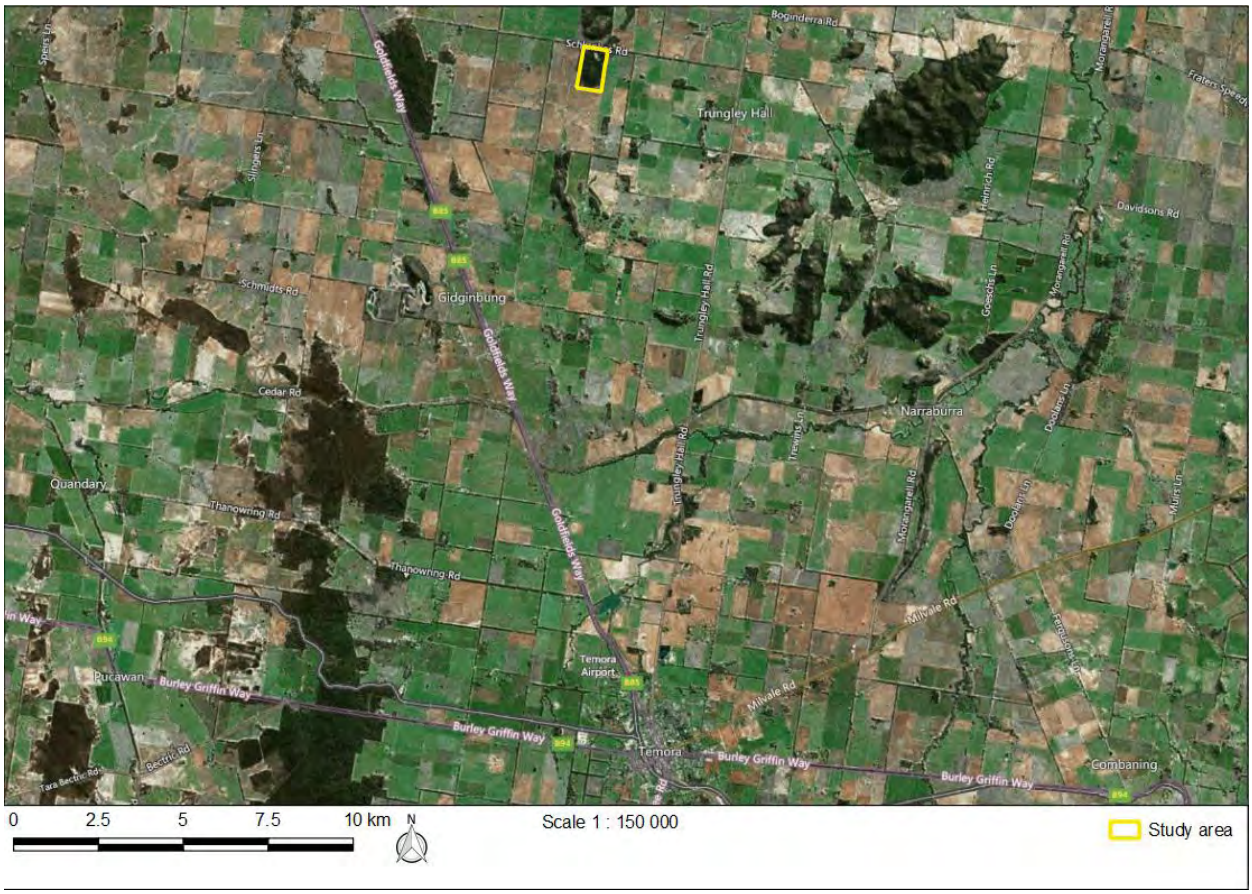
1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

OzArk Environmental & Heritage Management (OzArk) has been engaged by Geolyse (the client), on behalf of Sporting Shooters Association (NSW) (the proponent) to complete an Aboriginal Due Diligence archaeological assessment of Lot 941 DP130014 on Schlunkes Road, Trungley Hall, NSW (the study area; **Figure 1-1**). This report examines the work associated with the proposed Trungley Hall Sporting Shooters Complex (the proposal). The proposal is situated within the Temora Shire Local Government Area (LGA).

Figure 1-1. Location of the study area in relation to Trungley Hall and Temora.



1.2 STUDY AREA

The study area includes Lot 941 DP130014 which encompasses approximately 90 hectares of land, located 5.4 kilometres (km) northwest of Trungley Hall and 20km north of Temora. The study area is bounded to the north by Schlunkes Road and is surrounded by agricultural properties (**Figure 1-2**).

Figure 1-2: Aerial showing the study area.

1.3 ASSESSMENT APPROACH

The desktop and visual inspection component for the study area follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence; DECCW 2010). The field inspection followed the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH 2011).

2 DUE DILIGENCE ASSESSMENT

2.1 INTRODUCTION

The National Parks and Wildlife Regulation 2009 (NPW Regulation) made under the *National Parks and Wildlife Act 1974* advocates a Due Diligence process to determining likely impacts on Aboriginal objects. Carrying out Due Diligence provides a defence to the offence of harming Aboriginal objects and is an important step in satisfying Aboriginal heritage obligations in NSW.

2.2 DEFENCES UNDER THE NPW REGULATION 2009

2.2.1 Low Impact Activities

The first step before application of the Due Diligence process itself is to determine whether the proposed activity is a "low impact activity" for which there is a defence in the NPW Regulation. The exemptions are listed in Section 80B (1) of the NPW Regulation (DECCW 2010: 6).

The activities of the proponent are not considered an exempt 'low impact activity' listed in the NPW Regulation. Therefore, the Due Diligence process must be applied.

2.2.2 Disturbed Lands

Relevant to this process is the assessed levels of previous land-use disturbance.

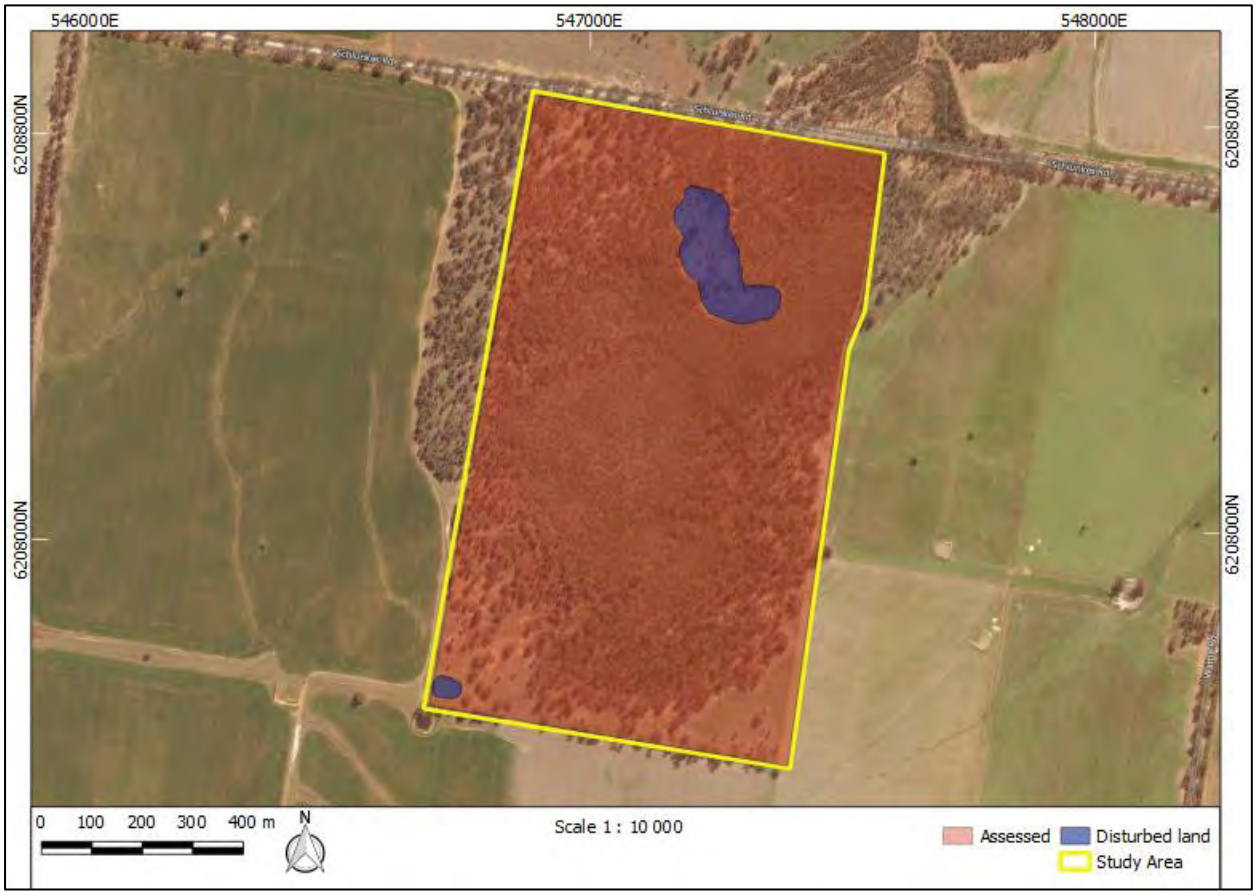
The NPW Regulation Section 80B (4) (DECCW 2010a: 18) define disturbed land as follows:

> *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable.*
>
> *Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.*

Figure 2-1 shows those portions of the study area which fall under the NPW Regulation definition of 'disturbed land' and those where the Due Diligence process must be applied further as the level of disturbance to the ground surface cannot be seen in a clear and observable manner. The area shown to be 'disturbed' in **Figure 2-1** includes a disused quarry in the north and a dam in the south-western corner. Those areas identified as 'disturbed' require no further assessment under the Due Diligence process. The remainder of the study area is densely vegetated by both mature and regenerating vegetation. Vegetation in the 'assessed' area has the potential to bear

cultural modifications such as scarring or carving and therefore the Due Diligence process must be applied.

Figure 2-1: Aerial of the study area showing portions defined as 'disturbed land' and assessed.



2.3 APPLICATION OF THE DUE DILIGENCE CODE OF PRACTICE TO THE PROPOSAL

To follow the generic Due Diligence process, a series of steps in a question/answer flowchart format (DECCW 2010: 10) are applied to the proposed impacts and the study area, and the responses documented.

2.3.1 Step 1

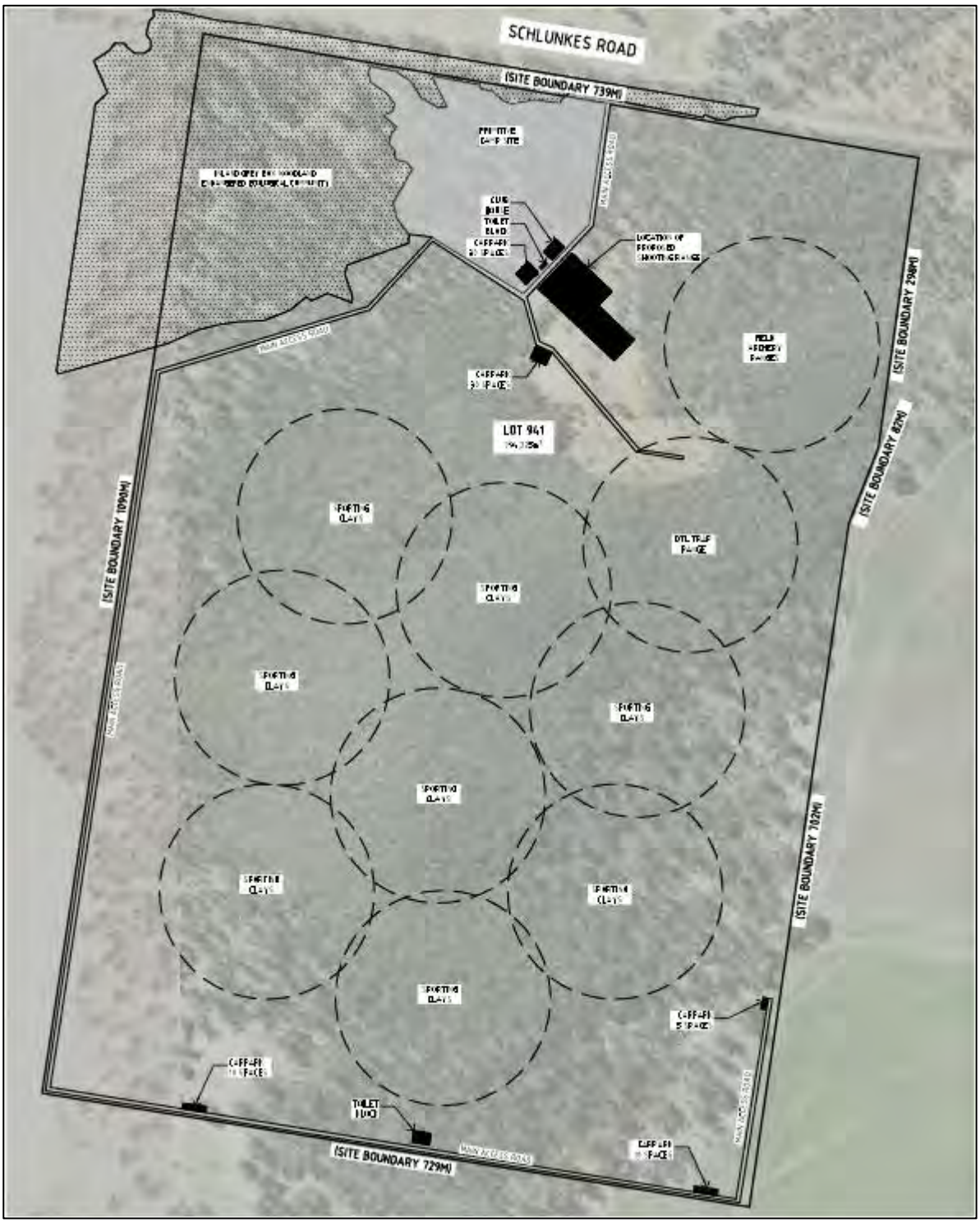
Will the activity disturb the ground surface or any culturally modified trees?

Yes. The proposal will disturb the ground surface through the construction of the following (**Figure 2-2**):

- Access tracks and fire trails;
- Car parks;
- A club house;
- Amenities;
- Rifle, pistol and shot gun ranges.

Mature native vegetation is present within the study area, as such, culturally modified tree could be at risk from the proposal.

Figure 2-2: Impact footprint.



2.3.2 Step 2 a)

Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?

No. A search of the OEH administered AHIMS database returned no records for Aboriginal heritage sites within a designated eight kilometre by eight kilometre search area over the study area (GDA Zone 55, Eastings: 543070–551070, Northings: 6204581–6212581 with a no buffer).

It should be noted that the lack of site recordings in the vicinity of the study area is more likely due no, or a low number of, surveys as opposed to an absence of sites.

2.3.3 Step 2 b)

Are there any other sources of information of which a person is already aware?

Limited assessments have been completed in the vicinity of the study area or the Temora region.

In 2011, OzArk completed an archaeological assessment from Bomen and Temora, following a roughly north–south alignment in the vicinity of an existing 66kV and 132kV electricity transmission lines. The 2011 subject area was largely flat to undulating with few prominent watercourses, with the majority of it disturbed by agricultural practices (cropping). Four Aboriginal sites were identified between Junee and Sebastopol during the field assessment, consisting of three artefact scatters (WJT-OS1, WJT-OS2 and WJT-OS3) and one scarred tree (WJT-ST1. The closet sites recorded were 34km south west of Trungley Hall.

There are no known cultural values or Aboriginal sites pertaining directly to the location of the proposed work. No Aboriginal community members accompanied the current visual inspection.

2.3.4 Step 2 c)

Are there any Landscape features that are likely to indicate presence of Aboriginal objects?

The topography of the study area is consistent with the Ardlethan Hills landscape unit as described by Mitchell (2002). The northern portion of the study area comprises a hill (elevation 320m) (**Plate 1**) which slopes on a moderate gradient to the south towards ephemeral drainage lines which terminate within the study area.

The geology of the Ardlethan Hills landscape unit consists of sandstone, greywacke, chert and phyllite, while soils are generally stony red and brown texture-contrast soils (Mitchell 2002: 59).

The study is densely vegetated by Cypress Pine, Eucalypt and Ironbark species.

Examination of topographic maps and satellite imagery suggests that confined flat or gently sloping landforms could exist in the very southern portion of the study area which would allow for Aboriginal occupation (camping). Any such occupation is more likely to have occurred on a short-term basis due to a lack of permanent water in close proximity. While the steeply sloping

landforms would not have been conducive for camping, the hill landform may have been utilised as a look out point.

In summary, artefact scatters and isolated artefacts are the most likely site types to be encountered in the study area in the southern portion. Artefacts are most likely to have been manufactured from greywacke or chert. Artefact scatters are more likely to be located adjacent to drainage lines, particularly on flat or gently sloping landforms. Culturally modified trees could exist in the study area, and are more likely to be located close to the drainage lines or where mature trees exist. Scars are most likely to be identified on mature box species, while carving could be identified on the Cypress Pine species. No cultural modifications are expected to be located on any Ironbark trees.

2.3.5 Step 3

Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?

No. The study area could include landscape features that contain, or have potential to contain, Aboriginal objects and sites, and these landscape features are not able to be avoided. In addition to this, the study area is densely vegetated and therefore has potential to contain culturally modified trees.

2.3.6 Step 4

Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?

No. The visual inspection of the study area was undertaken by OzArk Project Archaeologist, Stephanie Rusden, on Thursday 15 and Friday 16 June 2017. Standard archaeological field survey and recording methods were employed. The entirety of the study area was inspected on foot to ground-truth existing levels of disturbance and to identify and record any Aboriginal sites, if present. Pedestrian track data was captured via handheld GPS as shown in **Figure 2-2**. Emphasis was placed upon areas with minimal ground surface disturbance and adequate ground surface visibility (GSV) and all mature trees of sufficient age to contain Aboriginal scarring or carving were inspected. GSV and exposure were utilised in conjunction with background research regarding the potential for Aboriginal site locations to assess the landforms with greater archaeological potential.

Exposure across the study area was generally low (15 per cent) with the majority of the study area covered in thick grass. GSV was afforded by ant hills, contour banks, exposures along fence lines, and areas of erosion along drainage lines (**Plate 2**). GSV within exposures was generally high at 70 per cent. GSV within exposures was obscured by leaf litter, bark, branches and small rocks. Vegetation within the study area consists largely of regenerating Cypress Pine species

and Mugga Ironbark (**Plate 3**), with isolated stands of Inland Grey Box generally in the north western portion (**Plate 4**).

No Aboriginal sites were identified during the site inspection. One potential scarred tree was identified along the western boundary of the study area on an Inland Grey Box (**Figure 2-3**). While the shape of the scar and weathering on the dry face was consistent with culturally scarred trees (**Figure 2-4**), it was determined not to be of cultural origin based on the following:

- The low position on the trunk of the tree (21cm above the ground);
- The small size of the scar; and
- The low levels of regrowth.

A 'no' answer for Step 4, results in the following outcome (DECCW 2010):

> *AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH (Office of Environment and Heritage). If human remains are found, stop work, secure the site and notify NSW Police and OEH.*

Figure 2-3: Pedestrian coverage within the study area.

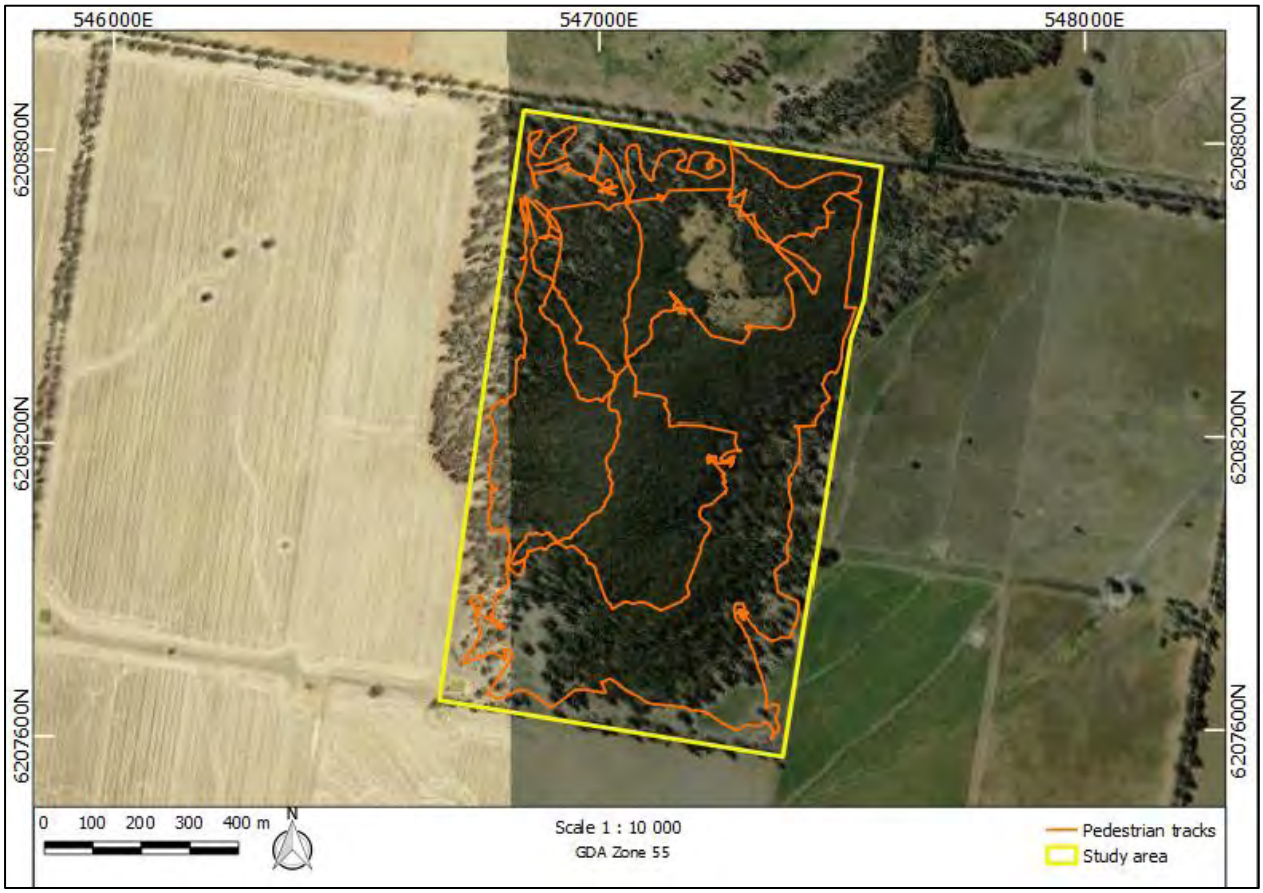


Figure 2-4: Location of potential scarred tree within the study area.

Figure 2-5: View of the non-cultural scarred tree.

	
1. Overview of the non-cultural scarred tree. The location of the scar is shown by the red circle.	2. Close-up view of the scar.

3 MANAGEMENT RECOMMENDATIONS

The undertaking of the Due Diligence process resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

> *AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH (Office of Environment and Heritage). If human remains are found, stop work, secure the site and notify NSW Police and OEH.*

To ensure the greatest possible protection to the area's Aboriginal cultural heritage values, the following recommendations are made:

1) The proposed work may proceed within the study area without further archaeological investigation under the following conditions:
    a) All land and ground disturbance activities must be confined to within the study area. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
    b) All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.
2) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. However, during the course of works, if Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed; and
3) Work crews should undergo cultural heritage induction to ensure they recognise Aboriginal artefacts (see **Appendix 3**) and are aware of the legislative protection of Aboriginal objects under the NPW Act and the contents of the *Unanticipated Finds Protocol.*

REFERENCES

DECCW 2010 — DECCW. 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. Department of Environment, Climate Change and Water, Sydney.

Mitchell 2002 — Mitchell, Dr. Peter. 2002. *Description for NSW (Mitchell) Landscapes Version 2.* Department of Environment and Climate Change NSW.

OEH 2011 — Office of Environment and Heritage. 2011. *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales.* Department of Environment, Climate Change and Water, Sydney.

OzArk 2012 — Aboriginal Heritage Assessment: *Temora to Bomen Electricity Transmission Line Project*. Report for GHD on behalf of Essential Energy.

PLATES

Plate 1: View upslope towards the hill in the northern portion of the study area. View to the northeast.

Plate 2: View of an area of exposure with high GSV along the western boundary.

Plate 3: View of Mugga Ironbark throughout the study area.

Plate 4: View of Inland Grey Box throughout the study area.

APPENDIX 1: AHIMS SEARCH RESULTS

Office of Environment & Heritage

NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Temora Shooters

Client Service ID : 284897

OzArk Environmental and Heritage Management

Date: 05 June 2017

PO Box 2069
Dubbo New South Wales 2830
Attention: Stephanie Rusden

Email: stephanie@ozarkehm.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 55, Eastings : 543070 - 551070, Northings : 6204581 - 6212581 with a Buffer of 0 meters, conducted by Stephanie Rusden on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

APPENDIX 2: ABORIGINAL HERITAGE: UNANTICIPATED FINDS PROTOCOL

An Aboriginal artefact is anything which is the result of past Aboriginal activity. This includes stone (artefacts, rock engravings etc.), plant (culturally scarred trees) and animal (if showing signs of modification; i.e. smoothing, use). Human bone (skeletal) remains may also be uncovered while onsite.

Cultural heritage significance is assessed by the Aboriginal community and is typically based on traditional and contemporary lore, spiritual values, and oral history, and may also take into account scientific and educational value.

Protocol to be followed in the event that previously unrecorded or unanticipated Aboriginal object(s) are encountered:

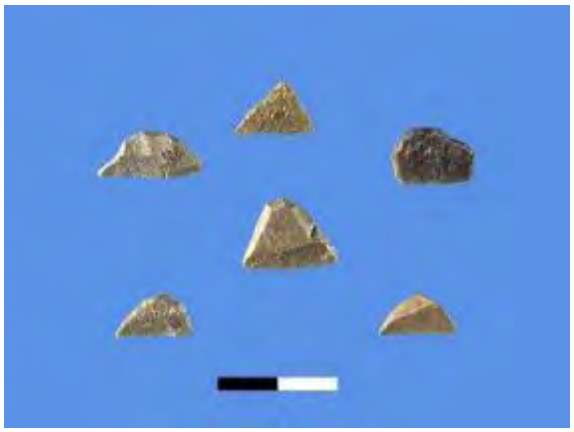
1. All ground surface disturbance in the area of the finds should cease immediately the finds are uncovered.
    a) The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and
    b) The site supervisor will be informed of the find(s).
2. If finds are suspected to be human skeletal remains, then NSW Police must be contacted as a matter of priority.
3. If there is substantial doubt regarding an Aboriginal origin for the finds, then gain a qualified opinion from an archaeologist as soon as possible. This can circumvent proceeding further along the protocol for items which turn out not to be archaeological. If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.
4. Immediately notify the following authorities or personnel of the discovery:
    a) OEH (Environment Line: 131 555); and
    b) Relevant Aboriginal Community Representatives.
5. Facilitate, in co-operation with the appropriate authorities and relevant Aboriginal community representatives:
    a) The recording and assessment of the finds;
    b) Fulfilling any legal constraints arising from the find(s). This will include complying with OEH directions; and
    c) The development and conduct of appropriate management strategies. Strategies will depend on consultation with stakeholders and the assessment of the significance of the find(s).

Where the find(s) are determined to be Aboriginal Objects, any re-commencement of construction related ground surface disturbance may only resume in the area of the find(s) following compliance with any consequential legal requirements and gaining written approval from OEH (normally an Aboriginal Heritage Impact Permit).

APPENDIX 3: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION

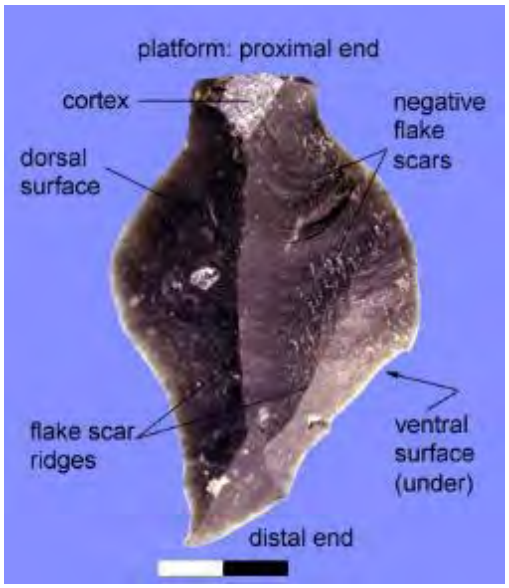
Retouched blades (scale = 1cm)

Flakes

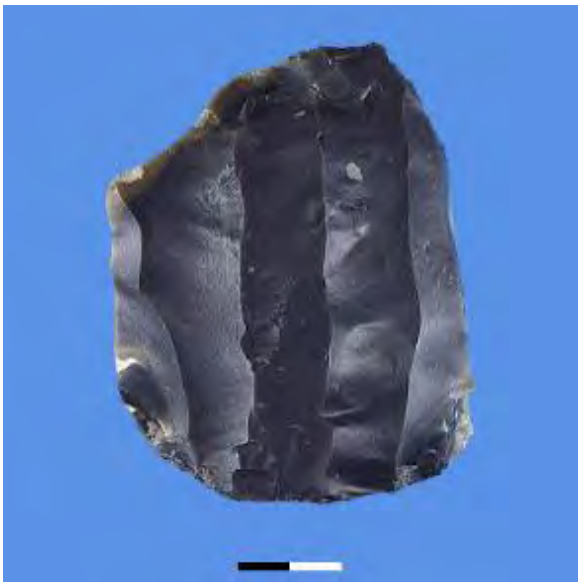


Microliths (scale = 1cm)

Scrapper (scale = 1cm)



Flake characteristics (scale = 1cm)



Core from which flakes have been removed (scale = 1cm)

Appendix C

ECOLOGICAL ASSESSMENT

Trungley Hall Shooters Complex

Ecological Assessment

Temora Local Government Area, NSW

Prepared for Geolyse Pty Ltd

November 2017

OzArk Environmental & Heritage Management Pty Limited

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OzArk and staff acknowledge Traditional Owners and Custodians of the country on which we work

DOCUMENT CONTROLS

Proponent	Sporting Shooters Association (NSW) Pty Ltd		
Client	Geolyse Pty Ltd		
Purchase Order No			
Document Description	Ecological Assessment: Trungley Hall Shooters Complex		
	Name	**Signed**	**Date**
Clients Reviewing Officer			

Clients representative managing this document	**OzArk representative managing this document**
David Walker	Kate Hammill (KH)
Location	**OzArk Job No.**
S:\OzArk EHM Data\Clients\Geolyse - Orange\ Temora Shooters Complex March2017\Ecology	#1611

Document Status: FINAL	**Version**	**Date**	**Action**
Draft series V1.X = OzArk internal edits	V1.0	05.10.2017	NA to RM
Draft series V2.X = OzArk and Client internal edits	V2.0	10.10.2017	RM to DW
FINAL once latest version of draft approved by client	V3.0	16.11.2017	RM to DW

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EXECUTIVE SUMMARY

OzArk Environmental & Heritage Management Pty Ltd (OzArk) has been engaged by Geolyse (the client), on behalf of the Sporting Shooters Association (NSW) (the proponent) to complete an ecological assessment of Lot 941 DP130014 on Schlunkes Road, Trungley Hall, NSW.

This report examines the potential impact on biodiversity of the activities associated with the proposed Trungley Hall Sporting Shooters Complex (the proposal) under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal is situated within the Temora Shire Local Government Area.

The direct impact to native vegetation will be 2.72 ha, a further 2 ha of understorey vegetation is likely to be affected within the camp site. The trap, sporting clay and archery ranges are not expected to cause a measurable impact to vegetation.

Field assessment was carried out by Rowan Murphy on Thursday 15 and Friday 16 June 2017. The assessment followed the *Working Draft Threatened Species Survey and Assessment Guidelines NSW* (DEC, 2004). Weather was cool and overcast, ranging from 0.6°C overnight to 16.6°C on Thursday 15 June. No rain or adverse weather conditions impacted the field assessment. The ecological survey was carried out over winter, which is not ideal for identifying several threatened species of plants known to occur in the region.

The topography of the study area is moderately steep in places and undulating in elevation between 280m and 320m AHD. The study area is part of the Reefton Hills and is about 4 kilometres south of Gidgingidginbung Pinnacle

The study area has been mapped as a mixture of remnant native vegetation and agricultural grazing; part of the subject site has been historically quarried. Field survey of the project site revealed that the remnant vegetation had been lightly grazed; an apiary and evidence of recreational hunting / vermin control was also identified in the study area.

Two Plant Community Types (PCTs) were identified in the subject site and are to be impacted by the proposal:

- PCT 76: Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions.
- PCT 217: Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion.

PCT 76 is associated with the following Endangered Ecological Communities (EECs):

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – EPBC Act.
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions – TSC Act.

No threatened fauna or flora species were recorded within the study area. Threatened species with assessed potential to occur within the study area are unlikely to be significantly impacted by the proposed work such that a viable local population would become locally extinct.

Eleven native fauna species and two invasive species were recorded in the subject site during the field survey.

The proposal has followed the principles of 'avoid, minimise, mitigate' to reduce the impact of the proposal on local biodiversity values.

The following avoidance measures have been made:

- Areas mapped as consistent with the Inland Grey Box Woodland EEC have been avoided. The proposal has been redesigned to retain these areas.

The design of the proposal has minimised the potential impact to biodiversity by:

- Minimising the size and extent of access roads and car parks.
- Clustering the club house and amenities buildings with the proposed shooting ranges.
- Designing the proposed shooting ranges over the previously quarried area to minimise vegetation removal.

Further mitigation measures have been recommended to manage the potential impact to biodiversity to minimise risk.

Having considered the ecology within the study area and the proposed impact, it is apparent that the proposal is:

- Unlikely to significantly affect any of the listed threatened species, fauna populations or communities.
- Unlikely to augment or significantly contribute to any of the National or State listed Key Threatening Processes.
- Unlikely to significantly affect any Ramsar wetland or any listed migratory species.
- Unlikely to significantly affect local hydrology.

The proposed activity should not be considered to constitute a significant impact and, as such, no Species Impact Statement (SIS) is warranted.

No specific licences, permits, approvals and notifications required for the construction, maintenance and operation of the proposal under Part 4 of the EP&A Act have been identified.

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FIGURES

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1 Introduction

OzArk Environmental & Heritage Management Pty Ltd (OzArk) has been engaged by Geolyse (the client), on behalf of the Sporting Shooters Association (NSW) (the proponent) to complete an ecological assessment of Lot 941 DP130014 on Schlunkes Road, Trungley Hall, NSW.

This report examines the potential impact on biodiversity of the activities associated with the proposed Trungley Hall Sporting Shooters Complex (the proposal) under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal is situated within the Temora Shire Local Government Area.

1.1 Objectives

The objectives of the ecological assessment are to provide:

- Accurate predictions and mapping of any vegetation clearing on site
- Detailed assessment of the potential impact to any threatened species, populations, endangered ecological communities or their habitats; groundwater dependent ecosystems predicted to occur; and any potential for offset requirements in accordance with the relevant Office of Environment and Heritage (OEH) Guidelines
- Detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts.

This assessment meets these objectives while addressing requirements under the following legislation.

1.1.1 International agreements

- Japan-Australia Migratory Bird Agreement (JAMBA).
- China-Australia Migratory Bird Agreement (CAMBA).
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
- Ramsar Convention on Wetlands (Ramsar).

1.1.2 Commonwealth of Australia

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including:
    - EPBC Act Environmental Offsets Policy.
    - Significant Impact Guidelines Version 1.1, 2013.

1.1.3 New South Wales

The EP&A Act provides the legal framework for the assessment and approval of the proposed construction activities. Various legislation and instruments are integrated with the EP&A Act including:

- *Threatened Species Conservation Act 1995* (TSC Act).[1]
- *Fisheries Management Act 1994* (FM Act).
- *Biosecurity Act 2015.*
- *Temora Local Environmental Plan 2010* including:
    - Temora Shire Development Control Plan 2012.

[1] The TSC Act has been repealed and replaced by the *Biodiversity Conservation Act 2016*; this assessment has been carried out under transitional arrangements.

1.2 Location

The study area includes Lot 941 DP130014 which encompasses approximately 90 hectares of land, located 5.4 kilometres northwest of Trungley Hall and 20 kilometres north of Temora. The study area is bounded to the north by Schlunkes Road and is surrounded by agricultural properties (**Figure 1-2**).

Three terms are used in this report to contextualise the proposal:

- Subject site.
- Study area.
- 10km buffer.

Boundaries of the subject site and study area are shown in **Figure 1-2**. Additional terms and abbreviations used are provided in **Appendix F**.

1.2.1 Subject site

The 'subject site' is the area directly affected by the proposal (DEC, 2004). A summary of the features of the subject site is given in **Table 1-1**.

Table 1-1: Description of the subject site

Subject site	Type of impact	Estimated impact area
Access tracks and car parks	Total direct impact	1.95 ha
Club house and amenities	Total direct impact	0.07 ha
Rifle and pistol range	Total direct impact	0.7 ha
Camp site	Light direct impact	2 ha
Trap, Sporting Clay and Archery ranges	Negligible direct impact	54 ha

The direct impact to native vegetation will be 2.72 ha, a further 2 ha of understorey vegetation is likely to be affected within the camp site. The trap, sporting clay and archery ranges are not expected to cause a measurable impact to vegetation.

1.2.2 Study area

The 'study area' includes the 'subject sites' and any additional areas likely to be affected by the proposal, either directly or indirectly (DEC, 2004). The study area is the subject site with a 500m buffer and is shown on **Figure 1-2**.

The regional context of the study area is provided in **Table 1-2** and proximity to environmentally sensitive areas is shown in **Table 1-3**.

Table 1-2: Regional context of the study area

Criteria	Value
Interim Biogeographic Regionalisation for Australia (IBRA Region)	NSW South Western Slopes, Lower slopes subregion
State	NSW
Local Government Area	Temora Shire Council
Nearest town	Barmedman
Accessed from nearest town by	Schlunkes Road
Nearest locality	Trungley Hall
Mitchell Landform	Ardlethan Hills

Criteria	Value
Land use / disturbance	Grazing
Nearest waterway (Name, Strahler Order)	Unnamed Strahler first order tributary of Greens Creek
Spot point Australian Height Datum (AHD)	300m
Surrounding land use	Agricultural

Table 1-3: Proximity of environmentally sensitive areas to the study area

Environmental Considerations	In the study area?
An area reserved or dedicated under the *National Parks and Wildlife Act 1974*?	No
Is the proposal located within land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation of other environmental protection purposes?	No
A World Heritage Area?	No
Environmental Protection Zones in environmental planning instruments?	No
Lands protected under SEPP 14 – Coastal Wetlands?	No
Lands protected under SEPP 26 – Littoral Rainforests?	No
Lands protected under SEPP 71 – Coastal Protection?	No
Lands protected under SEPP 44 – Koala Protection?	No
Lands protected under SEPP Sydney Drinking Water Catchment?	No
Land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness under the *National Parks and Wildlife Act 1974*?	No
Aquatic reserves dedicated under the *Fisheries Management Act 1994*?	No
Wetland areas dedicated under the Ramsar Wetlands Convention?	No
Land identified as State Forest under the *Forestry Act 1916*?	No
Land within a mining subsidence district?	No
Acid sulphate area?	No
Protected riparian habitat?	No
Mapped as Key Fish Habitat?	No
Critical habitat NSW?	No
Critical habitat nationally?	No

1.2.3 10 kilometre search area

The 10km search area contains all land within a 10km radius of the study area. The 10km search area is used to review database records of listed plants and animals to predict what may occur in the study area.

Figure 1-1: Regional context of the study area

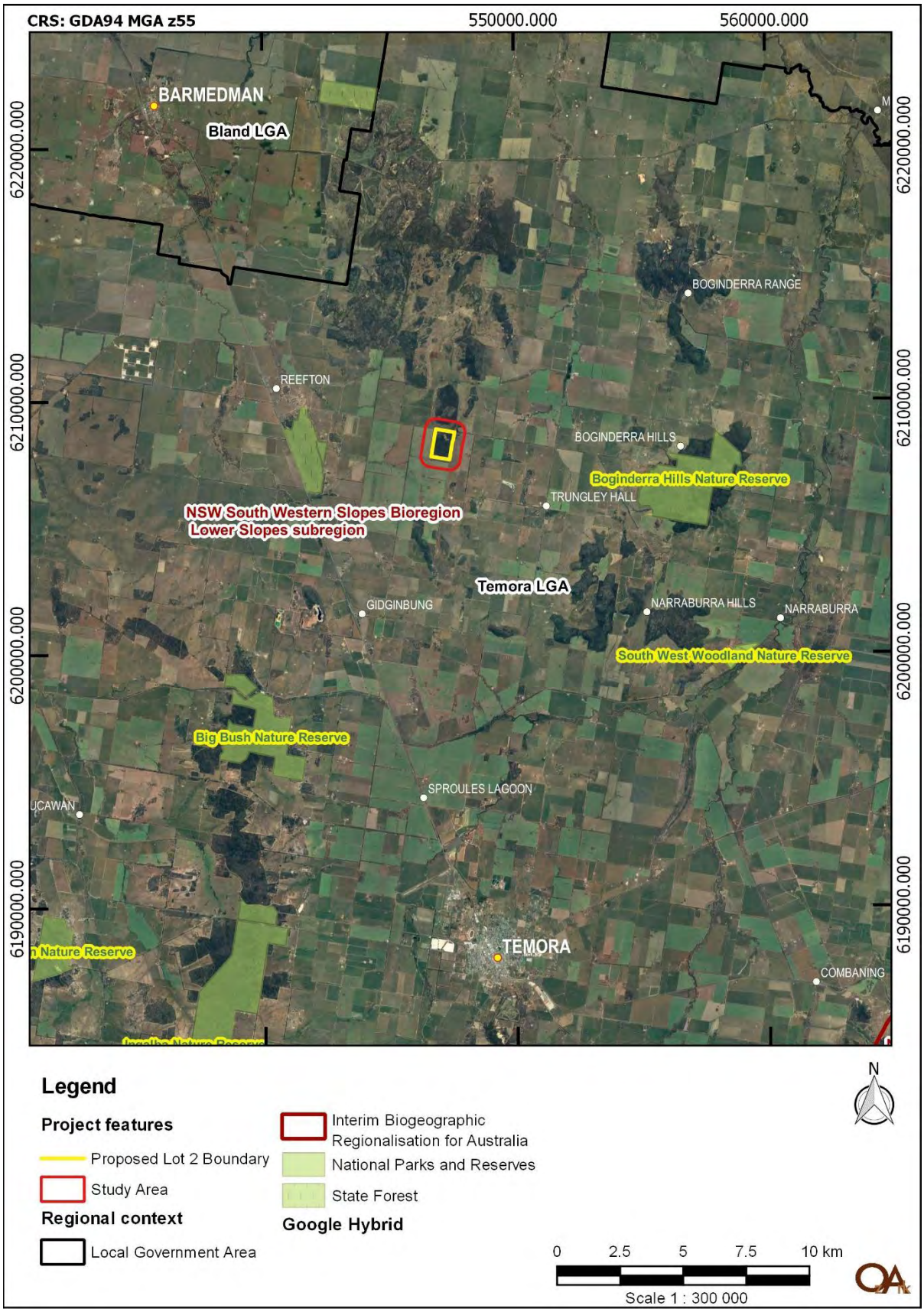


Figure 1-2: The study area

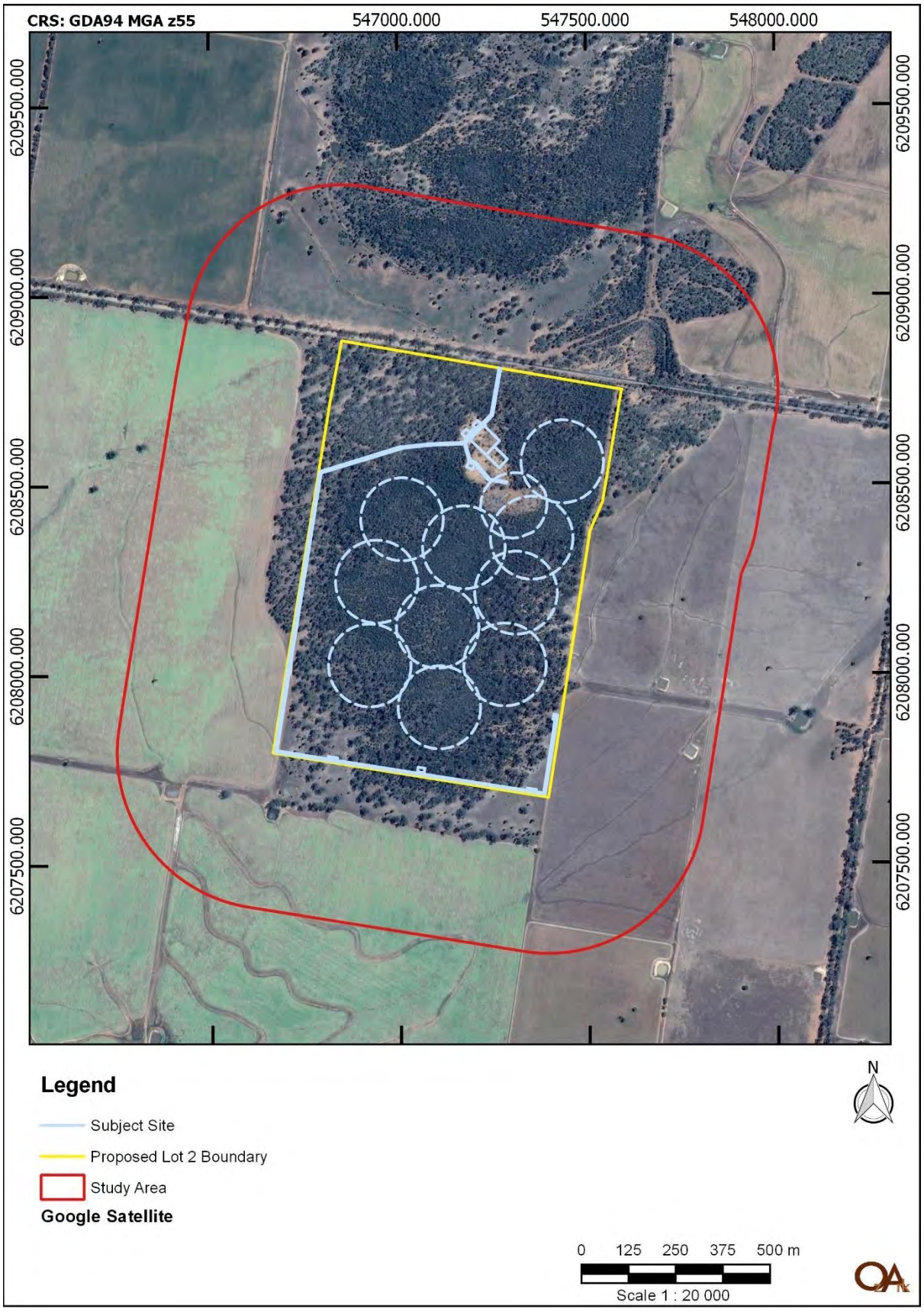
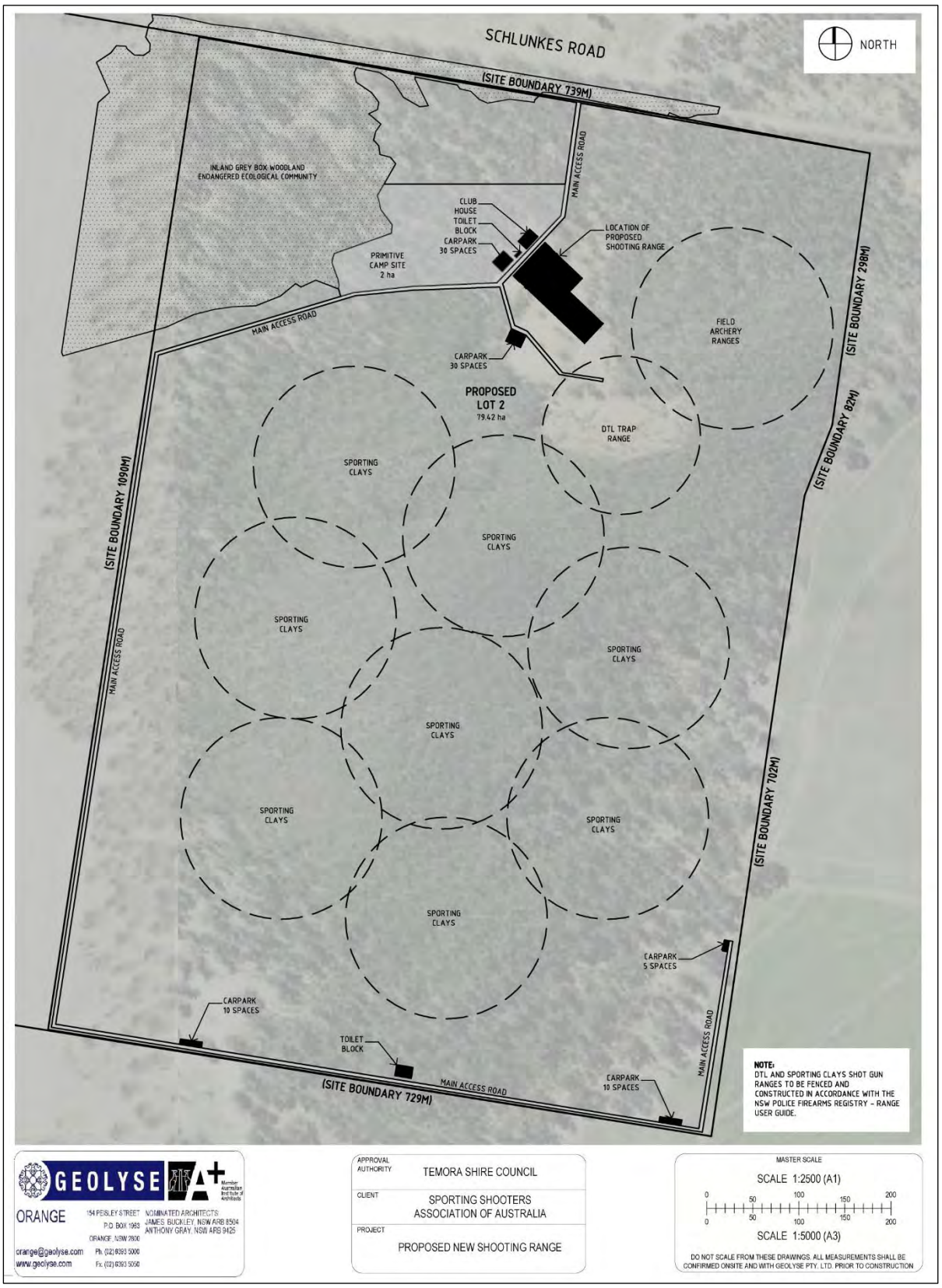


Figure 1-3: Detailed design of the subject site



2 Methods

The methodology employed for this report consisted of:

- A desktop and literature review of ecological databases and literature sources as direct references for the field survey.
- A field survey of the study area.

The assessment rationale was to evaluate the type and quality of habitat to be affected by the proposal; apply professional judgement, then complete targeted assessment of potential habitat to detect the regions listed species, populations or communities.

2.1 Reporting

Reporting components were completed by:

- Main Author: Rowan Murphy.
- Editor: Nikki Allen.

2.1.1 Licensing and qualifications

OzArk operates under NSW Department of Primary Industries (DPI) Ethics Approval No. 17/456 and NSW Scientific Research License 101908. Key details of scientific personnel from OzArk are provided in **Table 2–1**.

Table 2-1: Summary of OzArk qualifications

Name	Position	CV Details
Rowan Murphy	Ecologist / Assistant Project Manager	• Bachelor of Environmental Science (University of New England) • Bachelor of Laws (University of New England) • Practicing member of the NSW Ecological Consulting Association • Practicing member of the Environment Institute of Australia and New Zealand (EIANZ) • National Railtrack Safety Induction (ARTC) • WHS White Card: 1652972 • Apply First Aid (Parasol) ID: 6007220.
Nikki Allen	Environmental Scientist	• BSc. Major in Chemistry and Geography. University of New South Wales at the Australian Defence Force Academy • Grad. Dip. In Environmental Health. Queensland University of Technology. • Apply First Aid (ABC First Aid) ID: 34795 • CPCCOHS1001A Work Safely in the Construction Industry (White Card) • Roads and Maritime Worker on Foot Training

2.2 Desktop review

2.2.1 Information sources

Preliminary assessments drew on local experience, previous preliminary reporting and information held on government databases and archives (**Appendix E**). Data was used to assist in identifying distributions, suitable habitats and known records of threatened species to increase the effectiveness of field investigations. All databases were searched on 12 June 2017. Information sources reviewed included:

- Aerial photograph interpretation of the landscape and previous vegetation maps.
- Literature reviews (OzArk library, OEH Biometric list) to determine vegetation and species habitat(s) within the proposed study area and environs.
- Review of flora and fauna records contained in the NSW Threatened Species Database, EPBC Protected Matters Search Tool and DPI Records Viewer.
- NSW Wildlife Atlas/Bionet GIS data request and website search.
- Royal Botanical Gardens (PlantNET NSW Flora Online).

The background searches enabled the consultant to develop a predictive model for threatened flora and fauna to be recorded in the study area (**Section 4**).

2.2.2 Predictive Model

A review of the previously recorded (**Appendix E** – NSW Wildlife Atlas/Bionet GIS data), predicted (**Appendix E** – OEH, DPI Fisheries and Commonwealth database searches) and field survey recorded (**Appendix A**) threatened species was used to inform the list of threatened species with potential to be impacted by the proposal as discussed in **sections 3.4** and **3.5**. An assessment of likelihood of occurrence for listed species, populations, communities and migratory species identified from database searches was compiled (**Appendix B**). Five terms of likelihood for occurrence (based on database results or other records, presence or absence of suitable habitat, features of the study area, results of the field survey and professional judgement) were used to determine the likelihood of occurrence:

- “Yes” = the species was or has been observed on the site.
- “Likely” = a medium to high probability that a species uses the site.
- “Potential” = suitable habitat for a species occurs on the site, but there is insufficient information to the species as likely to occur, or unlikely to occur.
- “Unlikely” = a very low to low probability that a species uses the site.
- “No” = habitat on-site and in the vicinity is unsuitable for the species.

Once a species presence was determined the likelihood of the species to be impacted by the proposal was determined. This decision was based upon whether or not the location, duration and methods of the proposal would impact on important habitat features, breeding requirements, food sources and threatening processes. Species determined to have potential to be impacted by the proposal are listed in **sections 3.4** and **3.5**. Assessments of significance were undertaken for these species and results are summarised in **section 3.8**.

2.3 Field survey

Field assessment was carried out by Rowan Murphy on Thursday 15 and Friday 16 June 2017. The assessment followed the *Working Draft Threatened Species Survey and Assessment Guidelines NSW* (DEC, 2004). Survey effort and location of flora plots is provided in **Figure 2-1**.

Weather was cool and overcast, ranging from 0.6°C overnight to 16.6°C on Thursday 15 June. No rain or adverse weather conditions impacted the field assessment. The ecological survey was carried out over winter, which is not ideal for identifying several threatened species of plants known to occur in the region.

The objective of the field assessment was to:

- Describe the nature and extent of vegetation removal
- Determine if species, populations or communities listed in the EPBC, TSC or FM Acts would be, or have potential to be, affected by the proposal
- Determine if ground water dependant ecological communities would be, or have potential to be, affected by the proposal
- Describe the quality and value of the habitat affected by the proposal.

2.3.1 Flora

The flora assessment methodology followed the NSW Office of Environment and Heritage (OEH) *BioBanking Assessment Methods 2014* (BBAM) (OEH, 2014) and the "Random Meander Technique" described by Cropper (1993). Formal 20m by 20m vegetation, 50m by one metre transects and 20m by 50m habitat plots following BBAM were used for this assessment.

Plant identification followed nomenclature in Harden (1990-2002), Cunningham (1992) and Royal Botanic Gardens (2017). Special consideration was given to locating rare or threatened plants identified in database searches and literature review as having the potential to occur. The national conservation significance of flora was determined by referencing the schedules associated with the TSC Act and the EPBC Act.

2.3.2 Ecological communities

Ecological communities were identified in the field using (Benson, 2009) and conditional classes were assigned following definitions of low condition vegetation stated in BBAM (OEH, 2014).

A list of predicted threatened or endangered EPBC Act, TSC Act and FM Act communities was brought into the field during the assessment. Where the community had potential to be the listed community the description and definition for the listed item was cross referenced.

2.3.3 Fauna

Habitat assessment

Habitat in the study area was assessed for its potential to provide resources for listed species predicted to occur in **Appendix B**. Preference of habitat for these species was determined by OEH, Department of Primary Industries (DPI) Fisheries and the Australian Government Department of Environment and Energy (DoEE) threatened online species profiles.

Database searches were undertaken before the assessment to inform the consultant of what species predicted or known in the 10km buffer may be recorded or should need a targeted search.

Any indirect evidence of fauna i.e. scats, tracks, calls, fur feathers, sloughed skins etc. was assessed.

Each mature tree in the subject site was inspected for hollows and to determine if they were used for breeding. All eucalyptus trees in the study area were also assessed for nests, feeding habitat including mistletoe or resting habitat. Where a tree with a hollow was observed it was given a score reflecting its habitat value.

Birds

Opportunistic sightings of birds were recorded during the assessment of the study area. Particular attention was given to identifying tree hollows with signs of breeding activity or the presence of nests.

2.3.4 Limitations

Not all animals and plants can be fully accounted for within any given study area. The presence of threatened species is not static. It changes over time, often in response to longer term natural forces which can, at any time, be dramatically influenced by man-made disturbance or weather. In order to overcome some of these limitations, database searches were conducted for threatened species, populations and ecological communities known to occur within the region. A 'precautionary approach' for species occurrence has been adopted where required.

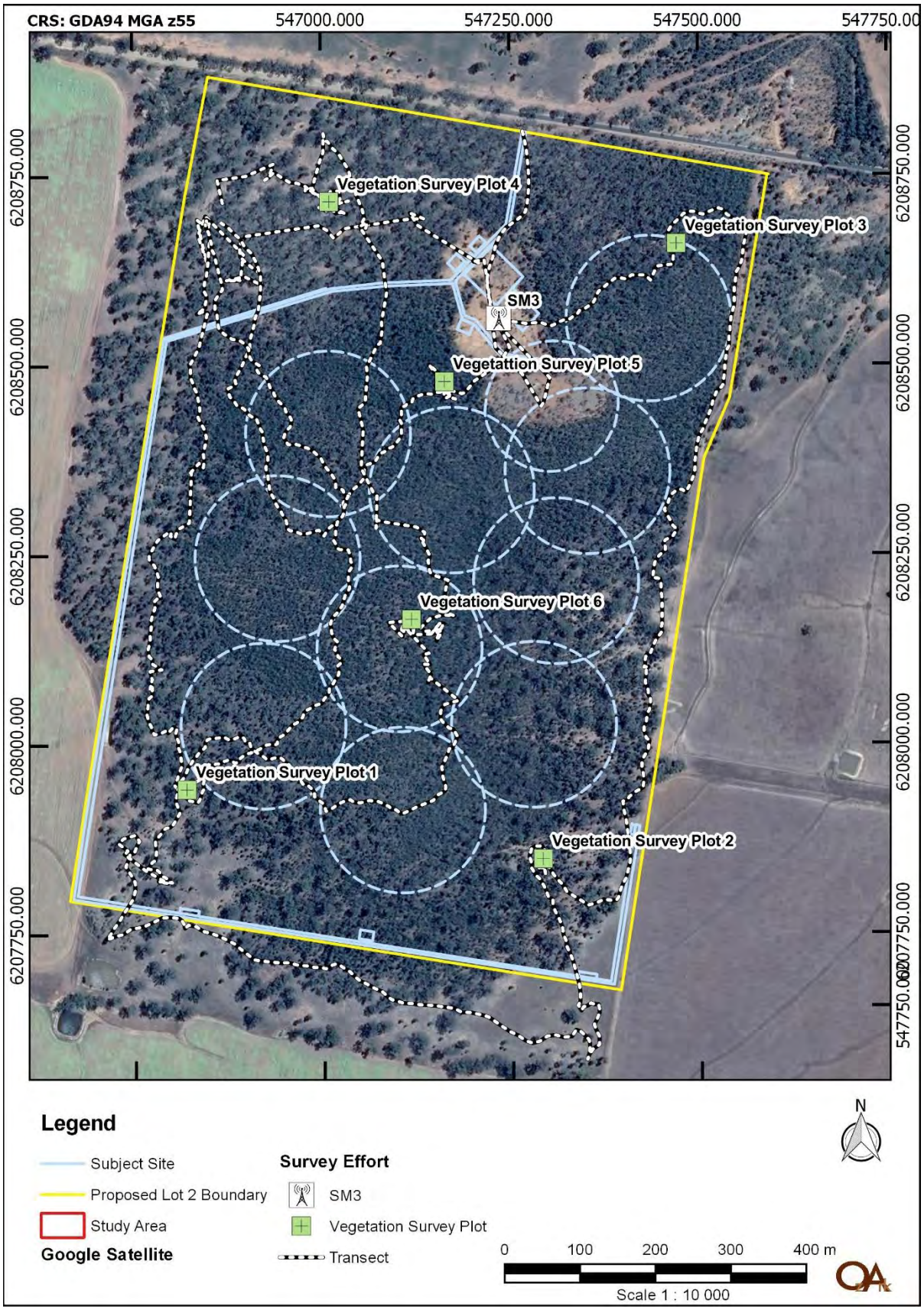
This report is based upon data acquired from recent and current surveys, however, it should be recognised that data gathered is indicative of the environmental conditions of the site at the time the report was prepared.

Limitations associated with the survey included:

- Trapping was not a component of the assessment.
- The field assessment was carried out in winter.

The above-mentioned constraints are not considered to compromise the findings or results of the field assessment as a precautionary approach to threatened species presence has been undertaken based upon a habitat assessment and literature review.

Figure 2-1: Survey transect and flora plots



3 Results

3.1 Landscape context

Landscape context of the study area locality is important when predicting the presence and abundance of species. Landscape features such as distance to water and land use can greatly influence the present of certain species in an area.

The topography of the study area is moderately steep in places and undulating in elevation between 280m and 320m AHD. The study area is part of the Reefton Hills and is about 4 kilometres south of Gidgingidginbung Pinnacle (**Figure 3-1**).

3.1.1 Climate

The study area is located within the South Western Slopes bioregion which has a sub-humid climate characterised by hot summers and no dry season. Average climate statistics from the Temora Research Station monitoring station show temperatures range from an average monthly maximum temperature of 31.5°C in January to an average monthly minimum temperature of 2.1°C in July. Average annual rainfall in the region of the study area is the highest in October with 52.2mm and lowest in February with 31.5mm (Bureau of Meteorology, 2017).

3.1.2 Mitchell Landscape

The proposal is located wholly within the Ardlethan Hills Mitchel Landscape unit. It is characterised by rolling hills and rises on Ordovician quartzose sandstone, greywacke, chert, and phyllite. General elevation ranges from 200m-412m, with a local relief of 50m-60m. Soils consist of stony red and brown texture-contrast soils merging to calcareous red earth on valley floors (Mitchell, 2002).

3.1.3 Land use

The study area has been mapped as a mixture of remnant native vegetation and agricultural grazing; part of the subject site has been historically quarried (OEH, 2013) (**Figure 3-2**).

Field survey of the project site revealed that the remnant vegetation had been lightly grazed; an apiary and evidence of recreational hunting / vermin control was also identified in the study area (**Plates 1** and **2**).

Plate 1: Apiary in the study area

Plate 2: Evidence of prior hunting

Figure 3-1: Topographical context of the study area

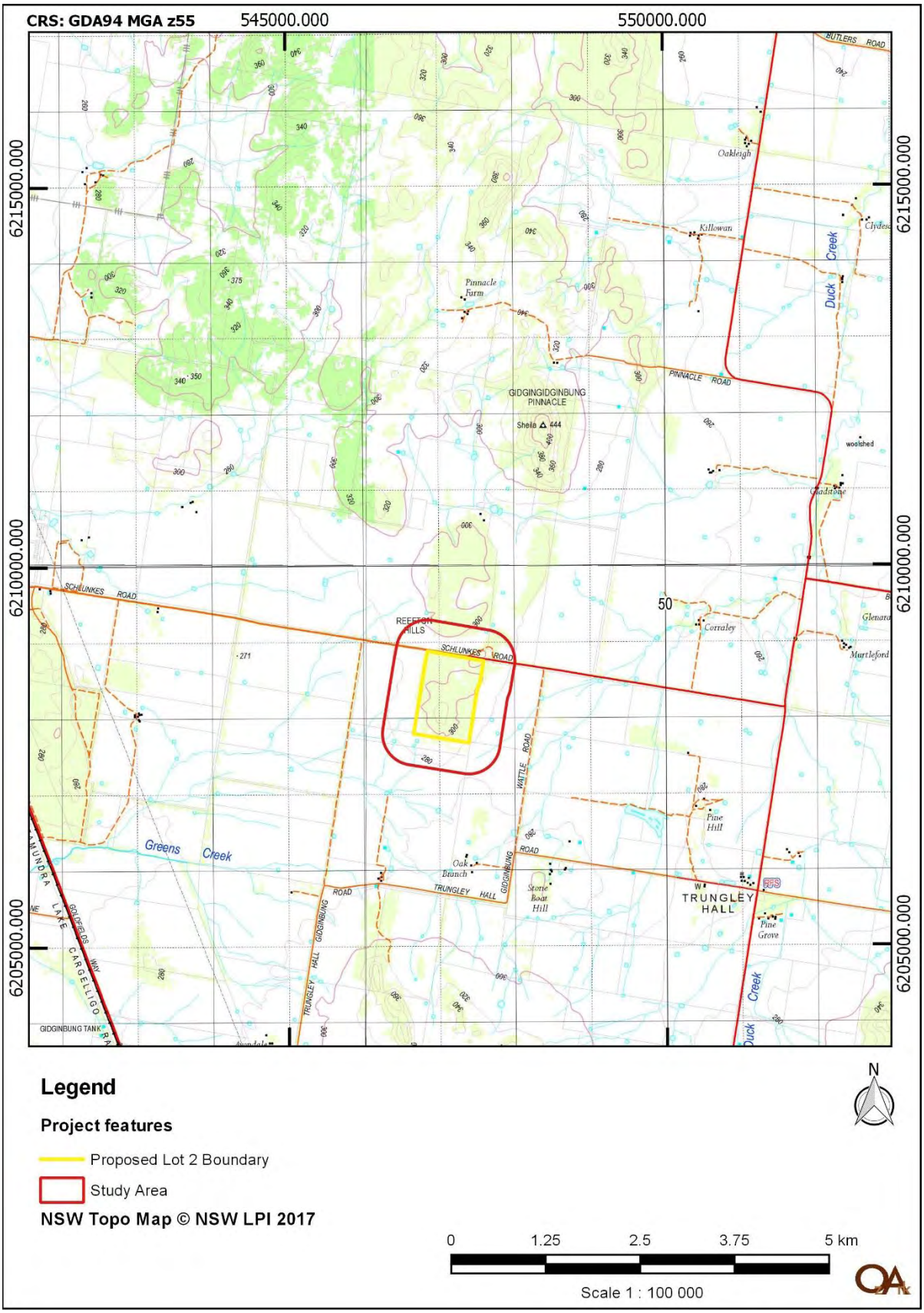
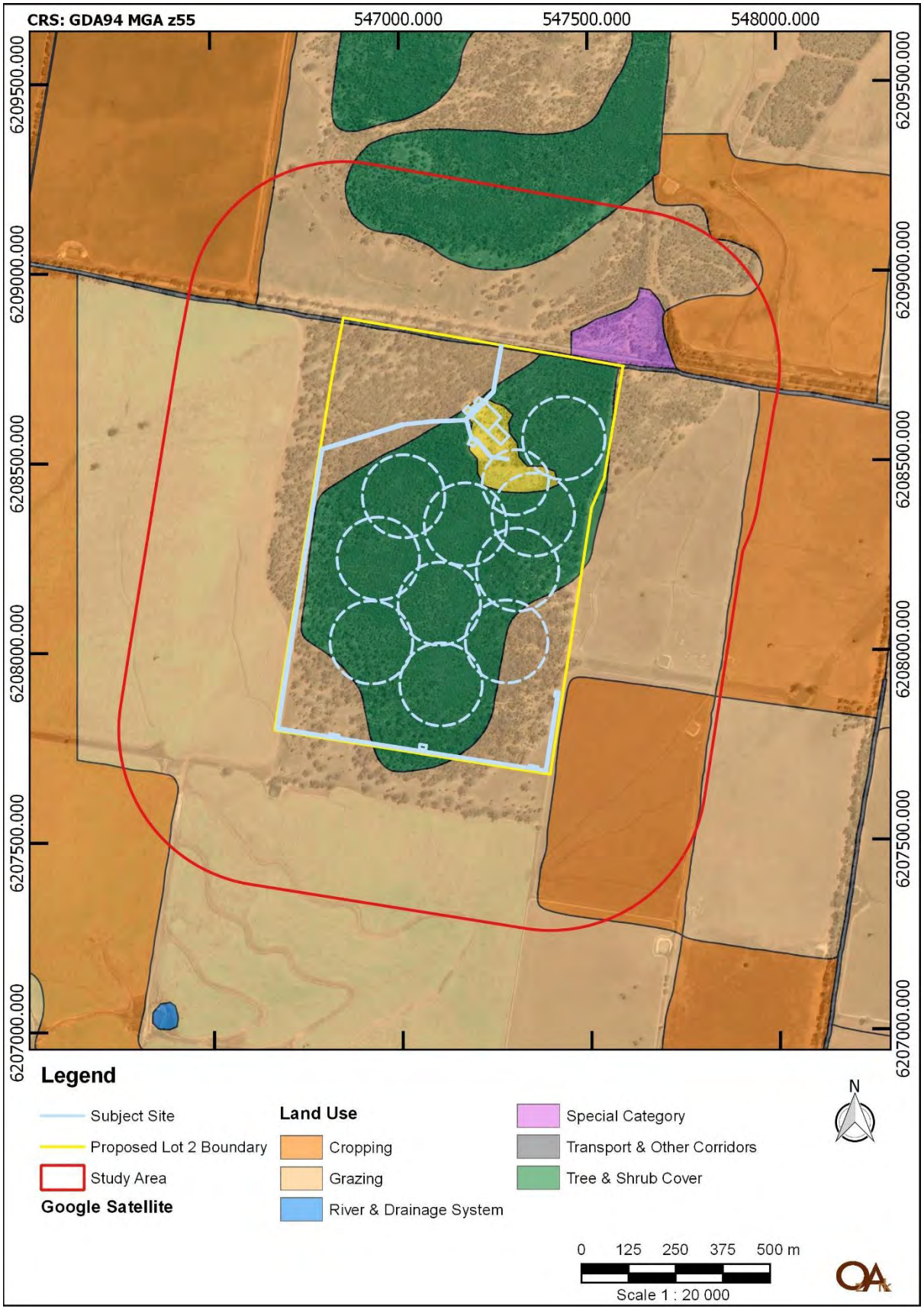


Figure 3-2: Land use of the study area



3.2 Aquatic ecological communities

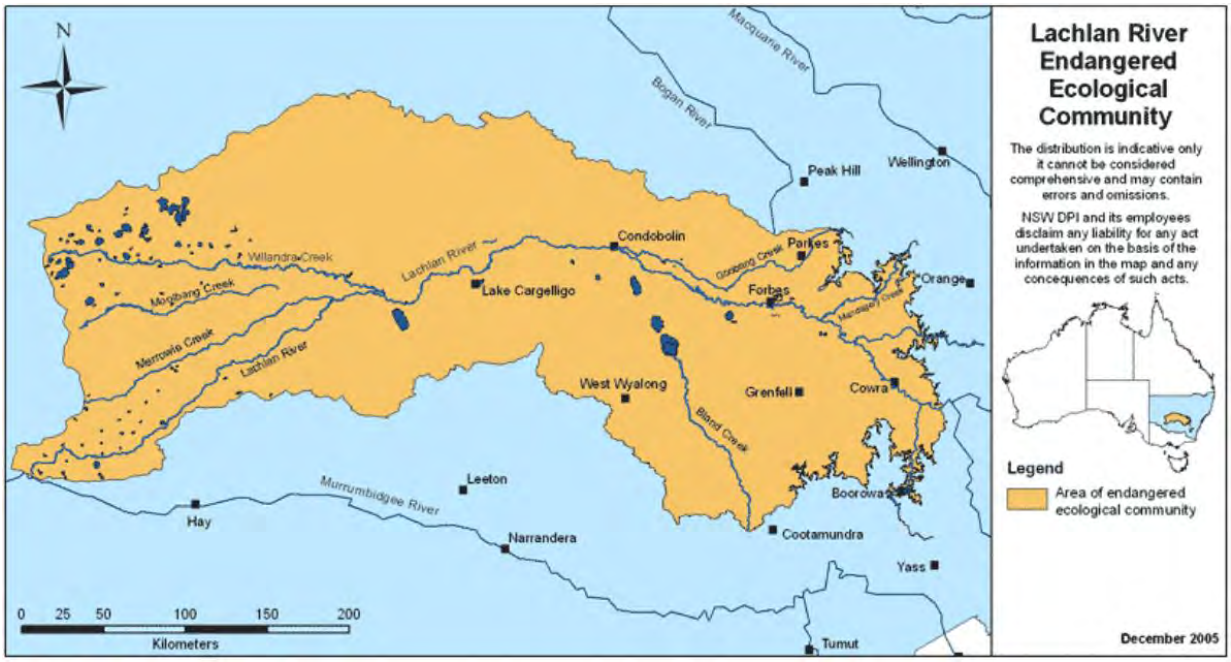
Endangered aquatic ecological communities face a very high risk of extinction in the near future as determined by the Fisheries Scientific Committee. An ecological community is eligible for listing as endangered if it has undergone a very large reduction in ecological function, geographic distribution or genetic diversity, and is affected by a threatening process (DPI, 2016).

3.2.1 Predicted and recorded aquatic ecological communities

Watercourses within the study area are part of the catchment for the *Lachlan River Endangered Ecological Community* (EEC).

The Lowland Catchment of the Lachlan River is part of the Murray-Darling Basin. The Lachlan River EEC includes all fish and aquatic invertebrates within all natural rivers, creeks, streams and associated lagoons, billabongs, lakes, wetlands, paleochannels, floodrunners, effluent streams (those that flow away from the river) and the floodplains of the Lachlan River within the State of New South Wales, and including Lake Brewster, Lake Cargelligo and Lake Cowal (DPI Fisheries, 2006). The extent of the Lachlan River EEC is mapped in **Figure 3-3**.

Figure 3-3: Extent of the Lachlan River EEC (Source: DPI Fisheries 2006)



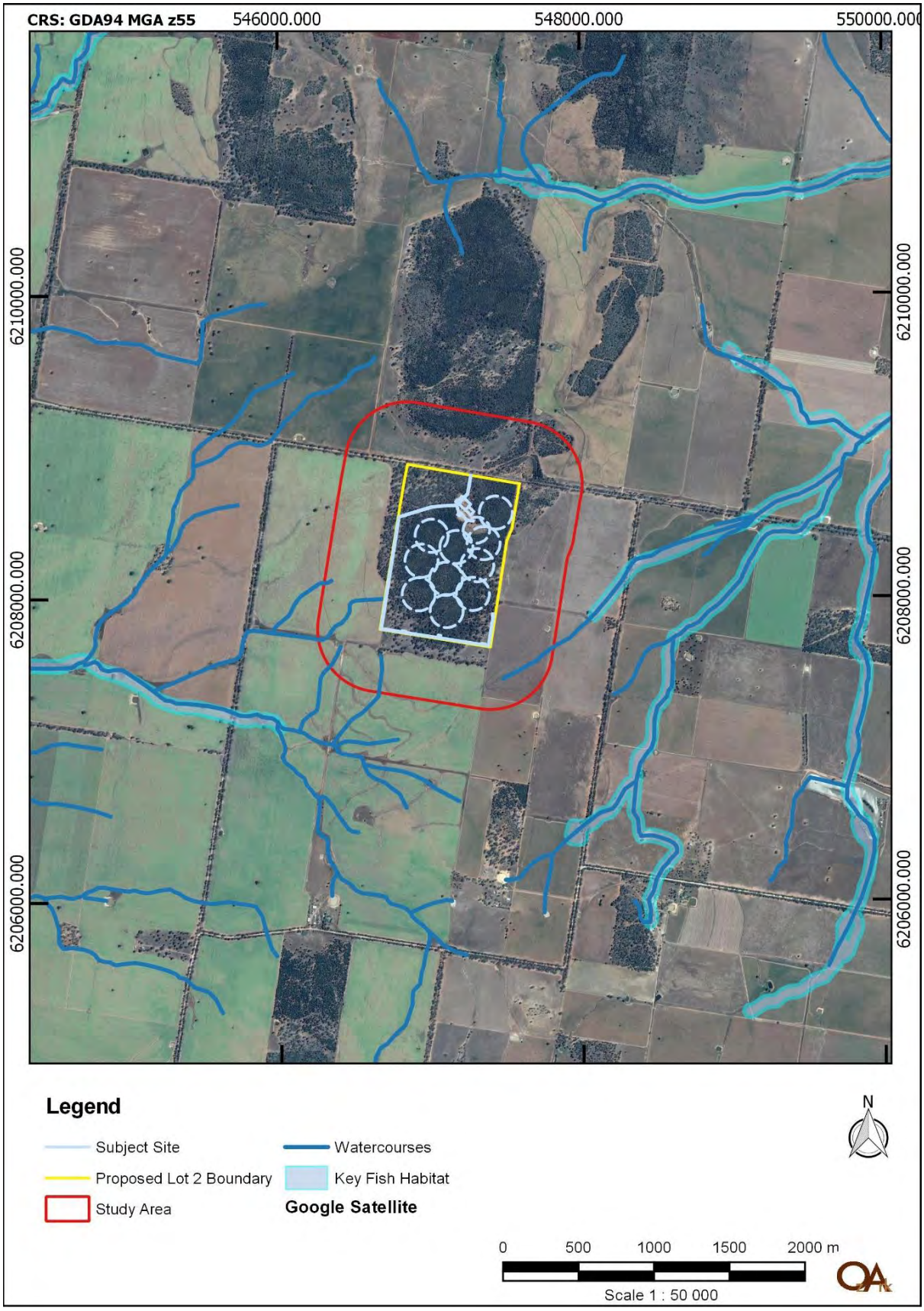
3.2.2 Drainage

Drainage features within the study area are limited to three unnamed Strahler first order tributary of Greens Creek and one unnamed Strahler first order tributary of Duck Creek (**Figure 3-4**). None of these drainage lines are located within the subject site.

3.2.3 Impact to aquatic ecological communities

The proposal will not directly impact any waterway. No impact to the Lachlan River EEC is anticipated.

Figure 3-4: Drainage of the study area



3.3 Terrestrial ecological communities

An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability (DoE, 2016).

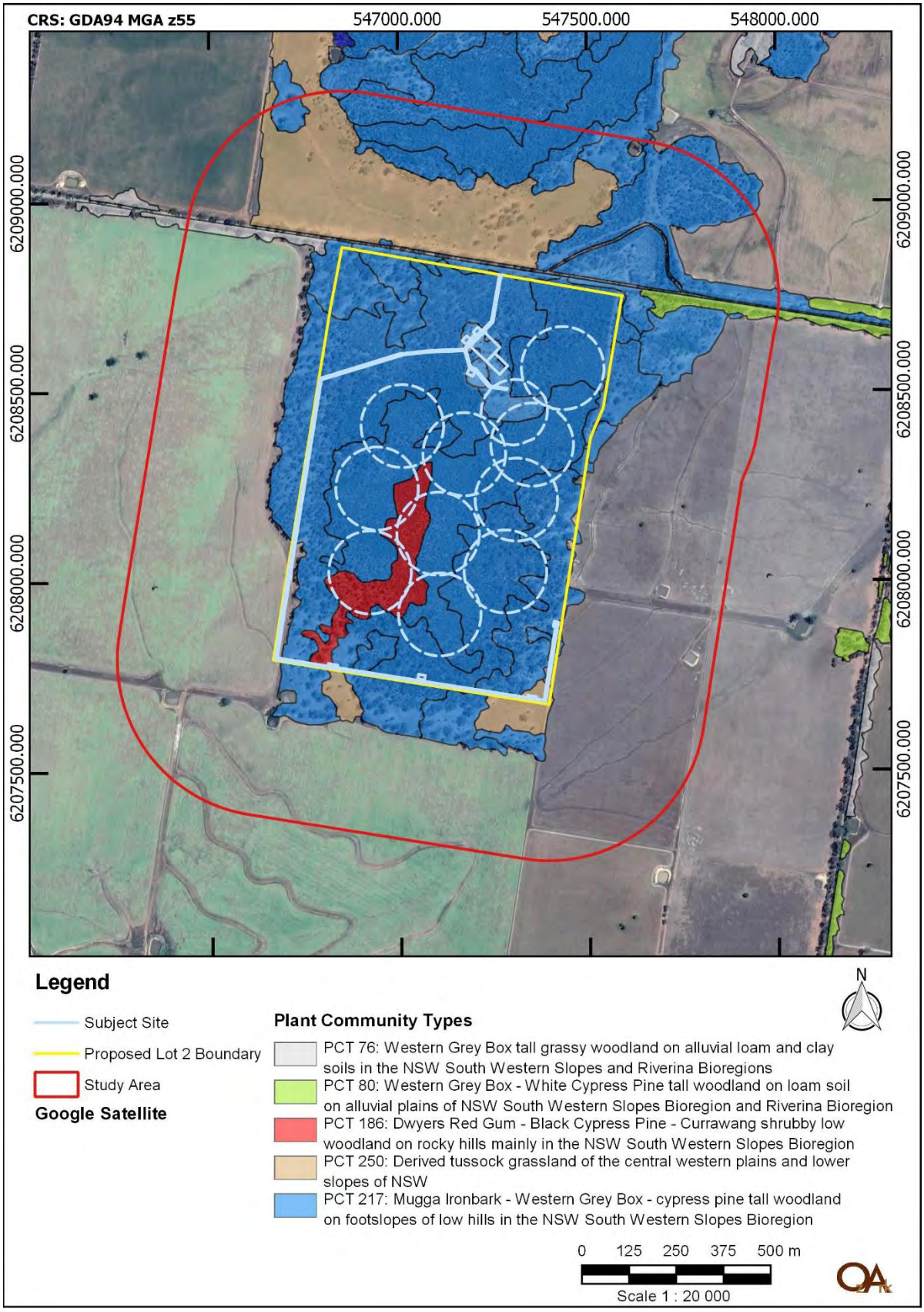
3.3.1 Predicted vegetation communities

The NSW Vegetation Information System (VIS) provides the NSW Government, its clients and the community with a central authoritative repository for native vegetation data. This data is generally comprised of predictive modelling extrapolated from field observations.

State Vegetation Type Map, Central West/Lachlan Regional Native Vegetation PCT Map, Version 1.0, Vegetation Information System (VIS) 4468 (OEH, 2016) was used to map the predicted vegetation communities. It found the following Plant Community Types (PCTs) were present in the study area (**Figure 3-3**):

- PCT 76: Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions.
- PCT 80: Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion.
- PCT 186: Dwyers Red Gum – Black Cypress Pine – Currawang Shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion.
- PCT 250: Derived tussock grassland of the central western plains and lower slopes of NSW.
- PCT 217: Mugga Ironbark – Western Grey Box – cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion.

Figure 3-5: Previously mapped vegetation communities of the study area



3.3.2 Recorded vegetation communities

Field survey of the subject site recorded two PCTs to be impacted by the proposal:

- PCT 76: Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions.
- PCT 217: Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion.

The extent of these vegetation communities is mapped in **Figure 3-6**. A description of each community is provided below.

PCT 76: Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions

PCT 76 is a tall woodland to 25m high, which is dominated by Western Grey Box (*Eucalyptus microcarpa*). Western Grey Box is often the only tree species often occupying 90% of the canopy cover but other trees may occur including Yellow Box (*Eucalyptus mellidora*), White Cypress Pine (*Callitris glaucophylla*) and Bulloak (*Allocasuarina luehmannii*).

The shrub layer is absent or sparse and includes *Dodonaea viscosa* subsp. *cuneata*, *Acacia buxifolia*, *Acacia acinacea*, *Acacia hakeoides*, *Bursaria spinosa*. Grazing has eliminated shrubs these in many places. A mid-dense or dense grass ground cover is present composed of *Austrodanthonia caespitosa*, *Austrodanthonia setacea*, *Austrostipa scabra* subsp. *falcata*, *Paspalidium constrictum*, *Themeda australis*, *Austrostipa aristiglumis*, *Aristida behriana* and *Elymus scaber* var. *scaber* along with introduced grass species such as *Bromus* spp., *Vulpia* spp. and *Hordeum leporinum*. The small scrambler *Einadia nutans* subsp. *nutans* is usually present. Native forbs include *Sida corrugata, Wahlenbergia gracilis, Vittadinia gracilis*, *Dianella porracea, Oxalis perennans* and *Chamaesyce drummondii*.

PCT 76 varies with soil type and drainage. Areas on heaver clays contain less shrubs and a rich forb/grass cover. Areas on lighter loam soils may contain White Cypress Pine and Yellow Box. Little is known about natural succession due to gross changes of understorey due to weed invasion. Fire may have played a significant role in grass/shrub dynamics.

Plate 3: PCT 76 recorded within the study area

PCT 217: Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion

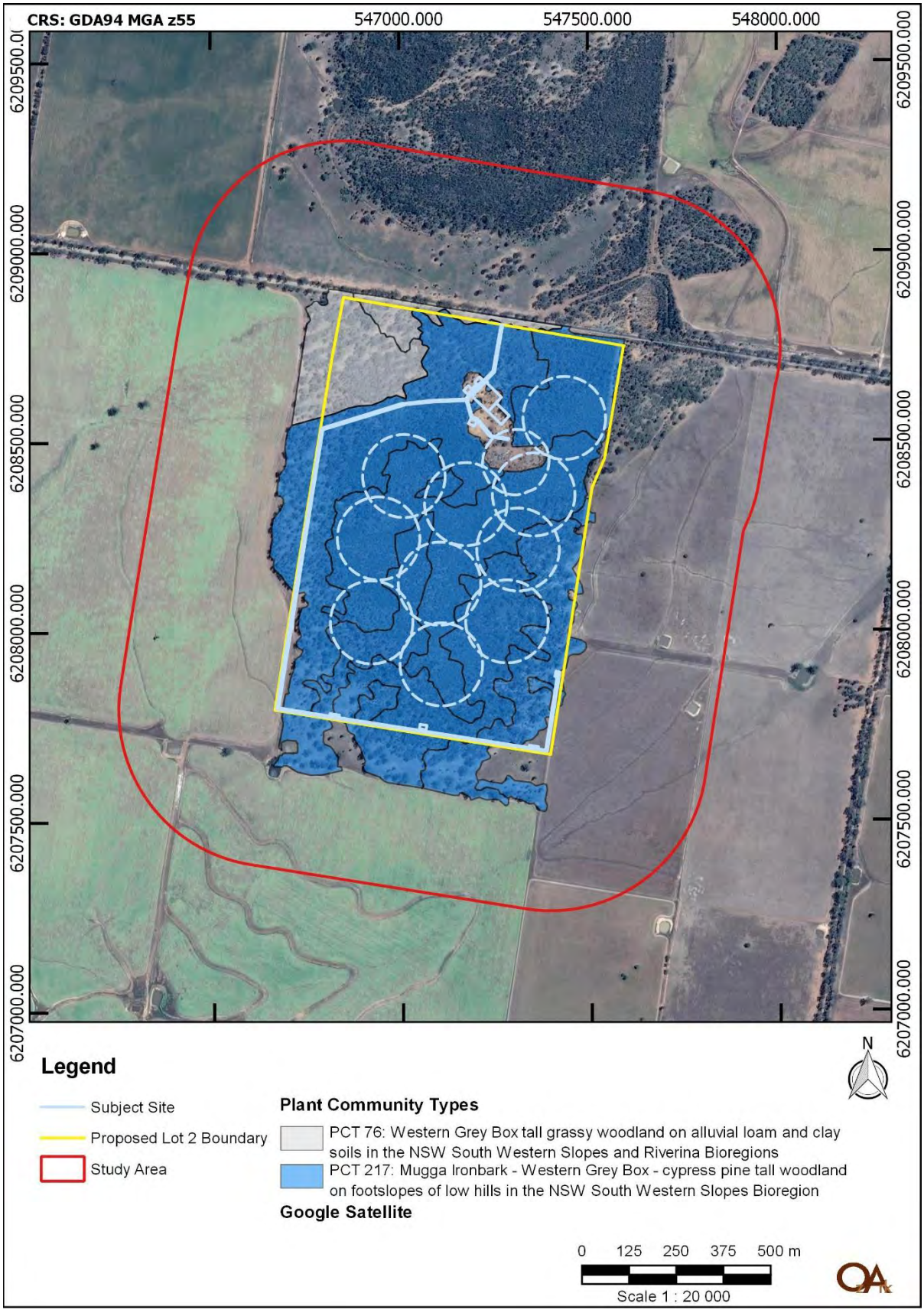
PCT 217 is a tall to very tall open forest to woodland to 25m high dominated by Mugga Ironbark (*Eucalyptus sideroxylon*) and Western Grey Box (*Eucalyptus microcarpa*) with either White Cypress Pine (*Callitris glaucophylla*) or Black Cypress Pine (*Callitris endlicheri*). Other trees may include Dwyer's Red Gum (*Eucalyptus dwyeri*), Kurrajong (*Brachychiton populneus* subsp. *populneus*) and Green Mallee (*Eucalyptus viridis*). Small trees include narrow-leaved quandong (*Santalum acuminatum*), Native Cherry (*Exocarpos cupressiformis*) or Currawong (*Acacia doratoxylon*).

The shrub layer is generally sparse but thickets may occur and species composition depends on grazing and burning history. It includes hop bushes (*Dodonaea viscosa* subsp. *spatulata*, *Dodonaea heterodmorpha*), cough bushes (*Cassinia uncata*, *Cassinia laevis*), wattles (*Acacia deanei, Acacia hakeoides, Acacia buxifolia*), daisy bushes (*Ozothamnus diosmifolius, Olearia ramulosa, Olearia ramulosa*), *Bertya cunninghamii*, *Grevillea floribunda* and *Leptospermum divaricatum*.

The ground cover is sparse to mid-dense with a scattering of small shrubs such as *Melichrus urceolatus* and *Lissanthe strigosa*. Grass species include *Eragrostis lacunaria*, *Austrostipa scabra, Austrostipa densiflora, Austrodanthonia setacea* and *Austrodanthonia fulva*. Forbs include *Calotis cuneifolia*, *Dianella revoluta* var. *revoluta*, *Xerochrysum viscosa, Einadia hastata* and *Goodenia hederacea* subsp. *hederacea*. Occurs on red-brown clay or clay-loam soil derived from sedimentary or metamorphic rocks on footslopes and hillslopes of low hills and rises in the undulating central western slopes of NSW.

Plate 4: PCT 217 recorded within the study area

Figure 3-6: Vegetation communities recorded in the study area



3.3.3 Threatened terrestrial ecological communities

An ecological community is listed as threatened if there is a significant decline in its distribution or ecological function. This could include a change in community structure or composition, disruption of ecological processes, invasion by exotic species, or habitat degradation or fragmentation (OEH, 2016).

PCT 76 is associated with the following Endangered Ecological Communities (EECs):

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – EPBC Act.
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions – TSC Act.

For this report, no delineation has been made between areas that meet the NSW listing criteria but do not meet the Commonwealth listing criteria. Management of the entire viable local population will ensure that no significant impact occurs to areas that qualify for protection under the EPBC Act.

Parts of PCT 76 meet the Commonwealth EPBC Act listing criteria for the Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia – endangered ecological community listing (Threatened Species Scientific Committee, 2010) (**Figure 3-7**). Although the vegetation plots did not meet the lower benchmark criteria to be protected under the Commonwealth listing; the precautionary principle has been applied to assume that parts of the mapped vegetation communities will be in a sufficient condition to meet this criteria. One of the disadvantages of applying random vegetation survey plots in the scientific methodology is that the random placement does not always allow for the capture of data in 'high quality' patches.

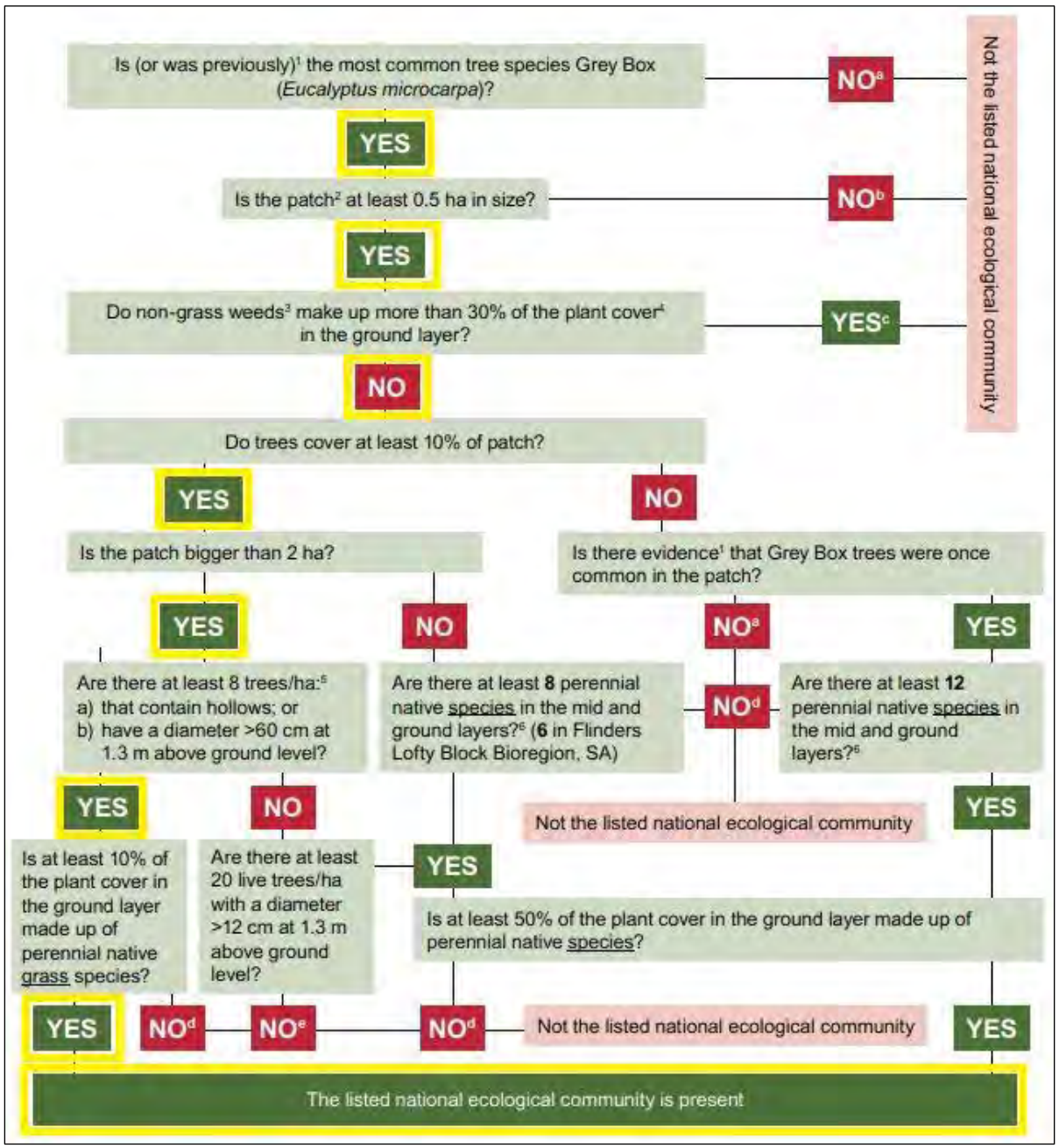
Inland Grey Box Woodland EEC includes those woodlands in which the most characteristic tree species*, Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea* subsp. *bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent. The community generally occurs as an open woodland 15–25 m tall but in some locations the over-storey may be absent as a result of past clearing or thinning, leaving only an understorey (OEH, 2011b).

The viable local population of the Inland Grey Box Woodland EEC has been mapped in **Figure 3-8**. The viable local population has been defined as the vegetation communities which have been mapped to be consistent with the Inland Grey Box Woodland EEC.

3.3.4 Groundwater dependant ecosystems

The study area is mapped by the Bureau of Meteorology (BoM) Atlas of Groundwater Dependant Ecosystems (GDEs) as having as having vegetation with a low potential for surface expression of groundwater (**Appendix E**).

Figure 3-7: EPBC Act guidelines for Grey Box Grassy Woodland EEC identification

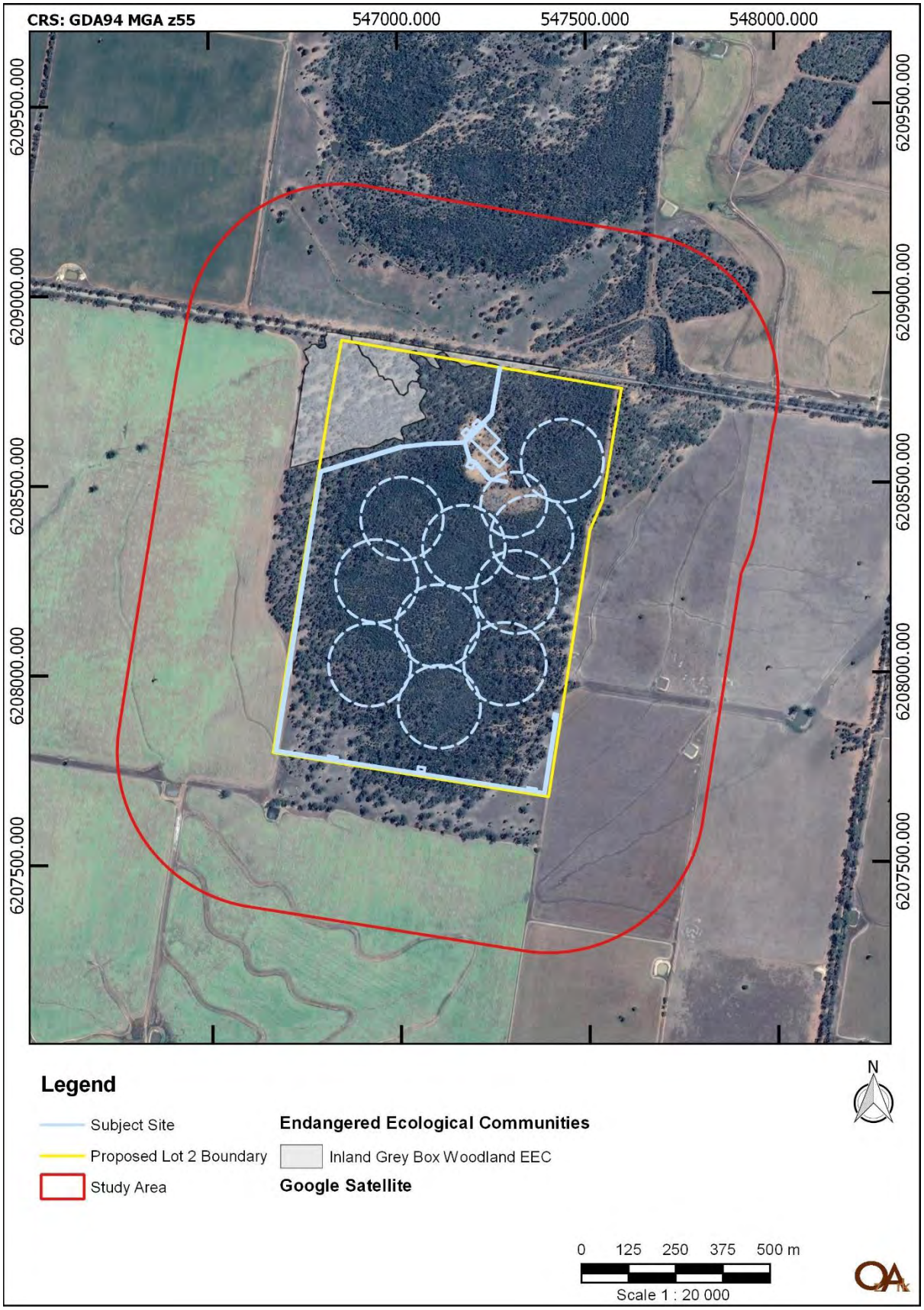


3.3.5 Impact to terrestrial ecological communities

The proposal has been redesigned to avoid impact to the Inland Grey Box Woodland EEC. There will be no significant impact to this EEC.

The direct impact to native vegetation (PCT 217) will be 2.72 ha, a further 2 ha of understorey vegetation is likely to be affected within the camp site. The trap, sporting clay and archery ranges are not expected to cause a measurable impact to vegetation.

Figure 3-8: Viable local population of threatened ecological communities



3.4 Flora

3.4.1 Predicted flora

A review of habitat requirements and database search records for each listed species, populations and ecological communities predicted to occur in the study area concluded three threatened plants have potential to be impacted by the proposal (**Table 3-1**).

Table 3-1: Threatened species with potential to be impacted by the proposal

Type	Scientific Name	Common Name	TSC Act	EPBC Act	Records in 10km
Herb	*Senecio garlandii*	Woolly Ragwort	Vulnerable		2
Orchids	*Diuris sp. (Oaklands, D.L. Jones 5380)*	Oaklands Diuris	Endangered		0
Orchids	*Diuris tricolor*	Pine Donkey Orchid	Vulnerable		0

3.4.2 Recorded flora

No threatened flora species were recorded within the study area. Threatened flora with assessed potential to occur within the study area are unlikely to be significantly impacted by the proposed work such that a viable local population would become locally extinct.

Impact on weed burden

The land use surrounding the study area is agricultural with a moderate weed burden. No significant invasion of the native vegetation communities with priority weed species was recorded during the field survey.

The proposal is unlikely to significantly increase the weed burden within the study area beyond existing levels. Risks include; increased traffic and vegetation clearing. Weed management is recommended for the study area as required during the operational phase of the proposal.

3.5 Fauna

3.5.1 Predicted threatened fauna

A review of habitat requirements and database search records for each listed species, population and ecological communities predicted to occur in the study area (**Figure 3-9**) concluded 16 threatened animals have potential to be impacted by the proposal (**Table 3-2**).

Table 3-2: Threatened fauna species with potential to be impacted by the proposal

Type	Scientific Name	Common Name	NSW Status	Commonwealth Status	10km Records
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	Vulnerable		11
Aves	*Chthonicola sagittata*	Speckled Warbler	Vulnerable		3
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	Vulnerable		21
Aves	*Epthianura albifrons*	White-fronted Chat	Vulnerable		2
Aves	*Falco subniger*	Black Falcon	Vulnerable		1
Aves	*Grantiella picta*	Painted Honeyeater	Vulnerable	Vulnerable	1
Aves	*Hieraaetus morphnoides*	Little Eagle	Vulnerable		2
Aves	*Lathamus discolor*	Swift Parrot	Endangered	Critically Endangered	2
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	Vulnerable		2
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	Vulnerable		3
Aves	*Neophema pulchella*	Turquoise Parrot	Vulnerable		2
Aves	*Pachycephala inornata*	Gilbert's Whistler	Vulnerable		4
Aves	*Petroica phoenicea*	Flame Robin	Vulnerable		1
Aves	*Polytelis swainsonii*	Superb Parrot	Vulnerable	Vulnerable	1
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	Vulnerable		19
Aves	*Stagonopleura guttata*	Diamond Firetail	Vulnerable		6
Bats	*Chalinolobus picatus*	Little Pied Bat	Vulnerable		0
Bats	*Nyctophilus corbeni*	Corben's Long-eared Bat	Vulnerable	Vulnerable	0
Bats	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	Vulnerable		0
Bats	*Vespadelus baverstocki*	Inland Forest Bat	Vulnerable		0
Marsupials	*Petaurus norfolcensis*	Squirrel Glider	Vulnerable		1

3.5.2 Recorded fauna

No threatened fauna species were recorded within the study area. Threatened fauna with assessed potential to occur within the study area are unlikely to be significantly impacted by the proposed work such that a viable local population would become locally extinct.

Eleven native fauna species and two invasive species were recorded in the subject site during the field survey (**Table 3-3**).

Table 3-3: Fauna recorded during the field survey

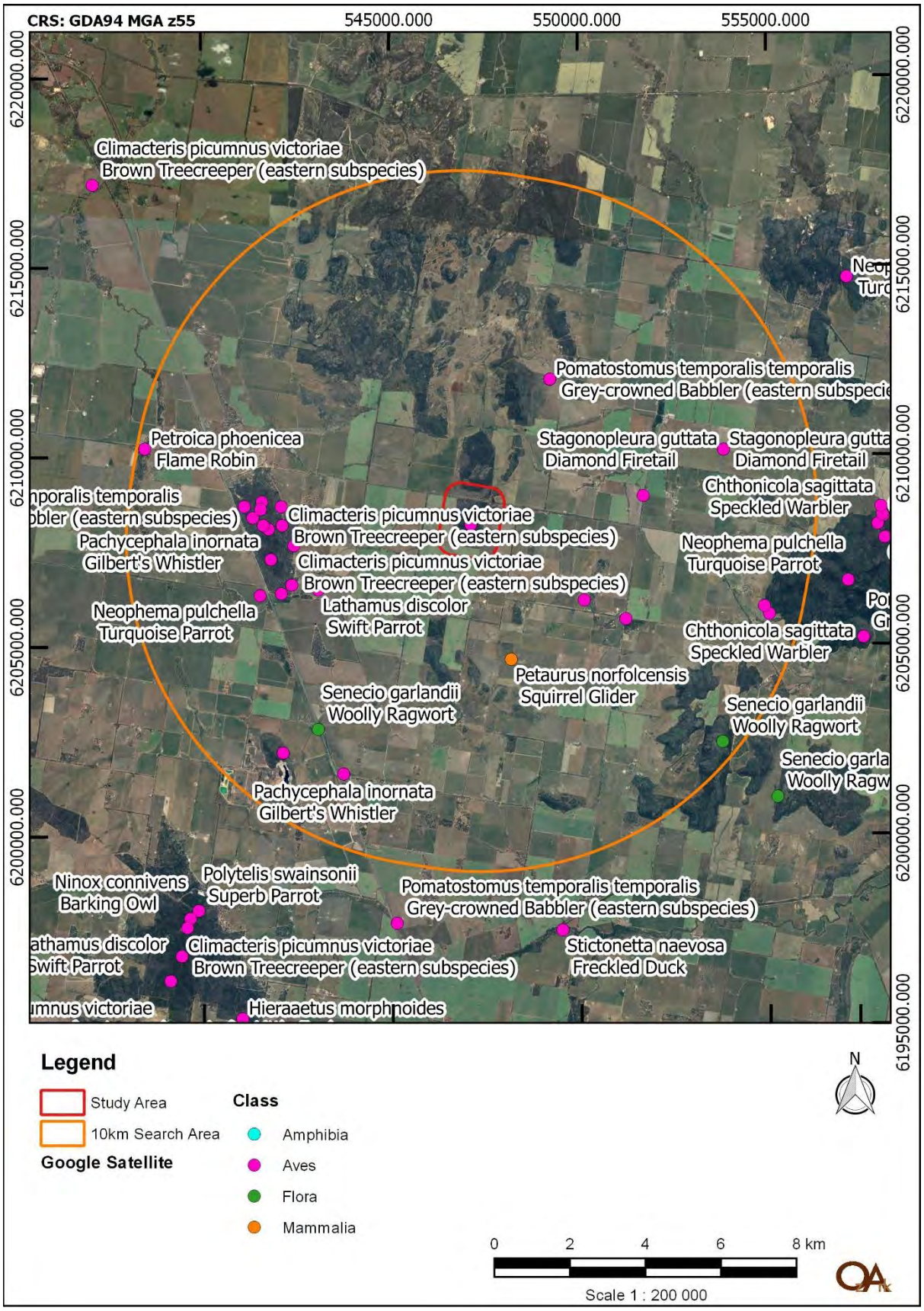
Type	Scientific Name	Common Name	TSC Act	EPBC Act
Aves	*Climacteris affinis*	White-browed Treecreeper		
Aves	*Eolophus roseicapilla*	Galah		
Aves	*Lichenostomus leucotis*	White-eared Honeyeater		
Aves	*Lichenostomus penicillatus*	White-plumed Honeyeater		
Aves	*Manorina melanocephala*	Noisy Miner		
Aves	*Ocyphaps lophotes*	Crested Pigeon		
Aves	*Platycercus eximius*	Eastern Rosella		
Aves	*Plectorhyncha lanceolata*	Striped Honeyeater		
Aves	*Pomatostomus superciliosus*	White-browed Babbler		
Aves	*Rhipidura albiscapa*	Grey Fantail		
Aves	*Rhipidura leucophrys*	Willie Wagtail		
Mammalia	*Ovis aries*	Sheep		
Mammalia	*Sus scrofa*	Pigs	KTP	
Marsupials	*Macropus giganteus*	Eastern Grey Kangaroo		

3.5.3 Impact to fauna

The proposal is unlikely to impact threatened fauna species or populations such that a viable local population is placed at risk of local extinction.

The proposal is likely to have a minor detrimental impact on bird populations within the subject site during shooting activities.

Figure 3-9: Threatened species within 10km of the study area



3.6 Key threatening processes

There are five Key Threatening Processes (KTP's) at the NSW or Commonwealth level which will be exacerbated by the proposal:

- Clearing of native vegetation.
- Bushrock removal.
- Anthropogenic climate change.
- Removal of dead wood and dead trees.
- Loss or degradation (or both) of sites used for hill-topping by butterflies.

A summary of the proposed impacts relating to the relevant key threatening processes is given in **Table 3-4**.

Table 3-4: Review of proposed impacts to key threatening processes

Key Threatening Process	TSC Act	FM Act	EPBC Act	KTP present in study area?	Exacerbated?
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)	✔		✔	No	No
Alteration of habitat following subsidence due to longwall mining	✔			No	No
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	✔	✔		Yes	No
Anthropogenic climate change	✔	✔	✔	Yes	Negligible
Bushrock removal	✔			No	**Yes**
Clearing of native vegetation	✔		✔	Yes	Yes
Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*)	✔		✔	Yes	No
Competition and habitat degradation by feral goats (*Capra hircus*)	✔		✔	No	No
Competition from feral honey bees (*Apis mellifera*)	✔			Yes	No
Death or injury to marine species following capture in shark control programs on ocean beaches	✔	✔		No	No
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	✔		✔	No	No
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	✔			No	No
Herbivory and environmental degradation caused by feral deer	✔			Yes	No
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	✔			Yes	No
Hook and line fishing in areas important for the survival of threatened fish species		✔		No	No
Importation of red imported fire ants (*Solenopsis invicta*)	✔		✔	No	No
Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South			✔	No	No

Key Threatening Process	TSC Act	FM Act	EPBC Act	KTP present in study area?	Exacerbated?
Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations			✔	No	No
Infection by psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations	✔		✔	Yes	No
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	✔		✔	No	No
Infection of native plants by *Phytophthora cinnamomi*	✔		✔	No	No
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	✔			No	No
Introduction of non-indigenous fish and marine vegetation to the coastal waters of New South Wales		✔		No	No
Introduction of the large earth bumblebee (*Bombus terrestris*)	✔			No	No
Invasion and establishment of exotic vines and scramblers	✔			No	No
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	✔			Yes	No
Invasion and establishment of the cane toad (*Bufo marinus*)	✔		✔	No	No
Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidata*	✔			No	No
Invasion of native plant communities by exotic perennial grasses	✔			Yes	No
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	✔			No	No
Invasion of northern Australia by Gamba Grass and other introduced grasses			✔	No	No
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	✔		✔	No	No
Invasion, establishment and spread of *Lantana camara*	✔			No	No
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	✔		✔	No	No
Loss of hollow-bearing trees	✔			Yes	No
Loss or degradation (or both) of sites used for hill-topping by butterflies	✔			No	Yes
Novel biota and their impact on biodiversity			✔	No	No
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	✔			Yes	No
Predation by exotic rats on Australian offshore islands of less than 1000 km2 (100,000 ha)			✔	No	No
Predation by the European red fox (*Vulpes vulpes*)	✔		✔	Yes	No

Key Threatening Process	TSC Act	FM Act	EPBC Act	KTP present in study area?	Exacerbated?
Predation by the feral cat (*Felis catus*)	✔		✔	Yes	No
Predation by the ship rat (*Rattus rattus*) on Lord Howe Island	✔		✔	No	No
Predation by *Gambusia holbrooki* Girard, 1859 (plague minnow or mosquito fish)	✔			No	No
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	✔		✔	Yes	No
Removal of dead wood and dead trees	✔			Yes	Yes
The degradation of native riparian vegetation along New South Wales water courses		✔		No	No
The introduction of fish to fresh waters within a river catchment outside their natural range		✔		No	No
The removal of large woody debris from NSW rivers and streams		✔		No	No

3.7 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government DoEE. No MNES will be impacted by the proposed works (**Table 3-5**).

Table 3-5: Impacts to Matters of National Environmental Significance

Factor	Impact
Any impact on a World Heritage property?	NIL
Any impact on a National Heritage place?	NIL
Any impact on a wetland of international importance?	NIL
Any impact on a listed threatened species or communities?	NIL
Any impacts on listed migratory species?	NIL
Any impact on a Commonwealth marine area?	NIL
Does the proposal involve a nuclear action (including uranium mining)?	NIL
Additionally, any impact (direct or indirect) on Commonwealth land?	NIL
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	NIL

3.8 Significance of potential impact

Management of ecological items is determined on the basis of their assessed significance as well as the likely impact of the proposal. Significance of a species, population or community is determined by appointed NSW and National Scientific Committees; with cultural and public significance are considerations within the significance determination process. Within the framework of an impact assessment, impact to listed significant items must be assessed at a state level (under the FM Act and TSC Act), and if also nationally listed, under the EPBC Act. The following sections identify state or nationally listed threatened species and then determines if the impact is 'significant'.

3.8.1 Commonwealth legislation

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

The habitat assessment identified five species listed under the EPBC Act which may potentially be affected by the proposal (**Appendix B**).

Table 3-6 gives an overview of the assessments and shows that the proposal:

1. Is not likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance are:
    i. World heritage properties.
    ii. National heritage places.
    iii. Wetlands of international importance.
    iv. Threatened species and ecological communities.
    v. Migratory species.
    vi. Commonwealth marine areas.
    vii. The Great Barrier Reef Marine Park. And;
    viii. Nuclear actions (including uranium mines).
    ix. A water resource, in relation to coal seam gas development and large coal mining development.
2. Is not likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013).

Table 3-6: Summary of the findings of EPBC Act significance assessments

Threatened species, or communities		Important population	Likely significant impact?
Bats			
Nyctophilus corbeni	Corben's Long-eared Bat	No	No
Birds			
Grantiella picta	Painted Honeyeater	No	No
Lathamus discolor	Swift Parrot	No	No
Merops ornatus	Rainbow Bee-eater	No	No
Polytelis swainsonii	Superb Parrot	No	No
Endangered Ecological Communities			
Grey Box *(Eucalyptus microcarpa)* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		Yes	No

3.8.2 NSW legislation

Twenty-seven subject species listed under the NSW TSC Act have been identified in the predictive model with potential to occur in the study area.

Table 3-7 gives an overview of the results of the seven-part tests (**Appendix D**) and shows a *Species Impact Statement* is not required, because:

1. In the case of a threatened species, the proposal is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
2. In the case of an endangered population, the proposal is not likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.
3. In the case of an endangered ecological community or critically endangered ecological community:
    i. The proposal is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
    ii. The proposal is not likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.
4. In relation to the habitat of a threatened species, population or ecological community:
    i. The extent to which habitat is likely to be removed or modified as a result of the proposal is not significant, and
    ii. That an area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the proposal, and
    iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality is not significant.
5. That the proposal is not likely to have an adverse effect on critical habitat (either directly or indirectly).
6. That the proposal is not consistent with the objectives or actions of a recovery plan or threat abatement plan.
7. That the proposal constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Table 3-7: Summary of the findings of TSC Act 7-Part Tests

Threatened species, or communities		7-Part Test Questions							Likely significant impact?
		1	2	3	4	5	6	7	
Aves									
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N	X	X	N	N	Y	Y	No
Chthonicola sagittata	Speckled Warbler	N	X	X	N	N	Y	Y	No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	N	X	X	N	N	Y	Y	No
Epthianura albifrons	White-fronted Chat	N	X	X	N	N	Y	Y	No

Threatened species, or communities		7-Part Test Questions							Likely significant impact?
		1	2	3	4	5	6	7	
Falco subniger	Black Falcon	N	X	X	N	N	Y	Y	No
Grantiella picta	Painted Honeyeater	N	X	X	N	N	Y	Y	No
Hieraaetus morphnoides	Little Eagle	N	X	X	N	N	Y	Y	No
Lathamus discolor	Swift Parrot	N	X	X	N	N	Y	Y	No
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	N	X	X	N	N	Y	Y	No
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	N	X	X	N	N	Y	Y	No
Merops ornatus	Rainbow Bee-eater	N	X	X	N	N	Y	Y	No
Neophema pulchella	Turquoise Parrot	N	X	X	N	N	Y	Y	No
Pachycephala inornata	Gilbert's Whistler	N	X	X	N	N	Y	Y	No
Petroica phoenicea	Flame Robin	N	X	X	N	N	Y	Y	No
Polytelis swainsonii	Superb Parrot	N	X	X	N	N	Y	Y	No
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	N	X	X	N	N	Y	Y	No
Stagonopleura guttata	Diamond Firetail	N	X	X	N	N	Y	Y	No
Bats									
Chalinolobus picatus	Little Pied Bat	N	X	X	N	N	Y	Y	No
Nyctophilus corbeni	Corben's Long-eared Bat	N	X	X	N	N	Y	Y	No
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	N	X	X	N	N	Y	Y	No
Scoteanax rueppellii	Greater Broad-nosed Bat	N	X	X	N	N	Y	Y	No
Vespadelus baverstocki	Inland Forest Bat	N	X	X	N	N	Y	Y	No
Marsupials									
Petaurus norfolcensis	Squirrel Glider	N	X	X	N	N	Y	Y	No
Flora									
Senecio garlandii	Woolly Ragwort	N	X	X	N	N	Y	Y	No
Diuris sp. (Oaklands, D.L. Jones 5380)	Oaklands Diuris	N	X	X	N	N	Y	Y	No
Diuris tricolor	Pine Donkey Orchid	N	X	X	N	N	Y	Y	No
Communities									
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions		X	X	N	N	N	Y	Y	No

Notes: Y= Yes (negative impact), N= No (no or positive impact), P = Potential, X= not applicable, ?= unknown impact.

4 Environmental safeguards

The proposal has followed the principles of 'avoid, minimise, mitigate' to reduce the impact of the proposal on local biodiversity values.

4.1 Avoid impact

The following avoidance measures have been made:

- Areas mapped as consistent with the Inland Grey Box Woodland EEC have been avoided. The proposal has been redesigned to retain these areas.

4.2 Minimise impact

The design of the proposal has minimised the potential impact to biodiversity by:

- Minimising the size and extent of access roads and car parks.
- Clustering the club house and amenities buildings with the proposed shooting ranges.
- Designing the proposed shooting ranges over the previously quarried area to minimise vegetation removal.

4.3 Mitigate impact

The mitigation measures in **Table 4-1** have been recommended to reduce the potential impact of the proposal.

Table 4-1: Summary of mitigation methods

Impact	Environmental safeguards	Responsibility	Timing
General	1. All personnel would be inducted to be aware that any impact to threatened species, populations or communities have legislative consequences whether deliberate or accidental without development approval under the EP&A Act. 2. Evidence of all personnel receiving an induction would be kept on file (signed induction sheets etc.). 3. A profile for each of the subject species previously recorded within 10km of the study area will be shown to personnel during inductions. Pictures of these species would be included in the profile to assist staff in avoiding these species. 4. Any change in design outside the assessed impact footprint within the study area will require further ecological survey.	Proponent	Pre-construction, construction, operation
Clearing and prevention of over-clearing	5. Before starting work, a physical vegetation clearing boundary at the approved clearing limit is to be demarcated and implemented. The delineation of such a boundary may include the use of temporary fencing, flagging tape, or similar. 6. Vegetation would be removed in a manner that avoids damage to surrounding vegetation. Ensure groundcover disturbance is kept to a minimum. 7. Where possible, vegetation to be removed would be mulched on-site and re-used to stabilise disturbed areas.	Contractor	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	8. Prior to clearing, inspect trees with bird nests or hollows before pushing or felling to ensure the nests are vacant. Inspection would occur immediately before pushing or felling. If a bird is in the nest, clear the trees around it first to see if the animal will disperse. If the bird is a nestling all measures would be taken to collect the bird and remove to a safe location. 9. Trees with nests or hollows are to be "knocked" and watched for movement of fauna for at least 15 minutes, before felling occurs. 10. Parts of trees from tree felling can be placed in areas of native vegetation to be retained. This will provide habitat complexity in the form of fallen timber to increase species diversity.		
Soil Management	11. Erosion and sediment controls in line with Landcom's Managing Urban Stormwater, Soils & Construction Guidelines (The Blue Book. Landcom 2004) are required. 12. Erosion and sedimentation controls are to be checked and maintained on a regular basis. Including clearing of sediment from behind barriers and after heavy rainfall events. 13. Erosion and sediment control measures are not to be removed until the works are complete and areas are stabilised.	Contractor	Pre-construction and construction
Introduction and spread of noxious weeds and pathogens	14. If declared noxious weeds are identified during construction they would be managed according to the requirements of the *Biosecurity Act 2015.* 15. Construction machinery (bulldozers, excavators, trucks, loaders and graders) would be cleaned using a high-pressure washer (or other suitable device) before entering and exiting work sites. 16. All pesticides would be used in accordance with the requirements on the label. Any person carrying out pesticide (including herbicide) application would be trained to do so and have the proper certificate of completion/competency or statement of attainment issued by a registered training organisation.	Contractor	Construction
Introduction of invasive fauna	17. All food scraps and rubbish are to be appropriately disposed of in sealed receptacles to prevent providing forage habitats for foxes, rats, dogs and cats.	Contractor	Construction
Disturbance to fallen timber, dead wood and bush rock	18. Any fallen timber, dead wood and bush rock (if present) encountered on site would be left in situ or relocated to a suitable place nearby. Rock would be removed with suitable machinery so as not to damage the underlying rock or result in excessive soil disturbance.	Contractor	Construction

5 Conclusion

PCT 76 is associated with the following Endangered Ecological Communities (EECs):

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – EPBC Act.
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions – TSC Act.

No threatened fauna or flora species were recorded within the study area. Threatened species with assessed potential to occur within the study area are unlikely to be significantly impacted by the proposed work such that a viable local population would become locally extinct.

Eleven native fauna species and two invasive species were recorded in the subject site during the field survey.

The proposal has followed the principles of 'avoid, minimise, mitigate' to reduce the impact of the proposal on local biodiversity values.

The following avoidance measures have been made:

- Areas mapped as consistent with the Inland Grey Box Woodland EEC have been avoided. The proposal has been redesigned to retain these areas.

The design of the proposal has minimised the potential impact to biodiversity by:

- Minimising the size and extent of access roads and car parks.
- Clustering the club house and amenities buildings with the proposed shooting ranges.
- Designing the proposed shooting ranges over the previously quarried area to minimise vegetation removal.

Further mitigation measures have been recommended to manage the potential impact to biodiversity to minimise risk.

Having considered the ecology within the study area and the proposed impact, it is apparent that the proposal is:

- Unlikely to significantly affect any of the listed threatened species, fauna populations or communities.
- Unlikely to augment or significantly contribute to any of the National or State listed Key Threatening Processes.
- Unlikely to significantly affect any Ramsar wetland or any listed migratory species.
- Unlikely to significantly affect local hydrology.

The proposed activity should not be considered to constitute a significant impact and, as such, no Species Impact Statement (SIS) is warranted.

No specific licences, permits, approvals and notifications required for the construction, maintenance and operation of the proposal under Part 4 of the EP&A Act have been identified.

6 References

Allen, C. B., Benson, J. S., Togher, C., & Lemmon, J. (2006). New South Wales Vegetation Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. *Cunninghamia*, 383-450.

Benson, J. (2009). *New South Wales Vegetation Classification and Assessment, NSWVCA batabase.* Sydney: NSW DEC.

Bureau of Meteorology. (2017). *Climate statistics for Australian locations*. Retrieved from http://www.bom.gov.au/climate/averages/tables/cw_065070.shtml

Cropper, S. (1993). *Management of Endangered Plants.* East Melbourne: CSIRO Publishing.

Cunningham, G., Mulham, W., Milthorpe, P., & Leigh, J. (1992). *Plants of Western New South Wales.* Collingwood, VIC: CSIRO Publishing.

DEC. (2004). *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities.* Sydney, NSW: NSW Government Department of Environment and Conservation.

DEC. (2009). *Biobanking Assessment Methodology and Credict Calculator Operation Manual .* Sydney: Department of Environment and Climate Change.

DECCW. (2010). *Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions.* Sydney: Department of Environment, Climate Change and Water.

DoE. (2013). *Matters of National Environmental Significance - Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999.* Department of the Environment. Canberra, ACT: Commonwealth of Australia . Retrieved April 2015, from http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf

DoE. (2016, August 12). *Threatened ecological communities*. Retrieved from Australian Government Department of the Environment: https://www.environment.gov.au/biodiversity/threatened/communities

DPI. (2016, August 12). *Listed threatened species, populations and ecological communities*. Retrieved from NSW Government Department of Primary Industries: http://www.dpi.nsw.gov.au/fishing/species-protection/conservation/what-current

DPI Fisheries. (2006). *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River.* Nelson Bay: DPI Fisheries. Retrieved from http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/634507/aquatic-ecological-community-in-the-natural-drainage-system-of-the-lowland-catchment-of-the-lachlan-river.pdf

DPI Water. (2012, July). *Controlled activity exemptions on waterfront land.* Retrieved from http://www.water.nsw.gov.au/__data/assets/pdf_file/0010/547048/licensing_approvals_controlled_activities_exemptions_factsheet.pdf

Harden, G. (1990-2002). *Flora of New South Wales* (Vols. 1 (Revised Ed.), 2 (Revised Ed.), 3 and 4). Sydney: New South Wales University Press.

Mitchell. (2002). *Descriptions for NSW (Mitchell) Landscapes.* NSW: NSW Government Department of Environment and Climate Change.

OEH. (2011a). *Vegetation mapping by 3-D digital aerial photo interpretation: vegetation of central-southern New South Wales.* Queanbeyan, NSW: NSW Office of Environment and Heritage.

OEH. (2011b, February 28). *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions - endangered ecological community listing.* Retrieved May 18, 2015, from http://www.environment.nsw.gov.au/determinations/EucalyptusMicrocarpaEndCom.htm

OEH. (2013). NSW Land Use. Hurtsville, NSW, Australia: OEH. Retrieved from https://www.finance.nsw.gov.au/ict/sites/default/files/NSW%20Government%20Foundation%20Spatial%20Data%20Framework.pdf

OEH. (2014). *BioBanking Asessment Methodology 2014.* Retrieved October 2015, from http://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf

OEH. (2016). *State Vegetation Type Map: Central West / Lachlan Regional Native Vegetation PCT Map Version 1.0. VIS_ID 4468.* Retrieved from http://data.environment.nsw.gov.au/dataset/central-west-lachlan-regional-native-vegetation-pct-map-version-1-0-vis_id-4358182f4

OEH. (2016, June 30). *Threatened ecological communities*. Retrieved from NSW Government Office of Environment & Heritage: http://www.environment.nsw.gov.au/threatenedspecies/hometec.htm

RBG. (2017). *PlantNET*. (Royal Botanic Gardens and Domain Trust) Retrieved 2015, from PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust: http://plantnet.rbgsyd.nsw.gov.au

Threatened Species Scientific Committee. (2010, March). *Advice to the Minister for Environment Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Threatened Ecological Communities under the EPBC Act.* Retrieved May 2015, from http://www.environment.gov.au/biodiversity/threatened/communities/pubs/86-listing-advice.pdf

Appendix A: Field survey results

Flora species list

Project Name: Trungley Hall Shooters Complex						
20x20m Plot ID	**1**	**2**	**3**	**4**	**5**	**6**
GPS Zone	55	55	55	55	55	55
GDA N	6207940.09	6207847.27	6208658.485	6208714.884	6208477.16	6208163.742
GDA E	546818.4507	547290.1016	547470.017	547010.0023	547161.9138	547116.8735
Details						
20x20m Plot ID	**1**	**2**	**3**	**4**	**5**	**6**
Dominant Stratum	Upper	Mid	Upper	Upper	Mid	Mid
Dominant Stratum % Cover	30%	40%	35%	30%	60%	50%
Landscape Position and Mitchell Landscape	Slope Ardlethan Hills	Slope Ardlethan Hills	Valley Ardlethan Hills	Flats Ardlethan Hills	Crest Ardlethan Hills	Crest Ardlethan Hills
Health	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
Condition	Good	Good	Good	Good	Good	Good
Plant Community Type	217	217	217	76	217	217
PCT Name	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion
EEC?	No	No	No	Yes	No	No
Formation	Western Slopes Dry Sclerophyll Forests	Western Slopes Dry Sclerophyll Forests	Western Slopes Dry Sclerophyll Forests	Floodplain Transition Woodlands	Western Slopes Dry Sclerophyll Forests	Western Slopes Dry Sclerophyll Forests
Highly Cleared Vegetation Type? (>70%)	No, 69%	No, 69%	No, 69%	Yes, 92%	No, 69%	No, 69%
Upper Stratum % cover	30%	20%	35%	30%	20%	10%
Mid Stratum % Cover	20%	40%	20%	1%	60%	50%
Lower Stratum % Cover	60%	15%	5%	60%	10%	15%
Upper Stratum height (m)	20m	15m	15m	20m	18m	5m
Mid Stratum height (m)	1.5m	2.5m	2m	2m	2.5m	2.5m

Lower Stratum height (m)	0.2m	0.3m	0.2m	0.4m	0.5m	0.2m
% Bare Ground	15%	10%	60%	0%	20%	50%
% Rocks	0%	1%	2%	0%	1%	3%
Ground logs 20x50m >10cm diameter	5m	15m	20m	10m	20m	10m
Tree Hollows 20x50m area						
Plot ID	**1**	**2**	**3**	**4**	**5**	**6**
Very Large	0	0	0	0	0	0
Large	0	0	0	0	0	0
Medium	0	2	0	0	0	0
Small	2	3	0	0	0	0
Terrestrial habitat						
Plot ID	**1**	**2**	**3**	**4**	**5**	**6**
Biodiversity links?	No	No	No	No	No	No
Habitat features	Hollows, small bird habitat	Hollows, small bird habitat	Smal bird habitat	Leaf litter,open woodland, ground logs	Small bird habitat	Small bird habitat
Plot ID	**1**	**2**	**3**	**4**	**5**	**6**
Upper stratum species						
1 (Dominant)	Mugga Ironbark (*Eucalyptus sideroxylon*)	Mugga Ironbark (*Eucalyptus sideroxylon*)	Mugga Ironbark (*Eucalyptus sideroxylon*)	Western Grey Box (*Eucalyptus microcarpa*)	Mugga Ironbark (*Eucalyptus sideroxylon*)	White Cypress Pine (*Callitris glaucophylla*)
2 (Co-dominant 1)	White Cypress Pine (*Callitris glaucophylla*)	White Cypress Pine (*Callitris glaucophylla*)	White Cypress Pine (*Callitris glaucophylla*)	Mugga Ironbark (*Eucalyptus sideroxylon*)	White Cypress Pine (*Callitris glaucophylla*)	Dwyer's Red Gum (*Eucalyptus dwyeri*)
3 (Co-dominant 2)			Dwyer's Red Gum (*Eucalyptus dwyeri*)			Bulloak (*Allocasuarina luehmannii*)
Bulloak (*Allocasuarina luehmannii*)						0.1
Dwyer's Red Gum (*Eucalyptus dwyeri*)			0.5			0.5
Kurrajong (*Brachychiton populneus* subsp. *trilobus*)						0.1
Mugga Ironbark (*Eucalyptus sideroxylon*)	1	0.5	1	0.5	2	0.1
Western Grey Box (*Eucalyptus microcarpa*)				1		

White Cypress Pine (*Callitris glaucophylla*)	2	2	2		1	2
Mid stratum species						
1 (Dominant)	White Cypress Pine (*Callitris glaucophylla*)	White Cypress Pine (*Callitris glaucophylla*)	White Cypress Pine (*Callitris glaucophylla*)	Currawang (*Acacia doratoxylon*)	White Cypress Pine (*Callitris glaucophylla*)	White Cypress Pine (*Callitris glaucophylla*)
2 (Co-dominant 1)				Wilga (*Geijera parviflora*)	Mugga Ironbark (*Eucalyptus sideroxylon*)	Dwyer's Red Gum (*Eucalyptus dwyeri*)
3 (Co-dominant 2)						
Currawang (*Acacia doratoxylon*)				0.5		
Dwyer's Red Gum (*Eucalyptus dwyeri*)						0.5
Mugga Ironbark (*Eucalyptus sideroxylon*)					0.5	
White Cypress Pine (*Callitris glaucophylla*)	2	1	2		2	2
Wilga (*Geijera parviflora*)				0.5		
Lower stratum species						
1 (Dominant)	Speargrass (*Austrostipa scabra* subsp. *scabra*),	Speargrass (*Austrostipa scabra* subsp. *scabra*),	Speargrass (*Austrostipa scabra* subsp. *scabra*),	Speargrass (*Austrostipa scabra* subsp. *scabra*),	Speargrass (*Austrostipa scabra* subsp. *scabra*),	Speargrass (*Austrostipa scabra* subsp. *scabra*),
2 (Co-dominant 1)	Smallflower Wallaby Grass (*Rytidosperma setaceum*) (Synonyms: *Austrodanthonia setacea*)	Smallflower Wallaby Grass (*Rytidosperma setaceum*) (Synonyms: *Austrodanthonia setacea*)	Sticky Everlasting (*Xerochrysum viscosum*)	Wallaby Grass (*Austrodanthonia bipartita*)	Sticky Everlasting (*Xerochrysum viscosum*)	Sticky Everlasting (*Xerochrysum viscosum*)
3 (Co-dominant 2)	White Cypress Pine (*Callitris glaucophylla*)	Sticky Everlasting (*Xerochrysum viscosum*)	Wallaby Grass (*Austrodanthonia bipartita*)	Purple Burr-daisy (*Calotis cuneifolia*)	Wallaby Grass (*Austrodanthonia bipartita*)	Wallaby Grass (*Austrodanthonia bipartita*)
Berry Salt Bush (*Einadia hastate*)	0.5			0.5		
Poison Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*)		0.5			0.5	
Purple Burr-daisy (*Calotis cuneifolia*)				0.5		

Smallflower Wallaby Grass (*Rytidosperma setaceum*) (Synonyms: *Austrodanthonia setacea*)	1	0.5		0.5		
Speargrass (*Austrostipa scabra* subsp. *scabra*),	2	0.5	0.5	1	0.5	1
Sticky Everlasting (*Xerochrysum viscosum*)	1	1	1	0.5	1	1
Tall Windmill Grass (*Chloris verticillata*)				0.5		
Wallaby Grass (*Austrodanthonia bipartita*)	1	0.5	0.5	1	0.5	0.5
White Cypress Pine (*Callitris glaucophylla*)	1					

Score	*Braun Banquet (BB) Cover
0	Absent from quadrant
0.1	Represented by a solitary item (<5% cover)
0.5	Represented by a few (<5) items (<5% cover)
1	Represented by >5 items (<5% cover)
2	Represented by many (>5) items (5-25% cover)
3	Represented by many items (25 - 50% cover)
4	Represented by many items (50-75% cover)
5	Represented by many items (75-100% cover)

Appendix B: Habitat assessment table

Full profile

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Amphibians	*Crinia sloanei*	Sloane's Froglet	Vulnerable		Known		No	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Unlikely - no watercourses	Unlikely
Animal>Amphibians	*Litoria raniformis*	Southern Bell Frog	Endangered	Vulnerable	Known		No	The Southern Bell Frog is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat.	Unlikely - no watercourses	Unlikely
Animal>Bats	*Chalinolobus dwyeri*	Large-eared Pied Bat	Vulnerable	Vulnerable	Known		No	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	Unlikely - no caves	Unlikely
Animal>Bats	*Chalinolobus picatus*	Little Pied Bat	Vulnerable		Known		No	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water.	Potential - suitable habitat	Potential
Animal>Bats	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	Vulnerable		Known		No	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Potential - suitable habitat	Unlikely
Animal>Bats	*Myotis macropus*	Southern Myotis	Vulnerable		Known		No	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Unlikely - no watercourses or caves	Unlikely
Animal>Bats	*Nyctophilus corbeni*	Corben's Long-eared Bat	Vulnerable	Vulnerable	Known	Likely	No	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Potential - suitable habitat	Potential
Animal>Bats	*Pteropus poliocephalus*	Grey-headed Flying-fox	Vulnerable	Vulnerable	Known	Foraging and feeding	No	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	No - unsuitable habitat	Unlikely
Animal>Bats	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	Vulnerable		Known		No	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Actitis hypoleucos*	Common Sandpiper				Likely	No	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	Unlikely - not coastal	Unlikely
Animal>Birds	*Anseranas semipalmata*	Magpie Goose	Vulnerable		Known		No	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	Unlikely - no wetlands	Unlikely
Animal>Birds	*Anthochaera phrygia*	Regent Honeyeater	Critically Endangered	Critically Endangered	Known	Known	No	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Range is between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar.	Potential - suitable habitat, outside core range	Unlikely
Animal>Birds	*Apus pacificus*	Fork-tailed Swift				Likely	No	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. The Fork-tailed Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines.	Potential - aerial foraging	Unlikely
Animal>Birds	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	Vulnerable		Known		Yes	The Dusky Woodswallow is a woodland dependant bird. It is found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests. Common habitat requirements are an open understorey with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris. Birds are also often observed in farm land, road sides and golf courses, usually at the edges of forest or woodland or wind breaks with dead timber.	Potential - suitable habitat	Potential
Animal>Birds	*Botaurus poiciloptilus*	Australasian Bittern	Endangered	Endangered	Known	May Occur	No	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	Unlikely - no wetlands	Unlikely
Animal>Birds	*Burhinus grallarius*	Bush Stone-curlew	Endangered		Known		No	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	Unlikely - outside current known range	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Calidris ferruginea*	Curlew Sandpiper	Endangered	Critically Endangered	Known	Likely	No	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	Unlikely - not coastal	Unlikely
Animal>Birds	*Callocephalon fimbriatum*	Gang-gang Cockatoo	Vulnerable		Known		No	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands,particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Unlikely - at edge of species extent	Unlikely
Animal>Birds	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Vulnerable		Known		No	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa)* are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	Potential - suitable habitat	Unlikely
Animal>Birds	*Calyptorhynchus lathami* - endangered population	Glossy Black-Cockatoo, Riverina population	Endangered Population		Known		No	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa)* are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	Potential - suitable habitat	Unlikely
Animal>Birds	*Certhionyx variegatus*	Pied Honeyeater	Vulnerable		Known		No	Widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. Inhabits wattle shrub, primarily Mulga (Acacia aneura), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (Eremophila spp.); also from mistletoes and various other shrubs (e.g. Grevillea spp.); also eats saltbush fruit, berries, seed, flowers and insects.	Unlikely - unsuitable habitat, not arid or semi-arid	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Chthonicola sagittata*	Speckled Warbler	Vulnerable		Known		Yes	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Potential - suitable habitat	Potential
Animal>Birds	*Cinclosoma castanotum*	Chestnut Quail-thrush	Vulnerable		Known		No	The Chestnut Quail-thrush is endemic to arid and semi-arid southern Australia, reaching its northern extent in the south of the Northern Territory. It mainly occupies low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine. However, in NSW it seems to occur almost exclusively in mallee habitats, with understorey dominated by spinifex, chenopods or other shrubs including Acacia species.	Unlikely - unsuitable habitat, not arid or semi-arid	Unlikely
Animal>Birds	*Circus assimilis*	Spotted Harrier	Vulnerable		Known		No	The Spotted Harrier occurs throughout the Australian mainland, except in densly forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Unlikely - no wetlands	Unlikely
Animal>Birds	*Climacteris affinis* - endangered population	White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area	Endangered Population		Known		No	In NSW, the White-browed Treecreeper occupies a broad area of western NSW, west from a line from Balranald to Lake Cargelligo then Lightning Ridge. The species appears absent in the far north west of the state with no records occurring west of a line from Broughams Gate, 100km northwest of Broken Hill to Hungerford. A small population, now recognised as isolated, occurs in Carrathool local government area south of the Lachlan River and Griffith local government areas. Occurs in a range of semi-arid and arid tall shrublands and woodlands across the southern half of Australia. In NSW, the species occupies a variety of habitats including Mulga, Brigalow, Gidgee, Belah, Buloke and White Cypress. The species may also occur in habitats adjacent to those detailed above, including Coolibah, River Red Gum and Black Box.	No - outside the required LGA	Unlikely
Animal>Birds	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	Vulnerable		Known		Yes	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging.	Potential - suitable habitat	Potential
Animal>Birds	*Daphoenositta chrysoptera*	Varied Sittella	Vulnerable		Known		No	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Potential - suitable habitat	Unlikely
Animal>Birds	*Drymodes brunneopygia*	Southern Scrub-robin	Vulnerable		Known		No	The Southern Scrub-robin inhabits mallee and acacia scrub, particularly with dense sub-shrubs in the understorey, including Broombush and other dry shrubs. This species is restricted to mallees and shrublands across southern Australia and in NSW is confined to two main areas. The first is in central NSW and is centred on Round Hill and Nombinnie Nature Reserves; the second occurs in the far south west of NSW, mainly within the Scotia mallee centred on Tarawi NR and Scotia Sanctuary.	Unlikely - unsuitable habitat, not semi-arid scrub	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Epthianura albifrons*	White-fronted Chat	Vulnerable		Known		Yes	The distribution of the White-fronted Chat extends across the southern half of Australia, from the southernmost areas of Queensland to southern Tasmania and across to Western Australia as far north as Carnarvon (Barrett et al. 2003). Found mostly in temperate to arid climates and very rarely seen in sub-tropical areas, the White-fronted Chat occupies foothills and lowlands below 1000 m above sea level (North 1904; Higgins et al. 2001; Barrett et al. 2003). In New South Wales the White-fronted Chat occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state (Higgins et al. 2001). Along the coastline, White-fronted Chats are found predominantly in saltmarsh vegetation although they are also observed in open grasslands and sometimes in low shrubs bordering wetland areas. These birds are unlikely to fly over urbanised areas.	Potential - suitable habitat	Potential
Animal>Birds	*Falco hypoleucos*	Grey Falcon	Endangered		Known		No	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Potential - suitable habitat	Unlikely
Animal>Birds	*Falco subniger*	Black Falcon	Vulnerable		Known		Yes	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres. Populations are likely to occur in most substantial reserve of flat, open habitats in the arid and semi-arid zones, particularly those with riparian habitats. The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded (eucalyptdominated) watercourses; it also uses agricultural land with scattered remnant trees. The Falcon is often associated with streams or wetlands, visiting them in search of prey. It uses standing dead trees as lookout posts.	Potential - suitable habitat	Potential
Animal>Birds	*Gallinago hardwickii*	Latham's Snipe				May Occur	No	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) . However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat (Naarding 1983).	Unlikely - no wetlands	Unlikely
Animal>Birds	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	Vulnerable		Known		No	It is uncommon in NSW, with records scattered across the box-ironbark woodlands of the Riverina and south west slopes, the River Red Gum forests and mallee of the Murray Valley as far west as the South Australian border, and, more rarely, the forests of the South Coast. The species is nomadic and most, if not all, records from NSW are associated with flowering events. Found in open forests and woodlands, particularly where there are large flowering eucalypts. Also recorded from mallee habitats.	Potential - suitable habitat	Unlikely
Animal>Birds	*Glossopsitta pusilla*	Little Lorikeet	Vulnerable		Known		No	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	Unlikely - no riparian habitat	Unlikely
Animal>Birds	*Grantiella picta*	Painted Honeyeater	Vulnerable	Vulnerable	Known	Likely	Yes	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Grus rubicunda*	Brolga	Vulnerable		Known		No	The Brolga was formerly found across Australia, except for the south-east corner, Tasmania and the south-western third of the country. It is still abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.	Potential - suitable habitat	Unlikely
Animal>Birds	*Haliaeetus leucogaster*	White-bellied Sea Eagle	Vulnerable		Known		No	The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea and sewage ponds). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land.	Unlikely - no open water	Unlikely
Animal>Birds	*Hamirostra melanosternon*	Black-breasted Buzzard	Vulnerable		Known		No	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	Potential - suitable habitat	Unlikely
Animal>Birds	*Hieraaetus morphnoides*	Little Eagle	Vulnerable		Known		Yes	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Potential - suitable habitat	Potential
Animal>Birds	*Hirundapus caudacutus*	White-throated Needletail				Known	No	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. White-throated Needletails only occur as vagrants in the Northern Territory and in Western Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	Potential - suitable habitat	Unlikely
Animal>Birds	*Hylacola cautus*	Shy Heathwren	Vulnerable		Known		No	The Shy Heathwren inhabits mallee woodlands with a relatively dense understorey of shrubs and heath plants. The central NSW population (for example in Cocoparra NP) also occurs at low densities in rocky hilltop vegetation with a thick shrub layer such as Broombush or Tea-tree. Occurs across southern Australia extending from the wheatbelt in southern Western Australia east to central NSW, including Kangaroo Island.	Unlikely - unsuitable habitat, not semi-arid scrub	Unlikely
Animal>Birds	*Lathamus discolor*	Swift Parrot	Endangered	Critically Endangered	Known	Likely	Yes	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Mugga Ironbark E. sideroxylon, and White Box E. albens. Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Leipoa ocellata*	Malleefowl	Endangered	Vulnerable	Known	Likely	No	The stronghold for this species in NSW is the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary, and is part of a larger population north of the Murray River in South Australia. The population in central NSW has been significantly reduced through land clearance and fox predation and now occurs chiefly in Yathong, Nombinnie and Round Hill NRs and surrounding areas, though birds continue to survive in Loughnan NR. Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers.	Unlikely - unsuitable habitat, not pilliga scrub	Unlikely
Animal>Birds	*Limosa limosa*	Black-tailed Godwit	Vulnerable		Known		No	The Black-tailed Godwit is found in all states and territories of Australia, however, it prefers coastal regions and the largest populations are found on the north coast between Darwin and Weipa. In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks.	Unlikely - no open water	Unlikely
Animal>Birds	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	Vulnerable		Known		No	This Cockatoo is found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.	Potential - suitable habitat	Unlikely
Animal>Birds	*Lophoictinia isura*	Square-tailed Kite	Vulnerable		Known		No	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.	Potential - suitable habitat	Unlikely
Animal>Birds	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	Vulnerable		Known		Yes	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	Vulnerable		Known		Yes	The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (Eucalyptus sideroxylon), White Box (E. albens), Inland Grey Box (E. microcarpa), Yellow Box (E. melliodora), Blakely's Red Gum (E. blakelyi) and Forest Red Gum (E. tereticornis). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees	Potential - suitable habitat	Potential
Animal>Birds	*Motacilla flava*	Yellow Wagtail				May Occur	No	Occurs throughout Australia. Can be found in a range of land uses including pastures, wetlands, shrublands, grasslands and man made environments. The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	Potential - suitable habitat	Unlikely
Animal>Birds	*Myiagra cyanoleuca*	Satin Flycatcher				May Occur	No	The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990a). In Queensland, it is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher, Myiagra rebecula, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	Unlikely - unsuitable woodland habitat	Unlikely
Animal>Birds	*Neophema pulchella*	Turquoise Parrot	Vulnerable		Known		Yes	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Potential - suitable habitat	Potential
Animal>Birds	*Ninox connivens*	Barking Owl	Vulnerable		Known		No	The Barking Owl is found throughout continental Australia except for the central arid regions and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains (especially the Pilliga) and in some northeast coastal and escarpment forests. Sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	Unlikely - no riparian habitat	Unlikely
Animal>Birds	*Numenius madagascariensis*	Eastern Curlew	Not listed	Critically Endangered		Likely	No	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states and rarely inland. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	Unlikely - not coastal	Unlikely
Animal>Birds	*Oxyura australis*	Blue-billed Duck	Vulnerable		Known		No	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.	Unlikely - no wetlands	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Pachycephala inornata*	Gilbert's Whistler	Vulnerable		Known		Yes	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia. The eastern population extends from the central NSW mallee (Yathong, Nombinnie and Round Hill NRs), south and east through the Cocoparra Range to Pomingalama Reserve (near Wagga Wagga) then north through the South West Slopes east as far as Cowra and Burrendong Dam, to the Goonoo reserves (with scattered records as far north as Pilliga). The species is also recorded in River Red Gum forests along the Murray River valley between Mathoura and Wentworth, with the eastern populations (between Mathoura and Barham) apparently isolated from other NSW populations. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including wattles, hakeas, sennas and hop-bushes. In woodland habitats, the understorey comprises dense patches of shrubs, particularly thickets of regrowth Callitris pine. Parasitic 'cherries' (Exocarpus species) appear to be an important habitat component in Belah and Red Gum communities, though in the latter case other dense shrubs, such as Lignum and wattles, are also utilised.	Potential - suitable habitat	Potential
Animal>Birds	*Pedionomus torquatus*	Plains-wanderer	Endangered	Critically Endangered	Known		No	The vast majority (>99%) of records of Plains-wanderers in NSW over the past 30 years come from an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east. Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. Habitat structure appears to play a more important role than plant species composition. Preferred habitat of the Plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. Most of the grassland habitat of the Plains-wanderer is <5 cm high, but some vegetation up to a maximum of 30 cm is important for concealment, as long as grass tussocks are spaced 10-20 cm apart. The average home range of a single bird is about 12 ha.	Unlikely - not suitable woodland habitat	Unlikely
Animal>Birds	*Petroica boodang*	Scarlet Robin	Vulnerable		Known		No	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	Potential - suitable habitat	Unlikely
Animal>Birds	*Petroica phoenicea*	Flame Robin	Vulnerable		Known		Yes	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Polytelis swainsonii*	Superb Parrot	Vulnerable	Vulnerable	Known	Known	Yes	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.	Potential - suitable habitat	Potential
Animal>Birds	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	Vulnerable		Known		Yes	The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Potential - suitable habitat	Potential
Animal>Birds	*Rhipidura rufifrons*	Rufous Fantail				May Occur	No	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (E. radiata), Mountain Ash (E. regnans), Alpine Ash (E. delegatensis), Blackbutt (E. pilularis) or Red Mahogany (E. resinifera); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (Acmena smithi) rainforest, with Grey Myrtle (Backhousia myrtifolia), Sassafras (Doryphora sassafras) and Sweet Pittosporum (Pittosporum undulatum) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (Eucalyptus maculata), Yellow Box (E. melliodora), ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (Melaleuca spp.) (Higgins et al. 2006).	Unlikely - outside range and not correct habitat	Unlikely
Animal>Birds	*Rostratula australis*	Australian Painted Snipe	Endangered	Endangered	Known	Likely	No	Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	Unlikely - no wetlands	Unlikely
Animal>Birds	*Stagonopleura guttata*	Diamond Firetail	Vulnerable		Known		Yes	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Cental and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	Potential - suitable habitat	Potential

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Birds	*Stictonetta naevosa*	Freckled Duck	Vulnerable		Known		No	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Unlikely - no wetlands	Unlikely
Animal>Birds	*Tyto novaehollandiae*	Masked Owl	Vulnerable		Known		No	The Masked Owl extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Potential - suitable habitat	Unlikely
Animal>Birds	*Calidris melanotos*	Pectoral Sandpiper				Likely	No	the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely - no wetlands	Unlikely
Animal>Fish	*Galaxias rostratus*	Flathead Galaxias	Critically Endangered	Critically Endangered	Known		No	The Flathead Galaxias is known from the southern part of the Murray Darling Basin. They have been recorded in the Macquarie, Lachlan, Murrumbidgee and Murray Rivers in NSW. Flathead Galaxias are found in still or slow moving water bodies such as wetlands and lowland streams. The species has been recorded forming shoals. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation.	Unlikely - no watercourses	Unlikely
Animal>Fish	*Maccullochella peelii*	Murray Cod	Not listed	Vulnerable		May Occur	No	The Murray Cod was historically distributed throughout the Murray-Darling Basin (the Basin), with the exception of the upper reaches of some tributaries. The distribution of the Murray Cod occurs in the following bioregions according to the Interim Biogeographic Regionalisation for Australia (IBRA7) (DSEWPaC 2012ae): Murray-Darling Depression, Riverina, NSW South Western Slopes, South Eastern Highlands, Cobar Peneplain, Darling Riverine Plains, Brigalow Belt South and Nandewar. The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Murray Cod are frequently found in the main channels of rivers and larger tributaries. The species is, therefore, considered a main-channel specialist. Murray Cod tend to occur in floodplain channels and anabranches when they are inundated.	Unlikely - no watercourses	Unlikely
Animal>Fish	*Macquaria australasica*	Macquarie Perch	Endangered	Endangered	Known	May Occur	No	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury/Nepean and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries.	Unlikely - no watercourses	Unlikely
Animal>Fish	*Tandanus tandanus*	Eel Tailed Catfish	Endangered Population		Known		No	Eel Tailed Catfish are naturally distributed throughout the Murray-Darling Basin and in the Eastern drainages NSW north of Newcastle. Eel Tailed Catfish numbers in the Murray-Darling Basin have declined due to a range of impacts including invasive species, habitat degradation, cold water pollution and fishing pressures and are now virtually absent from the Murray, Murrumbidgee and Lachlan catchments.	Unlikely - no watercourses	Unlikely
Animal>Marsupials	*Cercartetus nanus*	Eastern Pygmy-possum	Vulnerable		Known		No	The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts).	Potential - suitable habitat	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Animal>Marsupials	*Dasyurus maculatus*	Spotted-tailed Quoll	Vulnerable	Endangered	Known		No	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	Potential - suitable habitat	Unlikely
Animal>Marsupials	*Petaurus norfolcensis*	Squirrel Glider	Vulnerable		Known		Yes	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Potential - suitable habitat	Potential
Animal>Marsupials	*Petaurus norfolcensis* - endangered population	Squirrel Glider in the Wagga Wagga Local Government Area	Endangered Population		Known		No	The extent of the endangered population is legally defined by the boundaries of the Wagga Wagga LGA. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	No - not within Wagga LGA	No
Animal>Marsupials	*Phascolarctos cinereus*	Koala	Vulnerable	Vulnerable	Known	Known	No	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests.	Unlikely - no feed trees, no riparian zone	Unlikely
Animal>Marsupials	*Sminthopsis macroura*	Stripe-faced Dunnart	Vulnerable		Predicted		No	The Stripe-faced Dunnart is found throughout much of inland central and northern Australia, extending into central and northern NSW, western Queensland, Northern Territory, South Australia and Western Australia. They are rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford. Native dry grasslands and low dry shrublands, often along drainage lines where food and shelter resources tend to be better. They shelter in cracks in the soil, in grass tussocks or under rocks and logs. Co-occupies areas with the more common Fat-tailed Dunnart, but prefers relatively ungrazed habitats with greater diversity and healthier understorey vegetation.	Unlikely - no semi-arid grasslands	Unlikely
Animal>Reptiles	*Aprasia parapulchella*	Pink-tailed Legless Lizard	Vulnerable	Vulnerable	Known	Likely	No	There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	Potential - suitable habitat	Unlikely
Community> Threatened Ecological Communities	Weeping Myall Woodlands	Weeping Myall Woodlands	Not listed	Endangered		May Occur	No	The Weeping Myall Woodlands occurs on the inland alluvial plains west of the Great Dividing Range in NSW and Queensland, with one small outlying patch in northern Victoria. It occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling Depression, Nandewar and Cobar Peneplain IBRA Bioregions.	No - not recorded	No
Community>Threatened Ecological Communities	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community		Known		No	Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions occurs on brown loam or clay, alluvial or colluvial soils on prior streams and abandoned channels or slight depressions on the undulating plains or flats of the western slopes of the Great Dividing Range. This community often occurs upslope from River Red Gum communities, just above frequently inundated areas on the floodplain. It also occurs on colluvial soils on lower slopes and on valley flats. Only one small stand is currently known from a conservation reserve, at Weddin Mountains National Park near Grenfell.	No - not recorded	No

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Community>Threatened Ecological Communities	Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Inland Grey Box Woodland		Endangered		Likely	No	generally occurs in landscapes of low-relief such as flat to undulating plains, low slopes and rises and, to a lesser extent, drainage depressions and flats. The ecological community may extend to more elevated hillslopes on the fringes of its range where it intergrades with other woodland or dry sclerophyll forest communities. This ecological community often occurs on productive soils derived from alluvial or colluvial materials but may occur on a range of substrates. Soils include: duplex soils; red-brown earths; gradational soils; non-calceric and calceric browns with variable textures including sandy clay loam, clay loam, sandy loam, loam, heavy clay; and loams with quartzite surface stones and rocky outcroppings in the Mount Lofty Ranges. Gilgai topography may be present. The ecological community tends to occupy drier sites within the belt of grassy woodlands in south-eastern Australia. The Grey Box (E. microcarpa) Grassy woodlands and Derived Native Grasslands of SouthEastern Australia ecological community occurs from central-western NSW, through northern and central Victoria into South Australia. The core distribution of the ecological community lies within the NSW South Western Slopes, Riverina, Victorian Midlands and Murray Darling Depression bioregions but occurrences of the national ecological community may also extend into some of the adjoining bioregions.	Yes - recorded	Yes
Community>Threatened Ecological Communities	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Inland Grey Box Woodland	Endangered Ecological Community	Endangered	Known		No	Inland Grey Box Woodland occurs predominately within the Riverina and South West Slopes regions of NSW down to the Victorian border. It includes Albury to the east and may extend out west towards Hay. This community also extends across the slopes and plains in Central and Northern NSW up to the Queensland Border. Inland Grey Box Woodland occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 mm pa and the mean maximum annual temperature is 22- 26°C.	Yes - recorded	Yes
Community>Threatened Ecological Communities	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	Critically Endangered Ecological Community		Known		No	Mallee and Mallee-Broombush woodland has a very highly restricted distribution, with known occurrences falling with a region of less than 4000 km2 bounded by Lake Cowal - Temora - Ardlethan - Ungarie. It is estimated that the total area remaining is around 2300 hectares within the local government areas of Bland and Temora. It comes in three varients on plains to the east and north of West Wyalong on red earths including the aeolian soil known as parna; on low hills and rises in sandy loam soils over substrates including gravel ferricrete (ironstone) and mixed sedimentary, metamorphic and granitic substrates; on rocky rises of sandstone and other sedimentary rock types, mainly to the south west of West Wyalong.	No - not recorded	Unlikely
Community>Threatened Ecological Communities	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Weeping Myall Woodlands	Endangered Ecological Community	Endangered	Known		No	This EEC is known from parts of the Local Government Areas of Berrigan, Bland, Bogan, Carrathool, Conargo, Coolamon, Coonamble, Corowa, Forbes, Gilgandra, Griffith, Gwydir, Inverell, Jerilderee, Lachlan, Leeton, Lockhart, Moree Plains, Murray, Murrumbidgee, Narrabri, Narranderra, Narromine, Parkes, Urana, Wagga Wagga and Warren, and but may occur elsewhere in these bioregions.	No - not recorded	No
Community>Threatened Ecological Communities	White Box Yellow Box Blakely's Red Gum Woodland	White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community		Known		No	The Box – Gum Grassy Woodland and Derived Grassland ecological community occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria (Beadle 1981). It occurs in the Brigalow Belt South, Nandewar, New England Tableland, South Eastern Queensland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes, Victorian Midlands and Riverina Bioregions (Environment Australia 2000).	No - not recorded	No
Community>Threatened Ecological Communities	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and		Critically Endangered		Likely	No	Box-Gum Woodland is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum.	No - not recorded	No

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
	Derived Native Grassland	Derived Native Grassland								
Plant>Epiphytes and Climbers	*Tylophora linearis*	Tylophora linearis	Vulnerable	Endangered	Known	May Occur	No	Majority of linearis records occur in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla and Allocasuarina luehmannii. Also grows in association with Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species and Casuarina species.	Potential - suitable habitat	Unlikely
Plant>Ferns and Cycads	*Pilularia novae-hollandiae*	Austral Pillwort	Endangered		Known		No	In NSW, Austral Pillwort has been recorded from suburban Sydney, Khancoban, the Riverina between Albury and Urana (including Henty, Walbundrie, Balldale and Howlong), Oolambeyan National Park near Carathool and at Lake Cowal near West Wyalong. Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. Most of the records in the Albury-Urana area were from table drains on the sides of roads.	Unlikely - no wetlands	Unlikely
Plant>Herbs and Forbs	*Amphibromus fluitans*	Floating Swamp Wallaby-grass	Vulnerable	Vulnerable	Known		No	Amphibromus fluitans is found in Albury and surrounds. It grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels. Habitats in south-western NSW include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with Potamogeton and Chamaeraphis species.	Unlikely - no wetlands	Unlikely
Plant>Herbs and Forbs	*Austrostipa metatoris*	A spear-grass	Vulnerable	Vulnerable	Known		No	Most records of Austrostipa metatoris occur in the Murray Valley with sites including Cunninyeuk Station, Stony Crossing, Kyalite State Forest (now part of Murrumbidgee Valley Regional Park) and Lake Benanee. Grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. Associated species include Eucalyptus populnea, E. intertexta, Callitris glaucophylla, Casuarina cristata, Santalum acuminatum and Dodonaea viscosa.	Unlikely - no semi-arid grasslands	Unlikely
Plant>Herbs and Forbs	*Austrostipa wakoolica*	A spear-grass	Endangered	Endangered	Known	Likely	No	Spear grasses grow on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve).	Unlikely - no semi-arid grasslands	Unlikely
Plant>Herbs and Forbs	*Brachyscome muelleroides*	Claypan Daisy	Vulnerable	Vulnerable	Known		No	The Claypan Daisy occurs in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Grows in damp areas on the margins of claypans in moist grassland with Pycnosorus globosus, Agrostis avenacea and Austrodanthonia duttoniana. Also recorded from the margins of lagoons in mud or water, and in association with Calotis anthemoides.	Unlikely - no moist grassland habitat	Unlikely
Plant>Herbs and Forbs	*Brachyscome papillosa*	Mossgiel Daisy	Vulnerable	Vulnerable	Known		No	The Mossgiel Daisy is endemic to NSW and chiefly occurs within the Riverina Bioregion, from Mossgiel in the north, Murrumbidgee Valley (Yanga) National Park in the south west to Urana in the south east. Sites are scattered across this Bioregion including the Jerilderie area, the Hay Plain (Maude and Oxley) and around Darlington Point. Recorded primarily in clay soils on Bladder Saltbush (Atriplex vesicaria) and Leafless Bluebush (Maireana aphylla) plains, but also in grassland and in Inland Grey Box (Eucalyptus microcarpa) - Cypress Pine (Callitris spp.) woodland.	Unlikely - no semi-arid shrubland habitat	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Plant>Herbs and Forbs	*Cullen parvum*	Small Scurf-pea	Endangered		Known		No	The Small Scurf-pea is known in NSW from only two herbarium collections; one from Wagga Wagga in 1884 and the other from Jindera (near Albury) in 1967. In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (Eucalyptus camaldulensis) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm.	Unlikely - outside known range and no associated species	Unlikely
Plant>Herbs and Forbs	*Eleocharis obicis*	Spike-Rush	Vulnerable	Vulnerable	Known		No	The Spike-Rush grows in ephemerally wet situations such as roadside mitre drains and depressions, usually in low-lying grasslands. Sites include depressions with heavy clay soils on the Lachlan River floodplain; it is also found near Condobolin and Hay, as well as being known from an old collection from the Barrier Range near Broken Hill.	Unlikely - no wet areas or clay soils	Unlikely
Plant>Herbs and Forbs	*Lepidium aschersonii*	Spiny Peppercress	Vulnerable	Vulnerable	Known		No	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Also known from the West Wyalong in the south of the State. The Spiny Peppercress occurs in periodically wet sites such as gilgai depressions and the margins of freshwater and saline marshes and shallow lakes, usually on heavy clay soil .	Unlikely - no wet areas or clay soils	Unlikely
Plant>Herbs and Forbs	*Lepidium monoplocoides*	Winged Peppercress	Endangered	Endangered	Known		No	The Winged Peppercress occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Widespread in the semi-arid western plains regions of NSW.	Unlikely - no wet areas or heavy soils	Unlikely
Plant>Herbs and Forbs	*Leptorhynchos orientalis*	Lanky Buttons	Endangered		Known		No	Recorded from several Hay Plain and southern Riverina localities. Grows in woodland or grassland, sometimes on the margins of swamps. Communities include a Bimble Box plain in red-brown soil, dense Acacia pendula woodland with herbaceous understorey on red clay to clay-loam, open grassland areas on red soils, and red clay plains at the edge of a Canegrass swamp. Associated species include Eucalyptus populnea subsp. bimbil, Acacia pendula, Eragrostis australasica, Lepidium monoplocoides, Enchylaena tomentosa, Minuria leptophylla, Rhodanthe floribunda, R. pygmaea and Ptilotus spathulatus.	Unlikely - no known associated species	Unlikely
Plant>Herbs and Forbs	*Senecio garlandii*	Woolly Ragwort	Vulnerable		Known		Yes	Woolly Ragwort is found between Temora, Bethungra and Albury and possibly Burrinjuck near Yass. The largest populations are at The Rock and Mt Tabletop (and surrounds). Woolly Ragwort occurs on sheltered slopes of rocky outcrops.	Potential - suitable habitat	Potential
Plant>Herbs and Forbs	*Swainsona murrayana*	Slender Darling Pea	Vulnerable	Vulnerable	Known		No	Found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.	Unlikely - no semi-arid woodlands	Unlikely
Plant>Herbs and Forbs	*Swainsona recta*	Small Purple-pea	Endangered	Endangered	Known	May Occur	No	Populations of the Small Purple-pea still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx. Grows in association with understorey dominants that include Kangaroo Grass Themeda australis, poa tussocks Poa spp. and spear-grasses Austrostipa spp.	Unlikely - outside known range and no associated species	Unlikely
Plant>Herbs and Forbs	*Swainsona sericea*	Silky Swainson-pea	Vulnerable		Known		No	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes.	Unlikely - outside known range and no associated species	Unlikely

Type	Scientific name	Common name	NSW status	Commonwealth status	NSW Occurrence	Commonwealth Occurrence	10km	Habitat	Predicted	Affected?
Plant>Orchids	*Caladenia arenaria*	Sand-hill Spider Orchid	Endangered	Endangered	Known		No	*Caladenia arenaria* is found mostly on the south west plains and western south west slopes. The Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Occurs in woodland with sandy soil, especially that dominated by White Cypress Pine (*Callitris glaucophylla*).	Potential - suitable habitat	Unlikely
Plant>Orchids	*Caladenia concolor*	Crimson Spider Orchid	Endangered	Vulnerable	Known		No	Crimson Spider Orchid has two populations in NSW. One comprises a few hundred plants on private property near Bethungra and the other of about 100 plants occurs in Burrinjuck Nature reserve. The other occurrences of the Crimson Spider Orchid in NSW are from the Nail Can Hill Crown Reserve near Albury. Habitat is regrowth woodland on granite ridge country that has retained a high diversity of plant species, including other orchids. The dominant trees are Blakely's Red Gum (Eucalyptus blakelyi), Red Stringybark (E. macrorhyncha), Red Box (E. polyanthemos) and White Box (E. albens); the diverse understorey includes Silver Wattle (Acacia dealbata), Hop Bitter-pea (Daviesia latifolia), Common Beard-heath (Leucopogon virgatus), Spreading Flax-lily (Dianella revoluta) and Poa Tussock (Poa sieberiana).	Unlikely - outside known range and no associated species	Unlikely
Plant>Orchids	*Diuris sp*. (Oaklands, D.L. Jones 5380)	Oaklands Diuris	Endangered		Known		No	The Oakland Diuris is currently known only from the Oaklands-Urana region of southern NSW. Grows in White Cypress Pine (Callitris glaucophylla) Woodland, either among dense grasses in flat areas with associated eucalypts, or amongst sparse grasses and forbs on low sandhills. Grows mostly on sandy loam soils.	Potential - suitable habitat	Potential
Plant>Orchids	*Diuris tricolor*	Pine Donkey Orchid	Vulnerable		Known		No	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon, and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA, Pilliga National Park and Bibblewindi State Forest in the north and Muswellbrook in the east. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. Associated species include Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta, Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as Bulbine species. The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (Callitris spp.). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW.	Potential - suitable habitat	Potential
Plant>Shrubs	*Acacia ausfeldii*	Ausfeld's Wattle	Vulnerable		Known		No	Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong. In the Mudgee - Ulan area, A. ausfeldii is mostly found on flat ground in remnant roadside patches of woodland with Eucalyptus albens (White Box), E. blakelyi (Blakely's Red Gum) and Callitris spp. (Native Cypress Pines), with an understorey dominated by Cassinia spp. and grasses.	Unlikely - outside known range and no associated species	Unlikely
Plant>Shrubs	*Grevillea ilicifolia* subsp. *ilicifolia*	Holly-leaf Grevillea	Critically Endangered		Predicted		No	In New South Wales Grevillea ilicifolia subsp. ilicifolia has been recorded from shrubby mallee communities. The only population confirmed as extant occurs at Round Hill Nature Reserve north-west of Lake Cargelligo.	Unlikely - outside known range and no associated species	Unlikely
Plant>Shrubs	*Philotheca ericifolia*		Not listed	Vulnerable	Known	May Occur	No	*Philotheca ericifolia* is known only from the upper Hunter Valley and Pilliga to Peak Hill districts of NSW. The records are scattered over a range of over 400 km between West Wyalong and the Pilliga Scrub. Site localities include Pilliga East State Forest, Goonoo State Forest, Hervey Range, Wingen Maid Nature Reserve, Toongi, Denman, Rylestone district and Kandos Weir. Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies. It has been collected from a variety of habitats including heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops.	Potential - suitable habitat	Unlikely

Appendix C: EPBC Act assessment of significance

Notes:

Important Population as determined by the *Environment Protection and Biodiversity Conservation Act 1999*, is one that for a vulnerable species:

a) is likely to be key source populations either for breeding or dispersal
b) is likely to be necessary for maintaining genetic diversity
c) is at or near the limit of the species range.

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013).

Threatened species, or communities	Important population	Likely significant impact?
Bats		
Nyctophilus corbeni	Corben's Long-eared Bat	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). No important population of Corben's Long-eared Bat has been identified in the locality of the study area. The proposal is unlikely to have a significant impact on this species.
Birds		
Grantiella picta	Painted Honeyeater	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). No significant populations of these bird species have been identified in the study area.
Lathamus discolor	Swift Parrot	
Polytelis swainsonii	Superb Parrot	
Endangered Ecological Communities		
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		All remnant stands of endangered ecological communities are important. A remnant patch of this endangered ecological community was recorded within the study area. The proposal has been redesigned to completely avoid impacting this endangered ecological community. No significant impact to this community has been identified.

Appendix D: TSC Act assessment of significance

1) In the case of a threatened species, the Proposal is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
2) In the case of an endangered population, the Proposal is not likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.
3) In the case of an endangered ecological community or critically endangered ecological community:
    i. The Proposal is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
    ii. The Proposal is not likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.
4) In relation to the habitat of a threatened species, population or ecological community:
    i. The extent to which habitat is likely to be removed or modified as a result of the Proposal, and
    ii. That an area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the Proposal, and
    iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.
5) That the Proposal is not likely to have an adverse effect on critical habitat (either directly or indirectly).
6) That the Proposal is not consistent with the objectives or actions of a recovery plan or threat abatement plan.
7) That the Proposal constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Key:

X = The development will not impact critical habitat.

+ = The proposal is not consistent with objectives or actions of a recovery plan or threat abatement plan.

= The proposed development constitutes or is part of a key threatening process:

- Clearing of native vegetation.
- Bushrock removal.
- Removal of dead wood and dead trees.

Species		7-Part Test Questions					
Scientific Name	**Common Name**	**1/2**	**3**	**4**	**5**	**6**	**7**
Woodland Birds							
Artamus cyanopterus cyanopterus	Dusky Woodswallow	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). This impact is not likely to place a viable local population of this species at risk of local extinction. These bird species rely on woodlands for refuge, roosting and foraging habitat. The proposal is unlikely to disrupt the life cycle of a viable local population of these species to the extent that the population is placed at risk of local extinction.	N/A	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). The proposed vegetation clearing will not reduce the extent of the contiguous patch, contribute significantly to edge effects or create habitat islands. The importance of the habitat identified in the study area for these species is low. No viable local population of these species has been recorded in the subject site.	X	+	#
Chthonicola sagittata	Speckled Warbler						
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)						
Epthianura albifrons	White-fronted Chat						
Grantiella picta	Painted Honeyeater						
Lathamus discolor	Swift Parrot						
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)						
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)						
Neophema pulchella	Turquoise Parrot						
Pachycephala inornata	Gilbert's Whistler						
Petroica phoenicea	Flame Robin						
Polytelis swainsonii	Superb Parrot						
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)						
Stagonopleura guttata	Diamond Firetail						
Birds of prey							

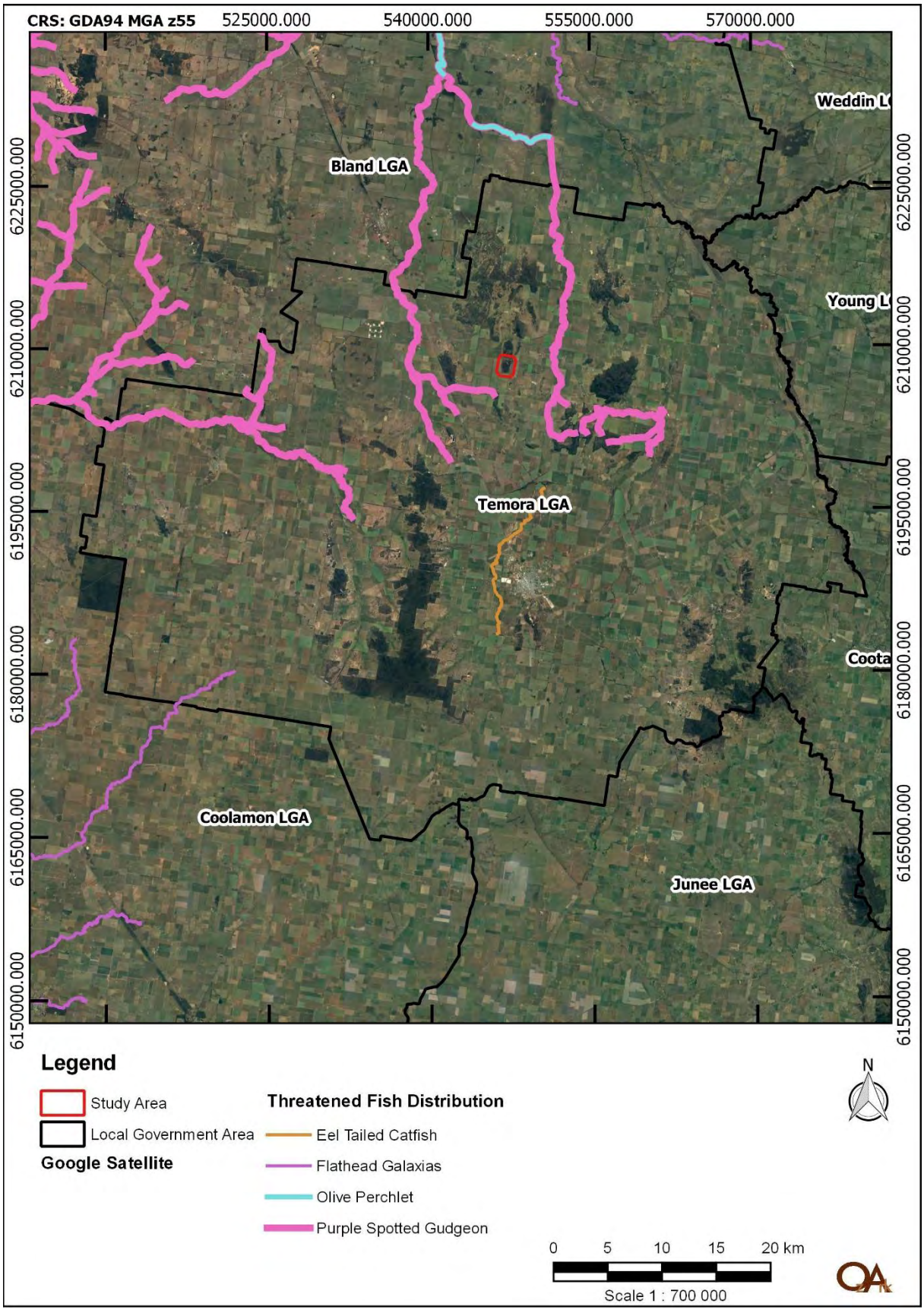
Species		7-Part Test Questions					
Scientific Name	**Common Name**	**1/2**	**3**	**4**	**5**	**6**	**7**
Falco subniger	Black Falcon	These bird species have large home ranges over a variety of habitats. The proposal is unlikely to affect these species ability to forage or roost in the region. This impact is not likely to place a viable local population of this species at risk of local extinction. The proposal is unlikely to disrupt the life cycle of a viable local population of these species to the extent that the population is placed at risk of local extinction.	N/A	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). The proposed vegetation clearing will not reduce the extent of the contiguous patch, contribute significantly to edge effects or create habitat islands. The importance of the habitat identified in the study area for this species is low. No viable local population of this species has been recorded in the subject site. There are few hollow bearing trees in the subject site and most of these will be retained.	X	+	#
Hieraaetus morphnoides	Little Eagle						
Bats							
Chalinolobus picatus	Little Pied Bat	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). This impact is not likely to place a viable local population of this species at risk of local extinction.	N/A	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). The proposed vegetation clearing will not reduce the extent of the contiguous patch, contribute significantly to edge effects or create habitat islands. The importance of the habitat identified in the study area for this species is low. No viable local population of this species has been recorded in the subject site. There are few hollow bearing trees in the subject site and most of these will be retained.	X	+	#
Nyctophilus corbeni	Corben's Long-eared Bat						
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat						
Scoteanax rueppellii	Greater Broad-nosed Bat						
Vespadelus baverstocki	Inland Forest Bat						
Marsupials							
Petaurus norfolcensis	Squirrel Glider	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). This impact is not likely to place a viable local population of this species at risk of local extinction.	N/A	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). The proposed vegetation clearing will not reduce the extent of the contiguous patch, contribute significantly to edge effects or create habitat islands. The importance of the habitat identified in the study area for this species is low. No	X	+	#

Species		7-Part Test Questions					
Scientific Name	**Common Name**	**1/2**	**3**	**4**	**5**	**6**	**7**
				viable local population of this species has been recorded in the subject site. There are few hollow bearing trees in the subject site and most of these will be retained.			
Flora							
Senecio garlandii	Woolly Ragwort	The proposal does not involve significant removal of native vegetation within the subject site (about 2.72 ha of a 240 ha contiguous patch; 1.13%). This impact is not likely to place a viable local population of these plant species at risk of local extinction. The removal of grazing in the subject site will increase the chances of survival of individuals within the subject site.	N/A	The importance of the habitat identified in the study area for this species is low. No viable local population of this species has been recorded in the subject site. There are few hollow bearing trees in the subject site and most of these will be retained.	X	+	#
Diuris sp. (Oaklands, D.L. Jones 5380)	Oaklands Diuris						
Diuris tricolor	Pine Donkey Orchid						
Endangered Ecological Communities							
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions		N/A	The proposal has been redesigned to completely avoid any impact to this endangered ecological community. The proposal is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. The proposal is not likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	There will be no reduction in the extent of this endangered ecological community. The remnant stand is not likely to be isolated from other areas of habitat or fragmented as a result of this proposal. All remnant stands of endangered ecological communities are important.	X	+	#

Appendix E: Database search results

Ground water dependant ecosystems (Source: BoM)

Primary Industries (Fishing and Aquaculture)



Search results from NSW OEH Threatened Species Database

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Animal	Amphibians	*Crinia sloanei*	Sloane's Froglet	Vulnerable	Known
Animal	Amphibians	*Litoria raniformis*	Southern Bell Frog	Endangered	Known
Animal	Bats	*Chalinolobus dwyeri*	Large-eared Pied Bat	Vulnerable	Predicted
Animal	Bats	*Chalinolobus picatus*	Little Pied Bat	Vulnerable	Known
Animal	Bats	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	Vulnerable	Known
Animal	Bats	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	Vulnerable	Known
Animal	Bats	*Myotis macropus*	Southern Myotis	Vulnerable	Known
Animal	Bats	*Nyctophilus corbeni*	Corben's Long-eared Bat	Vulnerable	Known
Animal	Bats	*Pteropus poliocephalus*	Grey-headed Flying-fox	Vulnerable	Known
Animal	Bats	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	Vulnerable	Known
Animal	Bats	*Scoteanax rueppellii*	Greater Broad-nosed Bat	Vulnerable	Known
Animal	Bats	*Vespadelus baverstocki*	Inland Forest Bat	Vulnerable	Known
Animal	Birds	* White-bellied Sea-Eagle </o:p>"	Vulnerable	Known
Animal	Birds	*Anseranas semipalmata*	Magpie Goose	Vulnerable	Known
Animal	Birds	*Anthochaera phrygia*	Regent Honeyeater	Critically Endangered	Known
Animal	Birds	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	Vulnerable	Known
Animal	Birds	*Botaurus poiciloptilus*	Australasian Bittern	Endangered	Known
Animal	Birds	*Burhinus grallarius*	Bush Stone-curlew	Endangered	Known
Animal	Birds	*Calidris ferruginea*	Curlew Sandpiper	Endangered	Known
Animal	Birds	*Callocephalon fimbriatum*	Gang-gang Cockatoo	Vulnerable	Known
Animal	Birds	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Vulnerable	Known
Animal	Birds	*Calyptorhynchus lathami - endangered population*	Glossy Black-Cockatoo, Riverina population	Endangered Population	Known
Animal	Birds	*Certhionyx variegatus*	Pied Honeyeater	Vulnerable	Known
Animal	Birds	*Chthonicola sagittata*	Speckled Warbler	Vulnerable	Known
Animal	Birds	*Cinclosoma castanotum*	Chestnut Quail-thrush	Vulnerable	Known

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Animal	Birds	*Circus assimilis*	Spotted Harrier	Vulnerable	Known
Animal	Birds	*Climacteris affinis - endangered population*	White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area	Endangered Population	Known
Animal	Birds	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	Vulnerable	Known
Animal	Birds	*Daphoenositta chrysoptera*	Varied Sittella	Vulnerable	Known
Animal	Birds	*Drymodes brunneopygia*	Southern Scrub-robin	Vulnerable	Known
Animal	Birds	*Epthianura albifrons*	White-fronted Chat	Vulnerable	Known
Animal	Birds	*Falco hypoleucos*	Grey Falcon	Endangered	Known
Animal	Birds	*Falco subniger*	Black Falcon	Vulnerable	Known
Animal	Birds	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	Vulnerable	Predicted
Animal	Birds	*Glossopsitta pusilla*	Little Lorikeet	Vulnerable	Known
Animal	Birds	*Grantiella picta*	Painted Honeyeater	Vulnerable	Known
Animal	Birds	*Grus rubicunda*	Brolga	Vulnerable	Known
Animal	Birds	*Hamirostra melanosternon*	Black-breasted Buzzard	Vulnerable	Known
Animal	Birds	*Hieraaetus morphnoides*	Little Eagle	Vulnerable	Known
Animal	Birds	*Hylacola cautus*	Shy Heathwren	Vulnerable	Known
Animal	Birds	*Lathamus discolor*	Swift Parrot	Endangered	Known
Animal	Birds	*Leipoa ocellata*	Malleefowl	Endangered	Known
Animal	Birds	*Limosa limosa*	Black-tailed Godwit	Vulnerable	Known
Animal	Birds	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	Vulnerable	Known
Animal	Birds	*Lophoictinia isura*	Square-tailed Kite	Vulnerable	Known
Animal	Birds	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	Vulnerable	Known
Animal	Birds	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Known
Animal	Birds	*Neophema pulchella*	Turquoise Parrot	Vulnerable	Known
Animal	Birds	*Ninox connivens*	Barking Owl	Vulnerable	Known
Animal	Birds	*Oxyura australis*	Blue-billed Duck	Vulnerable	Known
Animal	Birds	*Pachycephala inornata*	Gilbert's Whistler	Vulnerable	Known
Animal	Birds	*Pedionomus torquatus*	Plains-wanderer	Endangered	Known
Animal	Birds	*Petroica boodang*	Scarlet Robin	Vulnerable	Known
Animal	Birds	*Petroica phoenicea*	Flame Robin	Vulnerable	Known
Animal	Birds	*Polytelis swainsonii*	Superb Parrot	Vulnerable	Known
Animal	Birds	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Known

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Animal	Birds	*Rostratula australis*	Australian Painted Snipe	Endangered	Known
Animal	Birds	*Stagonopleura guttata*	Diamond Firetail	Vulnerable	Known
Animal	Birds	*Stictonetta naevosa*	Freckled Duck	Vulnerable	Known
Animal	Birds	*Tyto novaehollandiae*	Masked Owl	Vulnerable	Predicted
Animal	Marsupials	*Cercartetus nanus*	Eastern Pygmy-possum	Vulnerable	Predicted
Animal	Marsupials	*Dasyurus maculatus*	Spotted-tailed Quoll	Vulnerable	Known
Animal	Marsupials	*Petaurus norfolcensis*	Squirrel Glider	Vulnerable	Known
Animal	Marsupials	*Petaurus norfolcensis - endangered population*	Squirrel Glider in the Wagga Wagga Local Government Area	Endangered Population	Known
Animal	Marsupials	*Phascolarctos cinereus*	Koala	Vulnerable	Known
Animal	Marsupials	*Sminthopsis macroura*	Stripe-faced Dunnart	Vulnerable	Predicted
Animal	Reptiles	*Aprasia parapulchella*	Pink-tailed Legless Lizard	Vulnerable	Known
Community	Threatened Ecological Communities	*Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions*	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community	Known
Community	Threatened Ecological Communities	*Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Endangered Ecological Community	Known
Community	Threatened Ecological Communities	*Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion*	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	Critically Endangered Ecological Community	Known
Community	Threatened Ecological Communities	*Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Endangered Ecological Community	Known

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Community	Threatened Ecological Communities	*Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions*	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	Endangered Ecological Community	Predicted
Community	Threatened Ecological Communities	*White Box Yellow Box Blakelyâ€™s Red Gum Woodland*	White Box Yellow Box Blakelyâ€™s Red Gum Woodland	Endangered Ecological Community	Known
Plant	Epiphytes and Climbers	*Tylophora linearis*	Tylophora linearis	Vulnerable	Known
Plant	Ferns and Cycads	*Pilularia novae-hollandiae*	Austral Pillwort	Endangered	Known
Plant	Herbs and Forbs	*Amphibromus fluitans*	Floating Swamp Wallaby-grass	Vulnerable	Known
Plant	Herbs and Forbs	*Austrostipa metatoris*	A spear-grass	Vulnerable	Known
Plant	Herbs and Forbs	*Austrostipa wakoolica*	A spear-grass	Endangered	Known
Plant	Herbs and Forbs	*Brachyscome muelleroides*	Claypan Daisy	Vulnerable	Known
Plant	Herbs and Forbs	*Brachyscome papillosa*	Mossgiel Daisy	Vulnerable	Known
Plant	Herbs and Forbs	*Cullen parvum*	Small Scurf-pea	Endangered	Known
Plant	Herbs and Forbs	*Eleocharis obicis*	Spike-Rush	Vulnerable	Known
Plant	Herbs and Forbs	*Lepidium aschersonii*	Spiny Peppercress	Vulnerable	Known
Plant	Herbs and Forbs	*Lepidium monoplocoides*	Winged Peppercress	Endangered	Known
Plant	Herbs and Forbs	*Leptorhynchos orientalis*	Lanky Buttons	Endangered	Known
Plant	Herbs and Forbs	*Senecio garlandii*	Woolly Ragwort	Vulnerable	Known
Plant	Herbs and Forbs	*Swainsona murrayana*	Slender Darling Pea	Vulnerable	Known
Plant	Herbs and Forbs	*Swainsona recta*	Small Purple-pea	Endangered	Known
Plant	Herbs and Forbs	*Swainsona sericea*	Silky Swainson-pea	Vulnerable	Known
Plant	Orchids	*Caladenia arenaria*	Sand-hill Spider Orchid	Endangered	Known
Plant	Orchids	*Caladenia concolor*	Crimson Spider Orchid	Endangered	Predicted
Plant	Orchids	*Diuris pedunculata*	Small Snake Orchid	Endangered	Known
Plant	Orchids	*Diuris sp. (Oaklands, D.L. Jones 5380)*	Oaklands Diuris	Endangered	Known
Plant	Orchids	*Diuris tricolor*	Pine Donkey Orchid	Vulnerable	Known
Plant	Shrubs	*Acacia ausfeldii*	Ausfeld's Wattle	Vulnerable	Known
Plant	Shrubs	*Grevillea ilicifolia subsp. ilicifolia*	Holly-leaf Grevillea	Critically Endangered	Predicted
Plant	Shrubs	*Kippistia suaedifolia*	Fleshy Minuria	Endangered	Known

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Plant	Shrubs	*Philotheca angustifolia subsp. angustifolia*	Philotheca angustifolia subsp. angustifolia	Presumed Extinct	Known
Threat	Disease	Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species	Key Threatening Process	Predicted
Threat	Disease	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Key Threatening Process	Predicted
Threat	Disease	Infection of native plants by Phytophthora cinnamomi	Infection of native plants by Phytophthora cinnamomi	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Anthropogenic Climate Change	Human-caused Climate Change	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Bushrock removal	Bushrock Removal	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Clearing of native vegetation	Clearing of native vegetation	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	Ecological consequences of high frequency fires	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Loss of Hollow-bearing Trees	Loss of Hollow-bearing Trees	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Loss or degradation (or both) of sites used for hill-topping by butterflies	Loss and/or degradation of sites used for hill-topping by butterflies	Key Threatening Process	Predicted
Threat	Habitat Loss/Change	Removal of dead wood and dead trees	Removal of dead wood and dead trees	Key Threatening Process	Predicted
Threat	Other Threat	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Key Threatening Process	Predicted

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Threat	Pest Animal	Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners Manorina melanocephala	Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners <span style=font-style: italic">Manorina melanocephala."	Key Threatening Process	Predicted
Threat	Pest Animal	Competition and grazing by the feral European Rabbit, Oryctolagus cuniculus (L.)	Competition and grazing by the feral European rabbit	Key Threatening Process	Predicted
Threat	Pest Animal	Competition and habitat degradation by Feral Goats, Capra hircus Linnaeus 1758	Competition and habitat degradation by Feral Goats, <span style=font-style: italic">Capra hircus Linnaeus 1758"	Key Threatening Process	Predicted
Threat	Pest Animal	Competition from feral honey bees, Apis mellifera L.	Competition from feral honeybees	Key Threatening Process	Predicted
Threat	Pest Animal	Herbivory and environmental degradation caused by feral deer	Herbivory and environmental degradation caused by feral deer	Key Threatening Process	Predicted
Threat	Pest Animal	Importation of Red Imported Fire Ants Solenopsis invicta Buren 1972	Importation of red imported fire ants into NSW	Key Threatening Process	Predicted
Threat	Pest Animal	Introduction of the Large Earth Bumblebee Bombus terrestris (L.)	Introduction of the large earth bumblebee (Bombus terrestris)	Key Threatening Process	Predicted
Threat	Pest Animal	Invasion and establishment of the Cane Toad (Bufo marinus)	Invasion and establishment of the Cane Toad	Key Threatening Process	Predicted
Threat	Pest Animal	Invasion of the Yellow Crazy Ant, Anoplolepis gracilipes (Fr. Smith) into NSW	Invasion of the yellow crazy ant (Anoplolepis gracilipes) into NSW	Key Threatening Process	Predicted
Threat	Pest Animal	Predation and hybridisation by Feral Dogs, Canis lupus familiaris	Predation and hybridisation by Feral Dogs, Canis lupus familiaris	Key Threatening Process	Predicted
Threat	Pest Animal	Predation by Gambusia holbrooki Girard, 1859 (Plague Minnow or Mosquito Fish)	Predation by the Plague Minnow (Gambusia holbrooki)	Key Threatening Process	Predicted
Threat	Pest Animal	Predation by the European Red Fox Vulpes Vulpes (Linnaeus, 1758)	Predation by the European Red Fox	Key Threatening Process	Predicted

Kingdom	Type	Scientific Name	Common Name	NSW Status	Occurrence
Threat	Pest Animal	Predation by the Feral Cat Felis catus (Linnaeus, 1758)	Predation by feral cats	Key Threatening Process	Predicted
Threat	Pest Animal	Predation, habitat degradation, competition and disease transmission by Feral Pigs, Sus scrofa Linnaeus 1758	Predation, habitat degradation, competition and disease transmission by Feral Pigs (Sus scrofa)	Key Threatening Process	Predicted
Threat	Weed	Invasion and establishment of exotic vines and scramblers	Invasion and establishment of exotic vines and scramblers	Key Threatening Process	Predicted
Threat	Weed	Invasion and establishment of Scotch Broom (Cytisus scoparius)	Invasion and establishment of Scotch Broom (<span style=font-style: italic">Cytisus scoparius)"	Key Threatening Process	Predicted
Threat	Weed	Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.	Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.	Key Threatening Process	Predicted
Threat	Weed	Invasion of native plant communities by Chrysanthemoides monilifera	Invasion of native plant communities by bitou bush & boneseed	Key Threatening Process	Predicted
Threat	Weed	Invasion of native plant communities by exotic perennial grasses	Invasion of native plant communities by <span style=font-weight: bold">exotic perennial grasses"	Key Threatening Process	Predicted
Threat	Weed	Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	Invasion, establishment and spread of Lantana (<span style=font-style: italic">Lantana camara L. sens. lat)"	Key Threatening Process	Predicted
Threat	Weed	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Key Threatening Process	Predicted

Priority Weeds

Scientific Name	Common Name	Duty
	All plants	General Biosecurity Duty
Alternanthera philoxeroides	Alligator weed	Mandatory Measure/Biosecurity Zone/Regional Recommended Measure
Andropogon gayanus	Gamba grass	Prohibited Matter
Annona glabra	Pond apple	Prohibited Matter
Anredera cordifolia	Madeira vine	Mandatory Measure
Asparagus aethiopicus	Ground asparagus	Mandatory Measure
Asparagus africanus	Climbing asparagus	Mandatory Measure
Asparagus asparagoides	Bridal creeper	Mandatory Measure
Asparagus declinatus	Bridal veil creeper	Prohibited Matter
Asparagus plumosus	Climbing asparagus fern	Mandatory Measure
Asparagus scandens	Snakefeather	Mandatory Measure
Asystasia gangetica subsp. mic rantha	Chinese violet	Regional Recommended Measure
Austrocylindropuntia cylindrica	Cane cactus	Mandatory Measure
Austrocylindropuntia species	Prickly pears - Austrocylindropuntias	Mandatory Measure
Bassia scoparia	Kochia	Prohibited Matter
Bryophyllum species	Mother-of-millions	Regional Recommended Measure
Cabomba caroliniana	Cabomba	Mandatory Measure
Centaurea stoebe subsp. micra nthos	Spotted knapweed	Prohibited Matter
Centaurea X moncktonii	Black knapweed	Prohibited Matter
Chromolaena odorata	Siam weed	Prohibited Matter
Chrysanthemoides monilifera s ubsp. monilifera	Boneseed	Mandatory Measure/Control Order
Chrysanthemoides monilifera s ubsp. rotundata	Bitou bush	Mandatory Measure/Biosecurity Zone/Regional Recommended Measure
Clidemia hirta	Koster's curse	Prohibited Matter
Cryptostegia grandiflora	Rubber vine	Prohibited Matter
Cylindropuntia fulgida var. mam illata	Boxing glove cactus	Mandatory Measure
Cylindropuntia imbricata	Rope pear	Mandatory Measure
Cylindropuntia rosea	Hudson pear	Mandatory Measure
Cylindropuntia species	Prickly pears - Cylindropuntias	Mandatory Measure
Cytisus scoparius subsp. scopa rius	Scotch broom	Mandatory Measure/Regional Recommended Measure
Dolichandra unguis-cati	Cat's claw creeper	Mandatory Measure
Eichhornia azurea	Anchored water hyacinth	Prohibited Matter
Eichhornia crassipes	Water hyacinth	Mandatory Measure/Biosecurity Zone/Regional Recommended Measure
Equisetum species	Horsetails	Regional Recommended Measure
Genista linifolia	Flax-leaf broom	Mandatory Measure
Genista monspessulana	Cape broom	Mandatory Measure/Regional Recommended Measure
Gymnocoronis spilanthoides	Senegal tea plant	Regional Recommended Measure
Heteranthera reniformis	Kidney-leaf mud plantain	Regional Recommended Measure
Hieracium species	Hawkweeds	Prohibited Matter
Hydrocleys nymphoides	Water poppy	Regional Recommended Measure
Hydrocotyle ranunculoides	Hydrocotyl	Prohibited Matter
Hymenachne amplexicaulis and hybrids	Hymenachne	Mandatory Measure
Hyparrhenia hirta	Coolatai grass	Regional Recommended Measure
Jatropha gossypiifolia	Bellyache bush	Mandatory Measure
Lagarosiphon major	Lagarosiphon	Prohibited Matter
Lantana camara	Lantana	Mandatory Measure
Leucanthemum vulgare	Ox-eye daisy	Regional Recommended Measure

Scientific Name	Common Name	Duty
Limnobium laevigatum	Frogbit	Prohibited Matter
Limnobium spongia	Spongeplant	Prohibited Matter
Limnocharis flava	Yellow burrhead	Prohibited Matter
Lycium ferocissimum	African boxthorn	Mandatory Measure
Miconia species	Miconia	Prohibited Matter
Mikania micrantha	Mikania vine	Prohibited Matter
Mimosa pigra	Mimosa	Prohibited Matter
Myriophyllum spicatum	Eurasian water milfoil	Prohibited Matter
Nassella hyalina	Cane needle grass	Regional Recommended Measure
Nassella neesiana	Chilean needle grass	Mandatory Measure/Regional Recommended Measure
Nassella tenuissima	Mexican feather grass	Prohibited Matter
Nassella trichotoma	Serrated tussock	Mandatory Measure/Regional Recommended Measure
Nymphaea species	Water lilies	Regional Recommended Measure
Opuntia aurantiaca	Tiger pear	Mandatory Measure
Opuntia monacantha	Smooth tree pear	Mandatory Measure
Opuntia species	Prickly pears - Opuntias	Mandatory Measure
Opuntia stricta	Common pear	Mandatory Measure
Opuntia tomentosa	Velvety tree pear	Mandatory Measure
Orobanche species	Broomrapes	Prohibited Matter
Parkinsonia aculeata	Parkinsonia	Mandatory Measure/Control Order
Parthenium hysterophorus	Parthenium weed	Prohibited Matter/Mandatory Measure
Physalis hederifolia	Prairie ground cherry	Regional Recommended Measure
Physalis longifolia	Perennial ground cherry	Regional Recommended Measure
Pistia stratiotes	Water lettuce	Regional Recommended Measure
Prosopis species	Mesquite	Mandatory Measure/Regional Recommended Measure
Rubus fruticosus species aggregate	Blackberry	Mandatory Measure
Sagittaria platyphylla	Sagittaria	Mandatory Measure/Regional Recommended Measure
Salix cinerea	Grey sallow	Mandatory Measure/Regional Recommended Measure
Salix nigra	Black willow	Mandatory Measure/Regional Recommended Measure
Salix species	Willows	Mandatory Measure
Salvinia molesta	Salvinia	Mandatory Measure/Regional Recommended Measure
Senecio jacobaea	Ragwort	Regional Recommended Measure
Senecio madagascariensis	Fireweed	Mandatory Measure/Regional Recommended Measure
Solanum elaeagnifolium	Silverleaf nightshade	Mandatory Measure
Solanum viarum	Tropical soda apple	Control Order
Stratiotes aloides	Water soldier	Prohibited Matter
Striga species	Witchweeds	Prohibited Matter
Tamarix aphylla	Athel pine	Mandatory Measure
Trapa species	Water caltrop	Prohibited Matter
Ulex europaeus	Gorse	Mandatory Measure/Regional Recommended Measure
Vachellia karroo	Karroo thorn	Prohibited Matter
Vachellia nilotica	Prickly acacia	Prohibited Matter

Duty	Management Action(s)
Biosecurity Control Order	Must be eradicated from the land and be fully and continuously destroyed and suppressed, and the land kept free of the plant after eradication. Seeds and propagules must not be knowingly moved. The local control authority must be notified of any suspected or known presence of this plant.
Biosecurity Zone	Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone.
General Biosecurity Duty	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Mandatory Measure	Must not be imported into the State or sold.
Prohibited Matter	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.
Regional Recommended Measure	Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Note: Management actions may vary for each noxious weed from the general management actions listed above. If further information is required on a specific noxious weed, visit the DPI Weeds, NSW WeedWise website.

EPBC Protected matters report

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 28/09/17 10:52:34

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Coordinates
Buffer: 10.0Km

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	19
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	19
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	600 - 700km upstream
Hattah-kulkyne lakes	400 - 500km upstream
Riverland	500 - 600km upstream
The coorong, and lakes alexandrina and albert wetland	700 - 800km upstream

Listed Threatened Ecological Communities		[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.		
Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Mammals		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Austrostipa metatoris		
[66704]	Vulnerable	Species or species habitat may occur within area
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat likely to occur within area
Philotheca ericifolia		
[64942]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis		
[55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		

Name	Threatened	Type of Presence
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat may occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Boginderra Hills	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Alauda arvensis		
Skylark [656]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth lands is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of occurrence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian mainland

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.25638 147.506448,-34.258721 147.521726,-34.275674 147.518378,-34.272768 147.501841,-34.256025 147.505246,-34.256025 147.505416,-34.25638 147.506448

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Appendix F: Terms and abbreviations

Terms and abbreviations used in this report

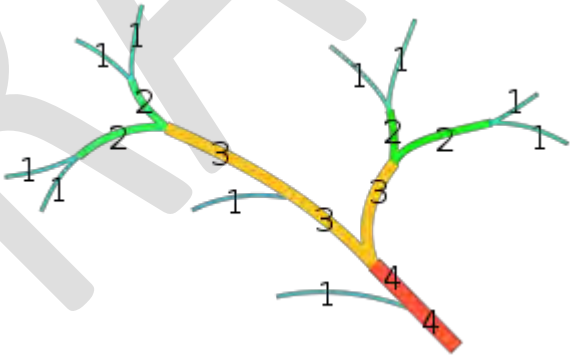
Abbreviation	Terminology	Description
	Assessment of significance	The Assessment of Significance refers to the factors that must be considered by decision makers to assess whether a proposal is likely to have a significant effect on threatened biodiversity. These mechanisms are contained in s5A of the EP&A Act and s94 of the TSC Act.
BoM	Australian Bureau of Meteorology	The Bureau of Meteorology is Australia's national weather, climate and water agency.
CAMBA	China-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with China entered into in 1986. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
CMA	Catchment Management Authority	Bodies established across New South Wales to ensure regional communities have a say in how natural resources are managed in their catchments. CMA's have now been replaced with LLS's.
	Consent authority	in relation to a development application or an application for a complying development certificate, means: The council having the function to determine the application, or If a provision of this Act, the regulations or an environmental planning instrument specifies a Minister, the Planning Assessment Commission, a joint regional planning panel or public authority (other than a council) as having the function to determine the application-that Minister, Commission, panel or authority, as the case may be.
	Critical habitat	Critical habitat is defined as an area crucial to the survival of an endangered species, population or ecological community. The declaration of critical habitat provides greater protection and stricter controls over activities in the area.
	Cumulative impacts	Impacts, when considered together, lead to a stronger impact than any impact in isolation.
	Direct impacts	Directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.
DoE	Australian Government Department of Environment.	The Department of the Environment designs and implements the Australian Government's policies and programmes to protect and conserve the environment, water and heritage and promote climate action.
DP	Deposited Plan	A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.
EEC	Endangered Ecological Community	An ecological community identified by relevant legislation likely to become extinct or is in immediate danger of extinction.
	Edge effects	A change in species composition, physical conditions or other ecological factors at the boundary between two ecosystems or the ecological changes carried out at the boundaries of ecosystems (including changes in species composition, gradients of moisture, sunlight, soil and air temperature, wind speed and other factors).
	Environment	The environment includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings.
EPA	Environment Protection Authority	Their purpose is to improve environmental performance and waste management for NSW. The EPA works with community, business, industry and government to maintain a balance between protecting the environment, managing competing demands on the environment and supporting sustainable growth.

Abbreviation	Terminology	Description
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW).	Provides the legislative framework for land use planning and development assessment in NSW.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).	Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPI	Environmental Planning Instrument	Environmental planning instruments are fundamental documents governing development of land in NSW. They are made under Part 3 of the EP&A Act for the purposes of achieving any of the objects under that Act.
ESD	Ecologically sustainable development.	Development which uses, conserves and enhances the resources of the community so ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
FM Act	*Fisheries Management Act 1994* (NSW)	The objects of this Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. This Act protects aquatic habitats and species which are not protected under the TSC Act.
GDA	Geocentric Datum of Australia	The Geocentric Datum of Australia (GDA) is the latest Australian coordinate system, replacing the Australian Geodetic Datum (AGD). The GDA is a part of a global coordinate reference frame and is directly compatible with the Global Navigation Satellite Systems.
GDE	Groundwater Dependent Ecosystems	Six types of groundwater dependent ecosystems are conventionally recognised in Australia: Terrestrial vegetation relies the availability of shallow groundwater. Wetlands such as paperbark swamp forests and mound springs ecosystems. River base flow systems where a groundwater discharge provides a base flow component to the river's discharge. Aquifer and cave ecosystems where life exists independent of sunlight Terrestrial fauna, both native and introduced, dependant on groundwater as a source of drinking water. Estuarine and near shore marine systems, such as some coastal mangroves, salt marshes and sea grass beds, which rely on the submarine discharge of groundwater.
GIS	Geographic Information System	A geographic information system (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present all types of spatial or geographical data.
GPS	Global Positioning System	A hand held device capable of applying location coordinates to digital objects such as photographs and GIS data such as lines or points.
	Habitat	The area occupied, or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.
IBRA	Interim Biogeographic Regionalisation of Australia	The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian Government's Department of the Environment. Each region is a land area made up of a group of interacting ecosystems repeated in similar form across the landscape.
	Indirect impacts	Occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser

Abbreviation	Terminology	Description
		drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.
JAMBA	Japan-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with Japan entered into in 1974. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
KTP	Key Threatening Process	A key threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. A requirement of their listing on the TSC Act is that the process adversely affects two or more threatened species, populations or ecological communities, or may cause species, populations or ecological communities not threatened to become threatened.
LEP	Local Environmental Plan	A type of planning instrument made under Part 3 of the EP&A Act.
	Life cycle	The series or stages of reproduction, growth, development, ageing and death of an organism.
LG Act	*Local Government Act 1993*	The purposes of this Act are as follows: to provide the legal framework for an effective, efficient, environmentally responsible and open system of local government in New South Wales, to regulate the relationships between the people and bodies comprising the system of local government in New South Wales, to encourage and assist the effective participation of local communities in the affairs of local government, to give councils: the ability to provide goods, services and facilities, and to carry out activities, appropriate to the current and future needs of local communities and of the wider public the responsibility for administering some regulatory systems under this Act a role in the management, improvement and development of the resources of their areas, to require councils, councillors and council employees to have regard to the principles of ecologically sustainable development in carrying out their responsibilities.
LGA	Local Government Area	The relevant LGA is Governed by Council who are the determining authority for this development application.
LLS	Local Land Services	Launched in January 2014. Each LLS delivers services to farmers, landholders and the community across rural and regional New South Wales. LLS bring together agricultural production advice, biosecurity, natural resource management and emergency management into a single organisation.
	Local population	The population occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated contiguous or interconnecting parts of the population continue beyond the study area. The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals extend into habitat adjoining and contiguous with the study area could reasonably be expected to be cross-pollinating with those in the study area. The local population of resident fauna species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) are known or likely to utilise habitats in the study area. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the study area from time to time.

Abbreviation	Terminology	Description
	Local population (EEC)	The ecological community present within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of the ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
	Locality	The area within a 50 kilometre radius of the subject site.
MNES	Matters of national environmental significance.	Refers to the seven matters of national environmental significance outlined under the EPBC Act.
NOW	NSW Office of Water	The NSW Office of Water in the Department of Primary Industries is responsible for the management of the state's surface water and groundwater resources. The Department of Primary Industries is a division within NSW Trade and Investment. The Office of Water reports to the NSW Government for water policy and the administration of key water management legislation, including the *Water Management Act 2000* and *Water Act 1912*.
Noxious Weeds Act	*Noxious Weeds Act 1993* (NSW)	The objects of this Act are as follows: • to reduce the negative impact of weeds on the economy, community and environment of this State by establishing control mechanisms to: • prevent the establishment in this state of significant new weeds, and • prevent, eliminate or restrict the spread in this state of particular significant weeds, and • effectively manage widespread significant weeds in this state, • to provide for the monitoring of and reporting on the effectiveness of the management of weeds in this state.
NPW Act	*National Parks and Wildlife Act 1974* (NSW)	The objects of this Act are as follows: • The conservation of nature, including, but not limited to, the conservation of: • habitat, ecosystems and ecosystem processes, and • biological diversity at the community, species and genetic levels, and • landforms of significance, including geological features and processes, and • landscapes and natural features of significance including wilderness and wild rivers, The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to: • places, objects and features of significance to Aboriginal people, and • places of social value to the people of New South Wales, and • places of historic, architectural or scientific significance, • Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, • Providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation. The objects of this Act are to be achieved by applying the principles of ecologically sustainable development.
NV Act	*Native Vegetation Act 2003*	The objects of this Act are: • to provide for, encourage and promote the management of native vegetation on a regional basis in the social, economic and environmental interests of the State, and • to prevent broad scale clearing unless it improves or maintains environmental outcomes, and

Abbreviation	Terminology	Description
		• to protect native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation, and • to improve the condition of existing native vegetation, particularly where it has high conservation value, and • to encourage the revegetation of land, and the rehabilitation of land, with appropriate native vegetation, In accordance with the principles of ecologically sustainable development.
OEH	Office of Environment and Heritage	The Office of Environment and Heritage (OEH) is a separate agency within the Planning and Environment cluster. OEH was formed on 4 April 2011 and works to protect and conserve the NSW environment, including the natural environment, Aboriginal country, culture and heritage and our built heritage, and manages NSW national parks and reserves.
PoEO Act	*Protection of the Environment Operations Act 1997*	The objects of this Act are as follows: • to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development, • to provide increased opportunities for public involvement and participation in environment protection, • to ensure the community has access to relevant and meaningful information about pollution, • to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms promoting: • pollution prevention and cleaner production, • the reduction to harmless levels of the discharge of substances likely to cause harm to the environment, • the elimination of harmful wastes, • the reduction in the use of materials and the re-use, recovery or recycling of materials, • the making of progressive environmental improvements, including the reduction of pollution at source, • the monitoring and reporting of environmental quality on a regular basis, • to rationalise, simplify and strengthen the regulatory framework for environment protection, • to improve the efficiency of administration of the environment protection legislation, • to assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.
RAMSAR	Convention on Wetlands of International Importance	The Ramsar Convention's broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those remaining. This requires international cooperation, policy making, capacity building and technology transfer.
	Risk of extinction	The likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with the Republic of Korea entered into in 2007. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
RF Act	*Rural Fires Act 1997*	The objects of this Act are to provide: • for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and • for the co-ordination of bush firefighting and bush fire prevention throughout the State, and • for the protection of persons from injury or death, and property from damage, arising from fires, and • for the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and

Abbreviation	Terminology	Description
		• for the protection of the environment by requiring certain activities referred to in paragraphs (a)-(c1) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the *Protection of the Environment Administration Act 1991*.
SEPP 44	State Environmental Planning Policy No.44 – Koala Habitat	This Policy aims to encourage the proper conservation and management of areas of natural vegetation with habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline: • by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and • by encouraging the identification of areas of core koala habitat, and • by encouraging the inclusion of areas of core koala habitat in environment protection zones.
Significant impact		A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity.
SIS	Species Impact Statement	A document included with an Environmental Impact Statement which details a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section. The requirements as to the contents of an SIS for different categories of protected species are given in section 110 of the TSC Act.
study area		Study area means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account.
Strahler stream order		Strahler stream order and are used to define stream size based on a hierarchy of tributaries. 
subject site		Encompasses all land which the Development Consent with apply to. This is the area to be impacted by the development and is the focus of this report.
Subject Species		Threatened species known to, or have the potential to utilise habitat within the subject site.
TSC Act	*Threatened Species Conservation Act 1995* (NSW)	This Act provides for the protection of all threatened plants and animals native to NSW and their habitats (including endangered populations and ecological communities, and their habitats). Threatened 'fish' and marine vegetation are specifically excluded as these are covered by the *Fisheries Management Act 1994*.

Appendix D

HEAVY METALS MANAGEMENT PLAN

HEAVY METAL MANAGEMENT PLAN

SCHLUNKES ROAD SITE, TRUNGLEY HALL

PROPOSED SMALL SCALE SHOOTING COMPLEX

PREPARED FOR:

SPORTING SHOOTERS ASSOCIATION OF AUSTRALIA (NSW) INC.

NOVEMBER 2017

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Report Title:	*Heavy Metal Management Plan*
Project:	*Schlunkes Road Site, Trungley Hall*
Client:	*Sporting Shooters Association of Australia (NSW) Inc.*
Report Ref.:	*217381_TMR_001C.docx*
Status:	*Final*
Issued:	*17 November 2017*

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Sporting Shooters Association of Australia (NSW) Inc. to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

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TABLES

1.0 INTRODUCTION

The SSAA (NSW) Inc. is in the process of purchasing Lot 941 DP130014 for the purposes of establishing a sporting shooters facility on the eastern portion of the site. The host lot has a size of approximately 174 hectares and a frontage to Schlunkes Road in the north of 1.6 kilometres.

The western extent of the site is generally flat and in use for cropping purposes (approximately 94 hectares) with the remainder formed of undulating slopes with varying amounts of tree cover. It is in this eastern extent that the proposed small scale shooting complex would take place.

The portion of the site the subject of this management plan (outlined in red on **Figure 1**, below) is approximately 79.7 hectares in size, and is located 19.8 kilometres north of the Temora township. The site is characterised by woodland vegetation together with informal internal access tracks and a cleared area formerly in use as a quarry.

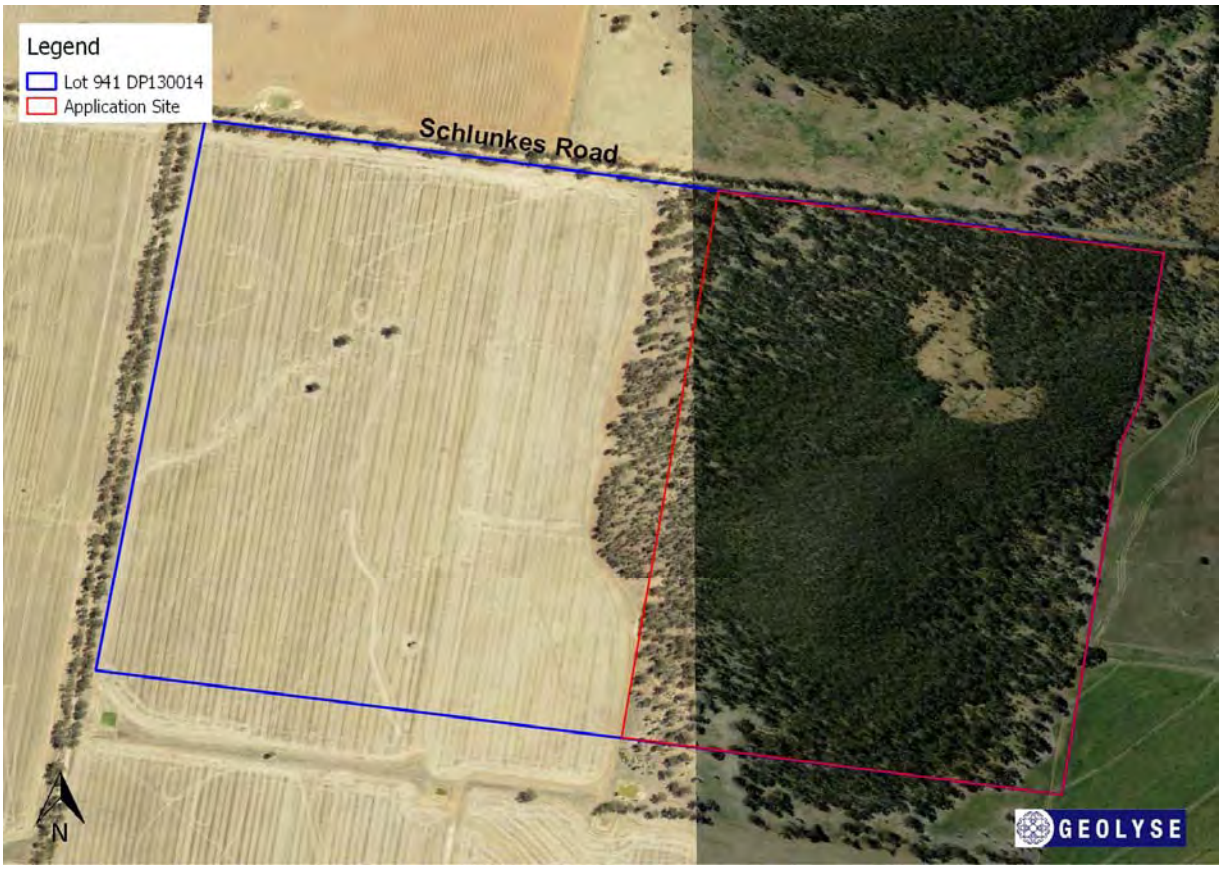

Figure 1: Aerial view of the subject site and locality (source: Google Earth 2016)

The Goldfields Way and the Cootamundra Lake Cargelligo Railway Line is located to the west of the site.

Access to the site is from Schlunkes Road in the north. Schlunkes Road is an all-weather, unsealed road linking the property to Goldfields Way in the west and Trungley Hall Road in the east.

The site is devoid of improvements apart from perimeter fencing. The subject land is surrounded by broad acre and grazing agricultural land. Adjacent land to the west is a formed but unnamed road leading to the south.

2.0 PROPOSED SITE LAYOUT

The proposed small scale shooting complex is intended for use by the local Temora shooting club.

The proposed shooting complex consists of the following components:

- Internal access roads and car parking, including one permanent 30 car parking area near the range and club house, an informal overflow parking area for 30 cars and several smaller parking areas in the southern extent of the site to serve the sporting clay walk through ranges;
- A combined 50 metre pistol range and 100 metre rifle range;
- 8 x sporting clay walk through ranges;
- 1 x field archery range;
- 1 x 'down-the-line' (DTL) trap range;
- An 18 metre by 12 metre club house;
- Two hectare primitive camping site; and
- Amenities buildings serving the camping area.

The shooting areas are discussed in further details as follows.

The pistol and rifle ranges will share a 50 metre wide x 10 metre deep concrete and steel firing shed featuring an extended roof to limit stray rounds escaping. The shed would accommodate 12 firing positions. The ranges would be surrounded by a 3 metre high earthen bund, stop butts every 50 metres and a minimum height 4 metre high stop butt at the end of each ranges. An indicative section drawing of the range is provided in **Figure 2**.

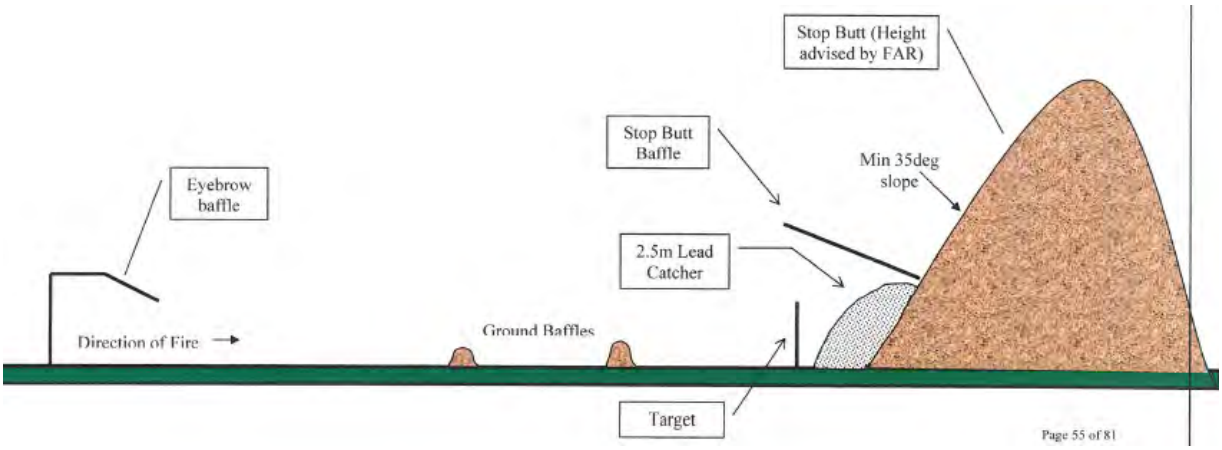

Figure 2: Indicative range section drawing

The sporting clays walk throughs would consist of a circular arrangement with a number of fixed firing positions. Some minor clearing of undergrowth would be required to install firing shelters and targets primarily limited to the removal of fallen timber. No live/standing trees would need to be removed to facilitate this proposed work.

The site would be expected to cater for 20-30 shooters on an average busy day however the site would also accommodate up to 60 shooters for regional events (3-4 times per year) and up to 80 shooters for a once a year national event. A formalised area of 30 car parking spaces would be provided for use on a weekly basis, with an additional informal area of 30 spaces for use during regional and national events (no more than five times per year).

3.0 CHARACTERISATION OF HEAVY METAL SOURCES

Pistol, rifle and shotgun shooting activities are all proposed to occur at the proposed small scale shooting complex.

Pistol and rifle shooting will be within the specified range areas, from fixed firing points and aiming at targets down-range. Shotgun shooting would occur within the sporting clay areas (DTL and walk-through areas) and would will also be from fixed firing points.

Sources of heavy metal contamination addressed in this management plan are shot projectiles and spent casings and cartridges. Heavy metals associated with shot projectiles and spent casings and cartridges are predominantly lead and copper, but may also include antimony, arsenic, chromium, mercury, aluminium and zinc.

Elevated concentrations of heavy metals in soil can result in leaching into groundwater or surface water, causing impacts to sensitive ecology or drinking water resources. An air quality pollutant risk may also arise in the event of impacted soils becoming airborne as dust.

4.0 BACKGROUND LEVELS OF METALS

The National Environment Protection (Assessment of Site Contamination) Measure (National Environment Protection Council, 1999) Guideline on Investigation Levels for Soil and Groundwater – superseded by the 2013 amendment – provides anticipated background levels of heavy metals and other potential contaminants. Further, the 2013 amended NEPM provides 'added contaminant limits' (ACLs) for a number of heavy metals, defined as "the added concentration of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required".

Heavy metal background concentrations and ACLs as provided in the 1999 and 2013 NEPM guidelines are summarised below in **Table 4.1**.

Table 4.1 – Heavy Metal Background Concentrations and ACLs

Heavy Metal	Background Concentration	Added Contaminant Limit	Comments
Lead	2 – 200 mg/kg	1,100	ACL for public open space setting, generic ACL
Copper	2 – 100 mg/kg	280	ACL for public open space setting, and assumes pH of 6.5
Antimony	NL	NL	
Arsenic	1 – 50 mg/kg	100	ACL for public open space setting. Absolute concentration not to be exceeded
Chromium	5 – 1,000 mg/kg	320	ACL specific for chromium(III) in public open space setting, and assumes minimum clay content of 5%
Mercury	0.03 mg/kg	NL	
Aluminium	NL	NL	
Zinc	10 - 300	230	ACL for public open space setting, and assumes pH of 6.5 and most sensitive cation exchange capacity (5 $cmol_c/kg$

Notes:
NL = No Level Specified in Guidelines

5.0 MANAGEMENT APPROACHES

5.1 PREVENTION

Geolyse proposes the management approaches listed in **Table 5.1** be adopted at the proposed small scale shooting complex to minimise and prevent environmental impacts from heavy metal contamination at the premises. These approaches have been adapted from the Australian Department of Defence *Pollution Prevention Environmental Management Guideline – Infrastructure Development: Design and Installation of Weapons Ranges* (2011):

Table 5.1 – Approaches to Prevent Heavy Metal Pollution

Aspect	Details
Shooting Area Layout	
Bullet Catcher Design	The bullet catcher should be designed with a height and thickness able to stop the relevant ammunition. The design of the bullet catcher should have a slope to enable stability of the berm. The bullet catcher should have an impermeable clay liner underlying the appropriate ballistically acceptable sand grade (free from rocks and debris with 85% able to pass through a 24 mm sieve). The clay liner should be made in layers with each layer compacted to inhibit the permeability of the clay. The bullet catcher should be designed by qualified personnel. The design of the weapons range should take into account requirements for deleading.
Stormwater Drainage	
Design	A stormwater management system should be designed based on the quantity and speed of the stormwater runoff. The system may consist of vegetative systems or hard engineering systems. Design should be undertaken by a qualified engineer. The stormwater system may consist of grass swales at the base of the earthen berm or at the top of the berm to direct water away from the weapons range. All systems should be contoured to inhibit erosion. Stormwater runoff can be diverted using land shaping or diversion ditches. The design of the system should allow for an area for stormwater outlet. Stormwater systems can be further stabilised using riprap lining to decrease the velocity of the stormwater. The velocity can also be decreased by minimizing the slope and putting filter systems or check dams within the runoff pathway. Filter systems (including filter beds and containment ponds) can be used to remove the sediment and trace metals from the stormwater prior to release to surface water. The filter system or containment pond must be designed for pollution prevention. All containment should be above the groundwater table and an impermeable membrane and a clay lining should be used to prevent trace metals leaching from the pond.
Maintenance	Vegetation cover provides erosion protection and dust control, to prevent sediment and trace metals from entering stormwater. Where feasible consideration should be made to cover the entire range with vegetation, with a focus on backstops, impact areas and runoff paths. All engineering design of the range should be completed prior to vegetating. The type of grass cover should be able to withstand the environment (people and animals) and be appropriate for the local climate. Consideration must also be given to the potential for fire and vermin associated with vegetative cover. To maintain grass cover upon the range the mowing frequency should allow time for grass growth. Grass between the firing line and the target should be mown to enable line of site, whilst grass behind the target should be grown as long as possible and not cut shorter than 10 cm. Ground cover can be improved by fertilizing the grass cover with a slow releasing fertilizer will promote growth more effectively. A mulch can also be used following seeding to promote growth, inhibit erosion and allow water retention. Where possible the range should have planned down time to allow an opportunity for vegetation growth. Traffic and access should be limited to the areas surrounding the weapons range to enable a natural vegetation buffer (consisting of trees, shrubs and ground cover) to form. If natural vegetation is not present in the area surrounding the weapons range then a buffer area should be planted. If necessary, the area can be seeded using aerial seeding. A well developed plan should be implemented prior to seeding. Best possible care should be taken to maintain existing native vegetation surrounding the weapons range, including trees, shrubs, vines and grasses, during the construction and development phases.

5.2 REMEDIATION

Geolyse proposes the management approaches listed in **Table 5.2** be adopted at the proposed small scale shooting complex as ongoing methodologies for rehabilitation of heavy metal contamination at the premises. These approaches have been adapted from the Australian Department of Defence *Pollution Prevention Environmental Management Guideline – Infrastructure Development: Design and Installation of Weapons Ranges* (2011):

Table 5.2 – Remediation of Heavy Metal Impacts

Aspect	Details
Down-Range Areas	
Environmental Testing	If bullets are landing directly on unsealed ground, the pH of the soil should be tested on an annual basis. Lead migration is faster with a lower pH and inhibited when the pH of the soil is between 5.5 and 8. In soils with an acidic pH the pH should be increased by the addition of lime or phosphate. Surface water and groundwater quality monitoring can be used to measure the movement of lead from the range to sensitive environments. Consideration should be given to undertaking regular monitoring.
Waste Management	
Deleading Processes	Deleading of the weapons range will be required approximately every 80,000 rounds per lane or every 2 to 3 years. During deleading the top layer of soil is removed and sifted to separate the lead from the soil. The soil can then be replaced and the lead undergoes waste disposal. The soil removed from the range will need to be stored prior to sifting in an area with an impermeable barrier and good stormwater drainage away from the stockpile. Vegetation upon the range will need to be removed prior to deleading. Where possible a range downtime may need to be applied to allow for deleading and subsequent vegetation growth. Following deleading the lead and soil need to be disposed of appropriately. The soil may be able to be replaced following deleading and the lead may be able to be recycled. The deleading process should be designed to ensure good separation is obtained to aid in disposal.

In addition to the above approaches, it is proposed that the design of fixed firing points will include consideration of spent casings and/or cartridges, allowing for appropriate collection and disposal.

6.0 CONCLUSION

The 174 ha site proposed as a small scale shooting complex property is to be developed by the Sporting Shooters' Association of Australia (NSW), consisting of ranges for rifles, pistols and shotguns. The operation of the complex will be addressed under separate documents.

The objective of this management plan is to minimise risks to the environment and human health associated with heavy metal impacts from on-site shooting activities.

Design, drainage, maintenance, assessment and remediation aspects have been considered and, when implemented, are anticipated to negate risks to the environment and human health associated with heavy metal impacts from on-site shooting activities.

The design of fixed firing points will also include consideration of spent casings and/or cartridges, allowing for appropriate collection and disposal.

The risk of leaching of heavy metals from the bullet-catchers and range areas is considered to be low. Adopting the management approaches provided in this management plan with further reduce such risks to negligible and acceptable levels.