



Hamilton Environmental Services
ABN: 89 108 410 911



TEST OF SIGNIFICANCE – 66 MEROOL ROAD, MOAMA



Test of Significance – 66 Merool Road, Moama

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Cover Photo: Looking east across the property towards the existing garden and dwelling.

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1. INTRODUCTION

In June 2021, Hamilton Environmental Services (HES) was engaged to undertake a Biodiversity Assessment and complete a Test of Significance under Part 7 Division 1 Section 7.3 of the *Biodiversity Conservation Act 2016* for the landholder of 66 Merool Road, Moama, Lot 2 DP1206253 and Lots 12 and 13 DP1259705.

The landholder is seeking to undertake the second stage of a residential subdivision - a 12 lot subdivision on the property.

Field assessment of the site was conducted on the 14th July 2021 by Dr. Steve Hamilton, and this report presents these findings.

2. BACKGROUND

2.1 Consultant Background

Steve Hamilton (Dr.)

AssocDipAppBiol, BAppSc(AppBiol), MAppSc (RMIT), PhD (University of Melbourne), BAM accredited Assessor (DPIE NSW), Vegetation Quality Assessment Certified (DSE/DEPI/DELWP Victoria), Bush Broker Site Assessor (DELWP Victoria), Certificate IV in Training and Assessment.

Steve is an ecologist specialising in flora and fauna inventory, auditing, monitoring and surveying, as well as soil typing, analysis and mapping. He has 12 years consulting experience, associated with a range of ecological evaluations and monitoring processes across all of Victoria, and southern and western New South Wales, which includes assessing and mapping vegetation condition, vegetation type, targeted threatened species surveys, habitat quality assessment (in Victoria, Habitat Hectares assessment and 'Net Loss' evaluations), across the range of terrestrial, riparian and wetland ecosystems.

He has vast experience in the assessment of native vegetation and species, and habitat loss assessment, for irrigation, residential, infrastructure and mining (including sand, rock and ore extraction) developments, and the successful negotiation of the appropriate legislative, regulatory and statutory frameworks across the three levels of Government to provide suitable outcomes for clients across both States to allow developments to proceed. In Victoria, this involves the production of Net Loss Reports, Vegetation Offset Management Plans and Work Plans, and in NSW, reporting for potential native vegetation/habitat losses, Tests of Significance and BAM assessments, threatened species threats in Development Applications (DAs), and in more detailed situations where Director General Requirements (or Secretary's Environmental Assessment Requirements; SEARs) are specified, Environmental Impact Statements (EISs) or Reviews of Environmental Factors (REFs).

Beyond statutory requirements and reporting, Steve is often called upon to provide technical reporting into particular issues, such as research/survey investigations into vegetation-soil-fauna management issues in natural areas or for development proposals, such as weed management surveys and strategies, kangaroo survey and management, potential mining pollution impacts, sustainability of timber resources, soil mapping and land capability assessment, ecosystem restoration, or revegetation design.

Prior to consulting, Steve spent 20 years as a senior teaching/research academic, and has more than 30 peer-reviewed papers and many technical reports, most focussing on the impacts of disturbance on the ecology and floristics of woodlands and grasslands.

2.2 Location and Description

The property is 2.6 km north-west of the centre of the township of Moama (Fig. 2-1).

Lot 2 DP1206253 and Lots 12 and 13 DP1259705 is a broadly rectangular shaped area of 6.2 ha, and has maximum dimensions of 140 m north-south, and 530 m east-west; the eastern half of the property is on the terrace above the floodplain, and slopes to the west to the floodplain of the Murray River.

The first stage of the residential subdivision has been released, and Bayaderra Court is the access for Stage 1; this road will be extended to access the proposed 12 lots in Stage 2, but currently, Bayaderra Court terminates is a cul-de-sac at the eastern boundary of Stage 2. The northern and southern boundary is freehold land, with the property to the east being the Winbi River Resort, and the Murray River forms the western boundary (Fig. 2-2).

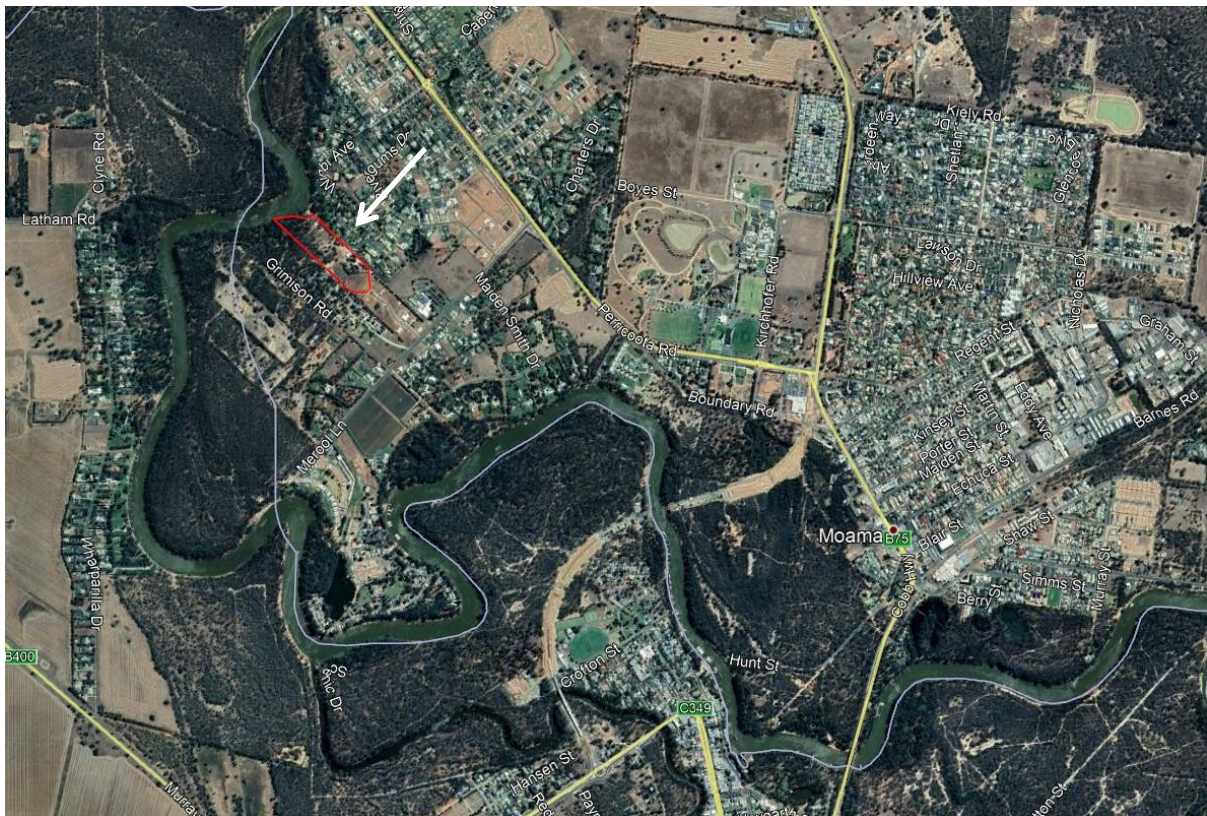


Figure 2-1 Aerial image of the general location of the assessed property, outlined in red (Google Earth 2021).

There is a dwelling and associated garden in the south-eastern corner of the area, and there is an old shed on the southern boundary of the property.

The property has been in the past fully fenced and utilised as a grazing paddock; no grazing stock were present at the time of assessment.

As indicated previously, the landholder is seeking to undertake a 12 lot subdivision on the property; the Plan of Subdivision is shown in Fig. 2-3. Proposed Lots 6 to 12 are in the eastern half of the property, and are on the elevated terrace, while proposed Lots 1 to 5 are on the slopes and floodplain, and are long rectangular lots. The floodplain section of these lots is not usable for development due to significant bushfire and flood risk, and it is recommended that Council enforce a covenant or some form of planning instrument to protect the vegetation rather than there being the potential for native vegetation clearance in the future.

Lots 1 to 5 do not extend to the Murray River, and their western boundaries are at least 140 m from the top of the river bank (see Fig. 2-3).

Lots 2 to 12 will have direct access to Bayaderra Court, while Lot 1 will directly access Merool Road by a long, linear corridor on the northern boundary of the property (see Fig. 2-3).

Proposed Lots 6 to 12 include the existing dwelling and the garden, and there is no native vegetation on the site; the paddock area of these outside of the dwelling and garden area is heavily infested with European Rabbit, and there are many warrens across the area.

Proposed Lots 1 to 5 have a significant extent of native vegetation – patches of River Red Gum (*Eucalyptus camaldulensis*) and some Grey Box (*E. microcarpa*) and associated indigenous shrub and ground layer vegetation – across their western extent in proximity to the Murray River. It is proposed that the majority of the native vegetation within these lots will be protected by an appropriate covenant – such as the designation of an Asset Protection Zone – and that the building envelopes for these lots will be on the slopes of the elevated terrace in the east of the lots (Claire Tunbridge pers. comm. 2021). However, two juvenile River Red Gum individuals are likely to be losses to as a consequence of the location of these building envelopes and bushfire protection measures.

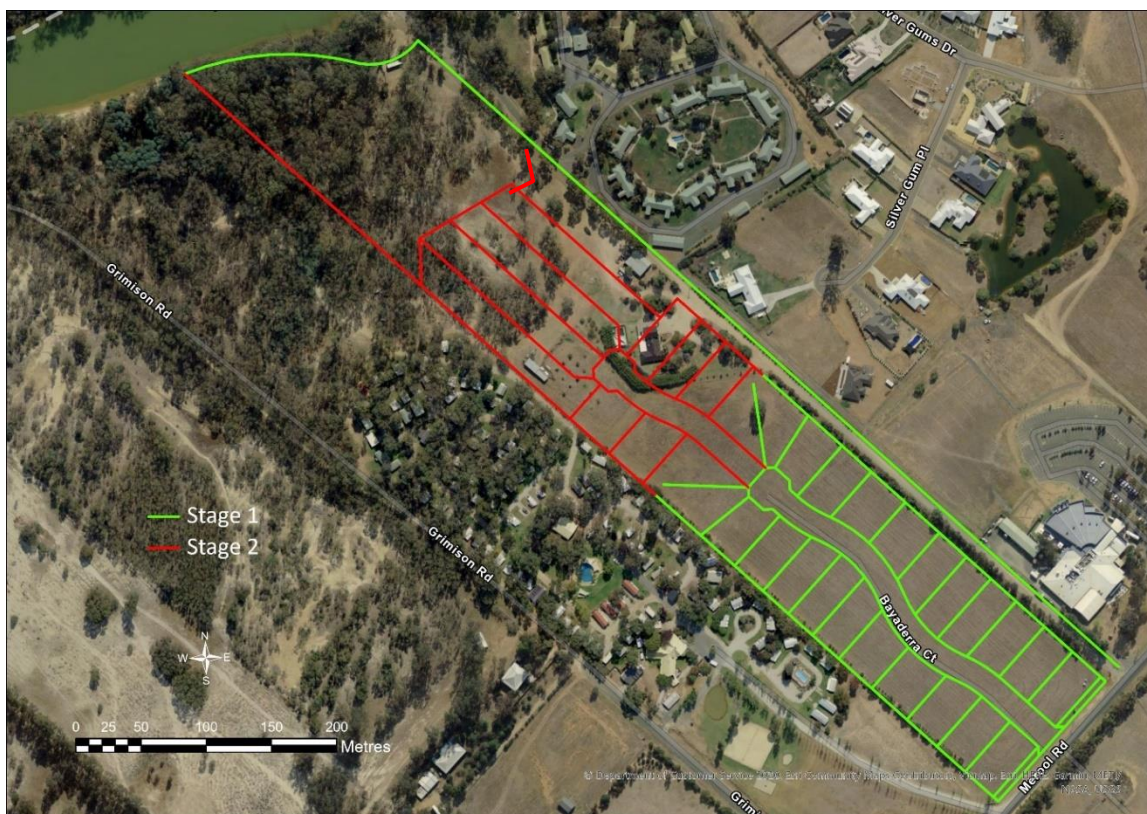


Figure 2-2 Aerial image of the 66 Merool Road Moama property and the proposed residential subdivision layout (Image from ESRI Australia 2021).

3. METHODOLOGY

3.1 Desktop Review

The following desktop information was gathered prior to field assessment:

- Aerial imagery and base map from Land and Property Information New South Wales;

- Determination of a general species list for the area (Department of Planning, Industry and Environment [DPIE] 2021a);
- Matters of National Significance reporting for the 10 km radius around the property (Department of Agriculture, Water and Environment [DAWE] 2021);
- Flora, fauna and threatened species lists, sighting records and information for the district was obtained from *BioNet – Website of the Atlas of NSW Wildlife* (DPIE 2021b).

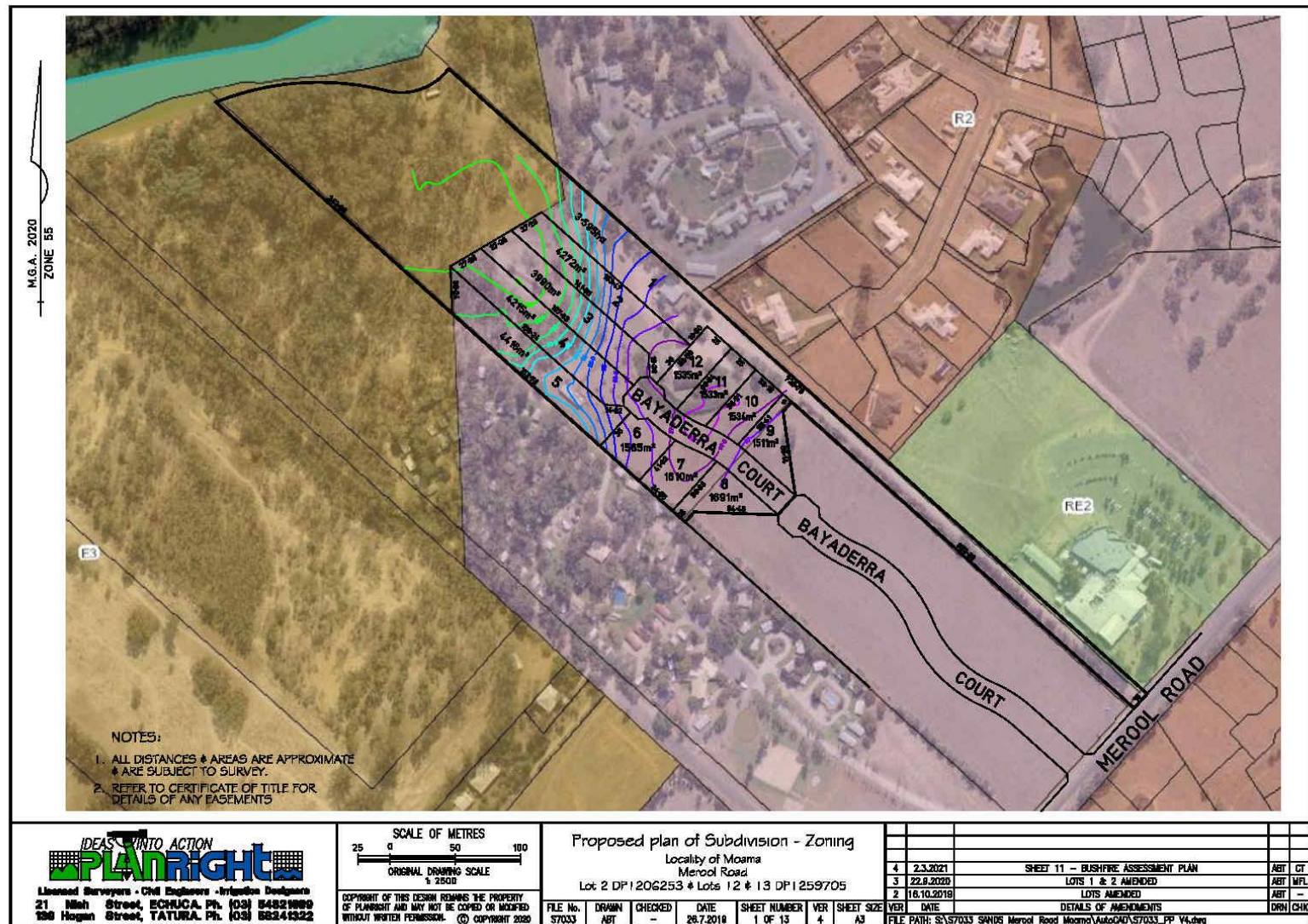


Figure 2-3 Plan of Subdivision, 66 Merool Street, Moama (Planright Echuca, dated 26/7/19).

3.2 General Site Assessment

On the 14th July 2021, Dr. Steve Hamilton (BAAS 18106) visited the property and the adjacent area to undertake the assessment. On this day, air temperatures were between 8 to 10°C, the sky was overcast, there was light rain, and there was a moderate wind (Bureau of Meteorology 2021).

The entire site was traversed by foot, and continuous active searching was conducted over a total period of 30 minutes.

In a general sense, the following assessments were undertaken across the assessed area:

- Vascular plant species were identified and noted according to zone, with an overall cover/abundance value recorded for each species in each zone completed post-field assessment (see Table 3-1);
- The species, location, diameter, health and basic hollow characteristics of all assessed tree individuals was recorded, and an image of the tree taken;
- Opportunistic recording of any fauna;
- Digital images across the site taken.

Fifty (50) images were taken across the area during the assessment to facilitate identification and to provide context to the description.

Table 3-1 Modified Braun-Blanquet scale applied to assessment to each vascular plant species identified.

Visual assessment of cover/abundance	
Symbol	Description
+	rare, cover < 5%
1	Uncommon, cover < 5 %
2	Very common, cover < 5 % or cover 5-25 % with any number of individuals
3	Cover 25-50 % with any number of individuals
4	Cover 50-75 % with any number of individuals
5	Cover 75-100 % with any number of individuals

3.3 Taxonomy

3.3.1 Flora

Vascular plants that could not be identified in the field, specimens and images were collected for identification using the *Flora of New South Wales* (Harden 1990, 1991, 1992, 1993), and *PlantNet Flora On-line* (Royal Botanic Gardens Sydney 2021).

3.3.2 Fauna

Any fauna observed were recorded, with the nomenclature based variously on the compilations of Hero *et al.* (1991), Menkhorst (1995), Cogger (1996) and Simpson and Day (1998), utilising Triggs (1996) for identification using indirect methods, such as the presence of scats or tracks.

4. EXISTING ENVIRONMENT

4.1 Vegetation

A total of 10 vascular plant species were recorded across the proposed future Lots 1 to 12.



Plate 4-1 Views across the property: the old shed on the southern boundary (top left), looking west down the slope towards the existing native vegetation Patch (top right), Tree 1 on the slope proposed for removal (middle left), looking north towards the Winbi River Resort (middle right), looking east across the eastern section of the property south of the existing dwelling and garden (bottom left), and the existing dwelling and garden (bottom right). Pertinent trees are numbered in white.

The River Red Gum patches in the west of Lots 1 to 5 maintained a mostly indigenous understorey Dwarf Cherry (*Exocarpos strictus*), Ringed Wallaby Grass (*Rytidopserma caespitosum*) and Brown-backed Wallaby Grass (*R. duttonianum*), Rigid Panic (*Walwhalleya proluta*) and Curly Windmill Grass

(*Enteropogon acicularis*)(30 % projective foliage cover); introduced ground layer species, such as Capeweed (*Arctotheca calendula*), Common Stork's-bill (*Erodium cicutarium*) and Onion-grass (*Romulea rosea*) are also common in this area (30 % projective foliage cover).

The eastern half of Lots 1 to 5 and all of Lots 6 to 12 do not maintain any woody vegetation – other than the existing garden area – and are dominated by introduced ground layer species Capeweed, Common Stork's-bill and Onion Grass (70 % projective foliage cover; the indigenous graminoid Ringed Wallaby Grass was found in this area, but was only found in low abundance (5 % projective foliage cover).

There were no rare or threatened species observed (after DPIE 2021a).

As indicated previously, the landholder is seeking to undertake a 12 lot subdivision on the property. Proposed Lots 6 to 12 are in the eastern half of the property, and are on the elevated terrace, while proposed Lots 1 to 5 are on the slopes and floodplain, and are long rectangular lots. The floodplain section of these lots is not usable for development due to significant bushfire and flood risk, and it is recommended that Council enforce a covenant or some form of planning instrument to protect the vegetation rather than there being the potential for native vegetation clearance in the future.

Proposed Lots 6 to 12 include the existing dwelling and the garden, and there is no native vegetation on the site; the paddock area of these outside of the dwelling and garden area is heavily infested with European Rabbit, and there are many warrens across the area.

Proposed Lots 1 to 5 have a significant extent of native vegetation – patches of River Red Gum and some Grey Box and associated indigenous shrub and ground layer vegetation – across their western extent in proximity to the Murray River. It is proposed that the majority of the native vegetation within these lots will be protected by an appropriate covenant – such as the designation of an Asset Protection Zone – and that the building envelopes for these lots will be on the slopes of the elevated terrace in the east of the lots (Claire Tunbridge pers. comm. 2021). However, two juvenile River Red Gum individuals are likely to be losses to as a consequence of the location of these building envelopes and bushfire protection measures.

The property is likely to have been predominantly former NSW Plant Community Type (PCT) ID 7 – *Inland Riverine Forests - River Red Gum-Warrego Grass-herbaceous riparian tall open forest wetland mainly in the Riverina Bioregion* (from Environment and Heritage 2012 and DPIE 2021d); the patches in the western end of the development are remnants of this community.

4.2 Significant Trees

Only two trees were assessed; as these were the only trees proposed for loss across the site:

- Tree 1 is a River Red Gum of 28 cm diameter at breast height (dbh), and is not hollow-bearing;
- Tree 2 is also a River Red Gum of 15 cm dbh, and is also not hollow-bearing.

The location of both assessed trees can be seen in Fig. 4-1.

The layout has been planned specifically to avoid and minimise the loss of native vegetation on the property.

Construction projects that involve earthworks or soil disturbance can cause indirect losses of native vegetation that are retained during construction due to root damage and soil modification within the zone where roots occur. Of particular concern is the longer-term impact of soil compaction and excavation (e.g. trenching for pipelines) close to trees and the effects of this on immediate and longer-term tree health. Standards Australia (2009) has provided guidance and clarity on this issue, and has defined an acceptable distance for tree retention in order to prevent indirect losses of native vegetation during and after construction activities as a guiding principle. These designated

Tree Protection Zones (TPZs) should be implemented for the duration of construction activities (Standards Australia 2009) as part of the development conditions.

A TPZ is a specific area above and below the ground, with a radius 12 times the Diameter at Breast Height (dbh; 1.3 m) of any individual tree; the TPZ of trees should be no less than 2 m or greater than 15 m, and it is recommended that physical barriers be erected to delineate the TPZ during construction activities. Should a development impinge on the TPZ area for > 10 % of its area, the tree shall be considered a loss, and will have to be offset (Standards Australia 2009).

There will need to be care taken in regard to any retained trees on the development site to ensure that their TPZs are not impacted.

4.3 Fauna

There were 4 species of fauna observed or inferred at the site; the indigenous Eastern Grey Kangaroo, Australian Magpie and Australian Wood Duck, and the introduced European Rabbit.

There were no rare or threatened species observed at the site (DPIE 2021a).

As indicated previously, the paddock area outside of the dwelling and garden area is heavily infested with European Rabbit, and there are many warrens across the area.

A considerable abundance of both European Rabbit and Eastern Grey Kangaroo scat was observed across the site, which does explain why the vegetation of the whole site was very closely cropped.

The Murray River corridor is within 140 m of the proposed lots, and given that there is native vegetation from within the lots that is continuous to the top of bank, the lots maintain a good landscape connectivity.

The indigenous fauna observed across the site is likely to be typical of those observed in cleared sites next to riparian native vegetation that for the majority of the site lacks a tree canopy and an understorey structure. Despite the good connectivity of the property, the lack of observed species diversity across the site is not surprising, given the poor weather at the time of observation and the short period of assessment time.

Therefore, while a greater species diversity was expected, ultimately, the condition of the majority of the site does not provide significant faunal habitat because of:

- The lack of an effective tree canopy across the majority of the site;
- The lack of significant numbers of hollow-bearing trees, or standing dead trees;
- the lack of understorey woody vegetation across the property (and adjacent properties as well) and the commensurate simplified vegetation structure, which would considerably limit mammal, reptile, bat and bird species residency;
- a low abundance and diversity indigenous ground layer;
- the lack of fallen timber, which would considerably limit mammal, reptile, bat and bird species residency;
- the likely presence of feral animal populations such as foxes and feral/semi-domestic/domestic cats, which would actively predate any ground-dwelling or near ground-dwelling species heavily.

On this basis, while some bird fauna will be able to utilise the nectar resources found on the western edge of the property and adjacent properties contiguous with the Murray River, there are limited habitat opportunities for fauna in terms of residence because of the lack of vegetation structure, on-going disturbance at the site, and the lack of structural and compositional diversity. However, it is reasonable to assume that some fauna found within the Murray River corridor will occasionally utilise the limited habitat resources of the assessed site because of the connectivity; however, it is



Figure 4-1 Aerial image of 66 Merool Street Moama, showing the location of the assessed indigenous trees (Image from ESRI Australia 2021).

clear that the majority of the site would not be primary or even secondary habitat for many species, and usage would be highly infrequent and opportunistic.

4.4 Threatened Species and Communities

4.4.1 Threatened community likelihood

As stated previously, the property was predominantly former NSW Plant Community Type (PCT) ID 7 – *Inland Riverine Forests - River Red Gum-Warrego Grass-herbaceous riparian tall open forest wetland mainly in the Riverina Bioregion* (from Environment and Heritage 2012 and DPIE 2021d); the patches in the western end of the development are remnants of this community.

Threatened Ecological Communities (TECs) are listed in the schedules of the *Biodiversity Conservation Act 2016*; *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*, the *Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression Bioregions, the *Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes Bioregions*, and *White Box-Yellow Box-Blakely's Red Gum Woodland* are listed as *Endangered* under the Act (DPIE 2021b).

Matters of National Environmental Significance searching reveals that the nationally critically endangered *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* and *Seasonal Herbaceous Wetlands (freshwater) of the Temperate Lowland* communities, and the nationally endangered *Natural Grasslands of the Murray Valley Plains*, *Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*, *Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions* and the *Weeping Myall Woodlands* communities occur within a 20 km radius of the site (DAWE 2021).

Threatened Ecological Communities (TECs) are listed in the schedules of the *Biodiversity Conservation Act 2016*. Several TECs are considered to occur within the district of the proposed development: *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*, the *Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression Bioregions, the *Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes Bioregions*, and *White Box Yellow Box Blakely's Red Gum Woodland* (known as Grassy Box Gum Woodland) are all listed as *Endangered* under the Act (DPIE 2021b); the assessed property was not formerly one of the six threatened community at a State or a National level.

4.4.2 Threatened species likelihood

There were no rare or threatened species under the *Biodiversity Conservation Act 2016* observed at the property (DPIE 2021a).

The likelihood of presence for all recorded threatened species within a 10 km radius of the site has been considered (DPIE 2021a).

BioNet – Website of the Atlas of NSW Wildlife and Matters of National Environmental Significance searches revealed that there were records or predicted occurrences of twenty four (24) threatened fauna species within a 10 km radius of the site (DPIE 2021a, DAWE 2021; Appendix A).

BioNet – Website of the Atlas of NSW Wildlife and Matters of National Environmental Significance revealed that there were nine (9) records or predicted occurrences of threatened flora species within a 10 km radius of the site (DPIE 2021a, DAWE 2021; Appendix A).

The likelihood of the presence of these species and their likelihood of utilisation of the proposed development area was considered and rated based on the habitat preferences of the species, the habitat quality of the site, the good landscape connectivity, known records for species and the currency of these records, and the composition, abundance and structure of the vegetation of the

site (Appendix A).

Of these species, all flora, and nineteen fauna species were not likely to occur at the site or to utilise it because of the following issues (or combination of them):

- the lack of a suitable community/habitat type (e.g. Floating Swamp Wallaby-grass, Australasian Bittern, Bush Stone-curlew, Rigid Spider-orchid, Golden Sun Moth, Grey-headed Flying-fox, Plains-wanderer, Spiny Rice-flower, Turnip Copperburr);
- the lack of connectivity of the site through clearing of habitat to areas of known occurrence (e.g. Fork-tailed Swift, Grey-crowned Babbler, Painted Honeyeater, Southern Bell Frog, Squirrel Glider, Koala, Yellow-bellied Sheath-tail Bat);
- disturbance to, and simplification of the site (e.g. Claypan Daisy, Sloane's Froglet, Southern Bell Frog, Striped Legless Lizard).

Based on the assumptions described above, five species of fauna – Brown Treecreeper, Corben's Long-eared Bat, Little Lorikeet, Superb Parrot and Swift Parrot – were considered to have potential to find the site and utilise it given the limited available habitat resources.

The subdivision will result in the removal of 2 juvenile River Red Gums which are non-hollow-bearing, and it is unlikely that the loss of this native vegetation from a site 140 m from the Murray River corridor, will not have any impact on these threatened species that have potential to find the site and utilise it given the available habitat resources.

4.4.3 Assessment of Significance

Part 7 Division 1 Section 7.3 of the *Biodiversity Conservation Act 2016* sets out five parameters that a determining authority must consider in deciding whether an activity is likely to have a significant effect on threatened species, populations, or ecological communities, or their habitats.

As indicated, other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced ground layer species.

The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing.

Six threatened communities, nine threatened species of flora and twenty four species of fauna have been recorded within a 10 km radius of the site (DPIE 2021a) or are known or predicted to occur within 10 km of the site (DAWE 2021)(Appendix A).

After likelihood assessment, no representative threatened communities or threatened flora are considered likely to occur in the area, and five fauna species have been determined to have potential to occur on the site, have been evaluated using the five parameters (Appendix D), and it is considered that the proposed development would have no impact on the other species and populations, or their habitats (Appendix A).

The application of the five parameters of Part 7 Division 1 Section 7.3 of the *Biodiversity Conservation Act 2016* in the following section specifically addresses the effects of the development on the five threatened species.

Fauna. Five threatened fauna have been considered to have potential to utilise the site are being considered in the following section collectively. As all of them have been recorded recently within reasonable proximity on the Murray River corridor, and all have similar issues in regard to their likely usage of the site given its quality and connectivity, this is considered a prudent action rather than providing a lengthy and repetitive response for each of the following individual species - Brown Treecreeper, Corben's Long-eared Bat, Little Lorikeet, Superb Parrot and Swift Parrot.

- 1 (a) *in the case of a threatened species, whether the action proposed is 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,*

Other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced ground layer species. The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing, and it unlikely that the loss of this native vegetation from a site 140 m from the Murray River, will not place any of the five species threatened species that have potential to find the site and utilise it given the available habitat resources, at the risk of local extinction.

- 1 (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is 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*

Not applicable.

- (ii) *is 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,*

Not applicable.

- 1 (c) *in relation to the habitat of a threatened species or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

Other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced ground layer species. The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing, and it unlikely that the loss of this native vegetation from a site 140 m from the Murray River, will not place any of the five species threatened species that have potential to find the site and utilise it given the available habitat resources, at any risk because of the minimal loss of secondary habitat to be removed.

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

Other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced ground layer species. The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing, and it unlikely that the loss of this native vegetation from a site 140 m from the Murray River, but disconnected from it, will result in any isolation or fragmentation of habitat for any of the five species threatened species that have potential to find the site and utilise it given the available habitat resources.

- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,*

Other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced

ground layer species. The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing, and it is unlikely that the loss of this modified native vegetation from a site 140 m from the Murray River, will not result in any impact on the long-term survival of any of the five species threatened species that have potential to find the site and utilise it given the available habitat resources.

- 1 (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly):*

No such declaration has been made for the area.

- 1 (e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

As indicated, the proposed development will result in one key threatening process - *Clearing of native vegetation*.

5. AVOIDANCE AND MINIMISATION OF NATIVE VEGETATION

The layout has been planned specifically to avoid and minimise the loss of native vegetation on the property.

As indicated, other than native vegetation patches in the western half of the site which is to be protected within an Asset Protection Zone, the property been cleared of indigenous woody vegetation, with this cleared area being disturbed by European Rabbits and dominated by introduced ground layer species.

The subdivision will result in the removal of 2 juvenile River Red Gum, which are non-hollow-bearing.

The generation of a Biodiversity Offset Scheme Entry Threshold Report (BOSET Report)(DPIE 2021f) reveals that the minimum Lot Size according to the *Murray Local Environmental Plan 2011* (New South Wales Government 2021) is 0.15 ha, and that the Area Clearing Threshold required to enter the Biodiversity Offset Scheme (BOS), and for a Biodiversity Development Assessment Report (BDAR) to be completed, is 0.25 ha.

Therefore, for development to avoid entering the BOS and requiring a BDAR to be undertaken, native vegetation clearance must be < 0.25 ha; the loss of the two juvenile River Red Gum with a combined estimated canopy area of 60 m². This is 0.006 ha, significantly less than the clearance threshold of 0.25 ha.

6. RECOMMENDATION

The landholder is seeking to undertake a 12 lot subdivision on the property. Proposed Lots 6 to 12 are in the eastern half of the property, and are on the elevated terrace, while proposed Lots 1 to 5 are on the slopes and floodplain, and are long rectangular lots. The floodplain section of these lots is not usable for development due to significant bushfire and flood risk, and it is recommended that Council enforce a covenant or some form of planning instrument to protect the vegetation rather than there being the potential for native vegetation clearance in the future.

The property is not in a declared area of outstanding biodiversity value, the proposed development area is not mapped as *Vulnerable or Sensitive Regulated Land* according to the *State Environmental Planning Policy (Vegetation) 2017*, and is also not mapped as an area of Biodiversity Value (DPIE 2021e); the adjacent Murray River corridor is an area of Biodiversity Value, but the proposed development area is wholly out of this mapped area.

The extent of the native vegetation on the property (effectively, the border of the canopies of the two immature trees for loss, and intervening areas according to canopy separation ratio) is

estimated to be < 0.01 ha (60 m²); these trees are losses from within a future Asset Protection Zone, due to building envelope and bushfire protection measures.

As indicated, the generation of a BOSET Report reveals that the minimum Lot Size is 0.15 ha, and that the Area Clearing Threshold required to enter the BOS, and for a BDAR to be completed, is 0.25 ha.

Therefore, for the development to avoid entering the BOS and requiring a BDAR to be undertaken, native vegetation clearance must be < 0.25 ha, and the estimated native vegetation loss is less than this threshold amount; therefore, a BDAR is not required.

The whole property has been evaluated and subjected to a Test of Significance under Part 7 Division 1 Section 7.3 of the *Biodiversity Conservation Act 2016*, and it is concluded that in the event of the development incurring the loss of 2 juvenile River Red Gums which are not hollow-bearing, there will not be any significant impacts on any threatened species or community as a consequence.

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7.1 Personal communications

Tunbridge, Claire (2021). Planright, Echuca.

APPENDIX A THREATENED SPECIES LIKELIHOOD OF PRESENCE

List of threatened communities, and flora and fauna species recorded by the BioNet - Atlas of NSW Wildlife and by Matters of National Environmental Significance search of a 10 km radius from the proposed development site, their status, and their likelihood of occurrence on the site (DPIE 2021b; DAW 2021).

Common Name	Scientific name	Conservation Status (NSW) ¹	Conservation Status (Comm) ²	Likelihood of Occurrence ³	Five Part Test
Vegetation community					
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		e	E	While this TEC is represented within the district, the property is former River Red Gum forest/woodland. Likelihood: Not present	No
Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		e	E	While this TEC is represented within the district, the property is former River Red Gum forest/woodland. Likelihood: Not present	No
Murray River endangered ecological community		e		The community is present within proximity to the Murray River; however, due to the minor nature of the work and its location away from the river, the community would not be impacted by the proposal. Likelihood: Not present	No
Natural Grasslands of the Murray Valley Plains		e	CE	While this TEC is represented within the district, the property is former River Red Gum forest/woodland. Likelihood: Not present	No
Seasonal herbaceous wetlands (freshwater) of the temperate lowland plains		ce		While this TEC is represented within the district, the property is former River Red Gum forest/woodland. Likelihood: Not present	No
Weeping Myall Woodlands		e	E	While this TEC is represented within the district, the property is former River Red Gum forest/woodland. Likelihood: Not present	No
Flora					
Floating Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	v	V	The species 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. Suitable habitat is not found on the site. Only once sighting within the Murray River Reserve 6 km E of the site in 1979. Likelihood: Highly unlikely to be present	No
Claypan Daisy	<i>Brachyscome muelleroides</i>	v	V	A small annual herb restricted to the mid-Murray/Murrumbidgee Rivers region in NSW and Victoria. It occurs in seasonally wet depressions, and relies on seasonal inundation. The species is now restricted to only 10 known populations. Such habitat is now not found on site. No records within 10 km. Likelihood: Highly unlikely to be present	No
Rigid Spider-orchid	<i>Caladenia tenax</i>		E	This species grows mostly in light soils on sand-hills and sand plains. Little information is now known of its NSW distribution, and the only known populations are in Victoria and South Australia. Such habitat is not found on site. No records of the species within 10 km of the site. Likelihood: Highly unlikely to be present	No
Spiny Rice-flower	<i>Pimelea spinescens</i> ssp. <i>spinescens</i>	xx	CE	This plant now largely occurs on basalt-derived soils west of Melbourne, across the central Victorian volcanic plains, and on alluvial soils across north west Victoria. Recent records regionally are closer to Terrick Terrick NP. Site is not suitable habitat. No record of the species within 10 km. Likelihood: Unlikely to be present	No

Test of Significance – 66 Merool Road, Moama

Common Name	Scientific name	Conservation Status (NSW) ¹	Conservation Status (Comm) ²	Likelihood of Occurrence ³	Five Part Test
	<i>Prasophyllum</i> sp. Moama	ce		A species of forb-rich natural grasslands on flat alluvial plains. <i>Prasophyllum</i> sp. Moama is known in NSW from only one locality, discovered in 2005, 11.5 km north of the proposed development area. The species is not endemic to New South Wales, occurring also in Victoria in small to moderate-sized populations within 50 km of Echuca. The Moama site is currently managed, under short-term funding, as a high conservation value area on a Travelling Stock Reserve (TSR), but remains subject to discretionary grazing. Site is not suitable habitat. No records of the species within 10 km. Likelihood: Highly unlikely to be present	No
Lowly Greenhood	<i>Pterostylis despectans</i>	ce	E	In New South Wales the species is known only from a single population discovered in 2005, 11.5 km north of the proposed development area. Several surveys of Riverina grassland and regional Travelling Stock Reserves did not record <i>P. despectans</i> and it seems likely that the species is extremely rare in New South Wales. The species also occurs as very small fragmented populations in central Victoria and in South Australia. The total estimated number of individuals in the Victorian and South Australian populations is less than 1,500. The Moama population has been assessed as comprising between 20 and 60 individual plants. All plants known to date occur within an area of about one hectare, within an apparently suitable habitat patch of about 20 ha. Site is now not suitable habitat. No records of the species within 10 km. Likelihood: Highly unlikely to be present	No
Turnip Copperburr	<i>Sclerolaena napiformis</i>	e	E	Confined to remnant grassland habitats on clay-loam soils. Grows on level plains in tussock grassland of <i>Austrostipa nodosa</i> and <i>Chloris truncata</i> , in grey cracking clay to red-brown loamy clay. Known from only a few small populations in remnant grassland in the southern Riverina of NSW and north-central Victoria. NSW populations are confined to the area between Jerilderie and Moama on travelling stock routes and road reserves. The site is not suitable habitat. Over 150 records for the species along the Cobb Highway/Moama TSR, the closest being 5 km NE of the site. Likelihood: Highly unlikely to be present	No
Slender Darling-pea	<i>Swainsona murrayana</i>	v	E	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. 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. Site is suitable habitat, but no record of the species within 10 km. Likelihood: Unlikely to be present	No
Red Darling-pea	<i>Swainsona plagiotropis</i>	v	V	Grassland and Grassy Woodland plant in sites prone to seasonal inundation. Site is not suitable habitat. No record of the species within 10 km. Likelihood: Unlikely to be present	No
Fauna					
Australian Painted Snipe	<i>Rostratala australis</i>	e	E	The Australian Painted Snipe inhabits many different types of shallow, brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins and small, low-lying islands. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and canegrass. Good suitable potential habitat available along the margins of the river and surrounding areas, but no suitable habitat occurs on site. No record of the species within 10 km. Likelihood: Highly unlikely to be present	No

Test of Significance – 66 Merool Road, Moama

Common Name	Scientific name	Conservation Status (NSW) ¹	Conservation Status (Comm) ²	Likelihood of Occurrence ³	Five Part Test
Australasian Bittern	<i>Botaurus poiciloptilus</i>	e	E	Australasian Bitterns specialise in living in dense beds of reeds and rushes, where they are surprisingly difficult to see, as they are particularly well camouflaged among reeds. Added to this, when alarmed, they stand still with neck stretched upwards and bill pointing skywards. Good suitable potential habitat available along the margins of the river and surrounding area, but no suitable habitat occurs on site. No record of the species within 10 km. Likelihood: Highly unlikely to be present	No
Brown Treecreeper (eastern ssp.)	<i>Climacteris picumnus victoriae</i>	v		Occurs in intact woodlands, and adjacent agricultural land. The development site is not suitable habitat, and no vegetation is proposed for removal; there are three records for the species in proximity along the Murray River corridor E of the site. Likelihood: May be present	Yes
Bush Stone-curlew	<i>Burhinus grallarius</i>	e		Range in south-eastern Australia is now largely confined to grassy woodlands and farmland. Likes to roost and nest in grassy woodlands of Buloke, gum or box with low, sparse grassy or herb understorey. Branches on the ground are essential for the bird's camouflage, and it is unlikely to attempt nesting without it. No suitable habitat occurs on site. One record for the species – 1.5 km SE of the site in 2008. Likelihood: Unlikely to be present	No
Corben's Long-eared Bat	<i>Nyctophilus corbeni</i>	v	V	Occurs in intact Buloke, mallee, Cypress-pine, ironbark and box woodlands and forests, and adjacent agricultural land. The property is suitable habitat. Site is well connected to known locations of the species. Not recorded within 10 km of the site. Likelihood: May be present	Yes
Curlew Sandpiper	<i>Calidris ferruginea</i>	E	CE	The Curlew Sandpiper is a common visitor during the Australian summer, congregating in large flocks, sometimes comprising thousands of birds, at sheltered intertidal mudflats and also at the muddy margins of terrestrial wetlands. No suitable habitat occurs on site. Has not been recorded within 20 km of the site. Likelihood: Highly unlikely to be present	No
Eastern Curlew	<i>Numenius madagascariensis</i>	v	Migratory Wetland Species	The Eastern Curlew is widespread in coastal regions in the north-east and south of Australia, including Tasmania, and scattered in other coastal areas, and is found on intertidal mudflats and sand flats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons. Site is not suitable habitat, and no records within 20 km. Likelihood: Highly unlikely to be present	No
Fork-tailed Swift	<i>Apus pacificus</i>		Migratory Marine Species	This non-breeding migrant visitor to Australia mostly occurs over inland plains, but sometimes above foothills or in coastal areas. Site does contain some suitable habitat; however there is a lack of connectivity to known locations. Not recorded within 20 km. Likelihood: Unlikely to be present	No
Golden Sun Moth	<i>Synemon plana</i>	e	CE	Occurs in grassy woodlands dominated by indigenous grasses. Some sections of the site may have once been suitable habitat, but is now not suitable habitat. Not recorded within 10 km of the site. Likelihood: Unlikely to be present	No
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	v		Prefers extensive intact woodlands with significant shrub and litter layers. The property is not suitable habitat. Two records for the species within 10 km; in the Murray River Reserve 600 m west of the site in 2004, and on Kiely Road 3.5 km NE of the site in 2008. Likelihood: Unlikely to be present	No

Test of Significance – 66 Merool Road, Moama

Common Name	Scientific name	Conservation Status (NSW) ¹	Conservation Status (Comm) ²	Likelihood of Occurrence ³	Five Part Test
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	v	V	Australia's only endemic flying-fox and occurs in a coastal belt from south-eastern Queensland to Melbourne, Victoria. It is a canopy-feeding frugivore and nectivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. The site is not suitable habitat for the species, and there is connectivity to known locations. However, no records within 10 km. Likelihood: Unlikely to be present	No
Koala	<i>Phascolarctus cinereus</i>	v	V	Inhabit eucalypt woodlands and forests. Spend most of their time in trees, but will descend and traverse open ground to move between trees. The property is not suitable habitat. No records within 10 km. Likelihood: Unlikely to be present	No
Little Lorikeet	<i>Glossopsitta pusilla</i>	v		The species forages primarily in the canopy of open <i>Eucalyptus</i> forest and woodland. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. The property is secondary habitat, and excellent connectivity to the corridor. One record 8 km NW of the site in 2017. Likelihood: May be present	Yes
Painted Honeyeater	<i>Grantiella picta</i>	v	V	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. Inhabits Boree/ Weeping Myall, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests, particularly those infested with mistletoe. The property is not primary habitat. No records within 10 km. Likelihood: Unlikely to be present	No
Plains-wanderer	<i>Pedionomus torquatus</i>	e	CE	Occurs in extensive quality riparian grasslands and plains woodlands, and adjacent agricultural land. Site is not suitable habitat. No records within 10 km. Likelihood: Highly unlikely to be present	No
Satin Flycatcher	<i>Myiagra cyanoleuca</i>		Migratory Terrestrial Species	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is not a commonly seen species, especially in the far south of its range, where it is a summer breeding migrant. The species is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. No records within 10 km. The site and the river alignment is not suitable habitat for the species, and no connectivity to known locations. Likelihood: Unlikely to be present	No
Sloane's Froglet	<i>Crinia sloanei</i>	v		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 has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. At a number of sites where records are verified by museum specimens, the species has not been subsequently detected during more recent frog surveys in the vicinity (e.g. Holbrook, Nyngan, Wagga Wagga and Tocumwal). It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. No suitable habitat now occurs on site. Two records within 10 km – 1 km north in 2008. Likelihood: Unlikely to be present	No
Southern Bell Frog	<i>Litoria raniformis</i>	e	V	In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. No records within 10 km. Likelihood: Unlikely to be present	No

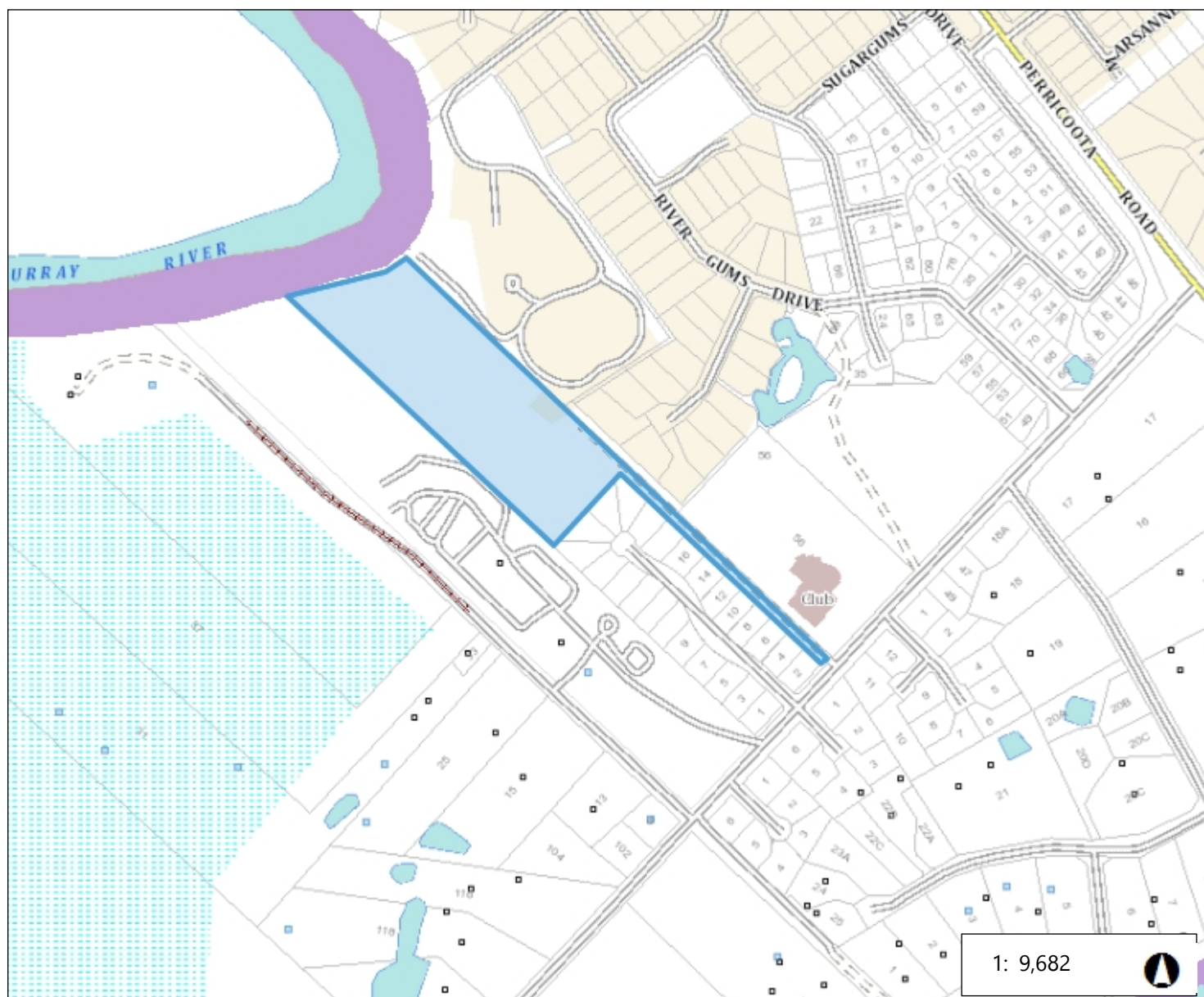
Test of Significance – 66 Merool Road, Moama

Common Name	Scientific name	Conservation Status (NSW) ¹	Conservation Status (Comm) ²	Likelihood of Occurrence ³	Five Part Test
Squirrel Glider	<i>Petaurus norfolcensis</i>	v		Prefers extensive intact woodlands with significant shrub and litter layers in blocks or along roadsides. The development site is not suitable habitat. One record 2.5 km SE of the site in 2012. Likelihood: Unlikely to be present	No
Striped Legless Lizard	<i>Delma impar</i>	v	V	Occurs in intact high quality grassy woodlands and grasslands. Site is not suitable habitat. Not recorded within 10 km of the site. Likelihood: Unlikely to be present	No
Superb Parrot	<i>Polytelis swainsonii</i>	v	V	Occurs in riparian woodlands and forest, and adjacent woodlands and agricultural land. The property is secondary habitat, and moderate connectivity to the corridor. Not recorded within 10 km of the site. Likelihood: May be present	Yes
Swift Parrot	<i>Lathamus discolor</i>	e	CE	Occurs in extensive riparian forests and woodlands, and adjacent agricultural land. The property is secondary habitat, and moderate connectivity to the corridor. Not recorded within 10 km of the site. Likelihood: May be present	Yes
White-throated Needletail	<i>Hirundapus caudacutus</i>		Migratory Terrestrial Species	Often occur in large numbers over eastern and northern Australia. Aerial birds and for a time it was commonly believed that they did not land while in Australia. Feeds on flying insects, such as termites, ants, beetles and flies, often over water. The site has suitable habitat for the species; however, no record of species within 20 km of site. Likelihood: Unlikely to be present	No
Yellow-bellied Sheathtail Bat	<i>Saccolaimus flaviventris</i>	v		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. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. The property is not suitable habitat. One record 2.5 km SE of the site in 2013. Likelihood: Unlikely to be present	No

1. x = presumed extinct in NSW; e = endangered in NSW; v = vulnerable in NSW; ce = critically endangered in NSW (from DPIE 2021b).
2. V = vulnerable nationally; E = endangered nationally; CE = critically endangered nationally (DAWE 2021).

**APPENDIX B BIODIVERSITY OFFSET SCHEME
ENTRY THRESHOLD (BOSET) TOOL
REPORT DATED 18TH AUGUST 2021**

Biodiversity Offset Scheme (BOS) Entry Threshold Map



491.8 0 245.91 491.8 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

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Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	18/08/2021 8:34 PM	BDAR Required*
Total Digitised Area	6.05 ha	
Minimum Lot Size Method	LEP	
Minimum Lot Size	0.15 ha	
Area Clearing Threshold	0.25 ha	
Area clearing trigger Area of native vegetation cleared	Unknown [#]	Unknown [#]
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies with all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature _____ Date: 18/08/2021 08:34 PM