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Milton Meadows FFA Addendum: Biodiversity assessment of the additional managed area within Lot 3 DP 785757, 65 Wilfords Lane

Dear David,

A biodiversity assessment was undertaken by Cumberland Ecology on 5th March 2020 of the area proposed to be established and maintained as the 'additional managed area' within Lot 3 DP 785757 for the Milton Meadows development. The assessment was conducted in accordance with Section 6.2.1 of Chapter G5 "Biodiversity Assessment - Flora and Fauna Report" in Shoalhaven City Council's Development Control Plan, which indicates that potential biodiversity impacts are required to be considered under the (now repealed) NSW *Threatened Species Conservation Act 1995* (TSC Act).

The results of this assessment are provided within **Appendix A**.

If you have any questions, please feel free to contact me at our Sydney office on the numbers provided.

Yours sincerely,

Heather Gosper
Ecologist/Project Manager
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APPENDIX A :

Milton Meadows FFA Addendum

A.1. Introduction

A.1.1. Purpose

Cumberland Ecology Pty Ltd (Cumberland Ecology) has been commissioned by ANNSCA Property Group (APG) to undertake an addendum biodiversity assessment of an area proposed to be impacted within Lot 3 DP 785757 for the Milton Meadows development. The proposed impact will be maintenance of the additional managed area as grassland, due to a requirement that the 140m to the west of the Milton Meadows subject site be maintained as grassland in order to allow for a 10m APZ within the subject site instead of a 20m APZ. Throughout this addendum, this will be referred to as the establishment and maintenance of the additional managed area (**Figure 1**). The biodiversity assessment has been prepared in accordance with Section 6.2.1 of Chapter G5 Biodiversity Assessment - Flora and Fauna Report in Shoalhaven City Council's Development Control Plan (DCP), which indicates that potential biodiversity impacts within APZs are required to be considered under the (now repealed) NSW *Threatened Species Conservation Act 1995* (TSC Act).

The purpose of this addendum biodiversity assessment is to evaluate the ecological impacts of the proposed maintenance of the additional managed area, specifically impacts on threatened flora, fauna or ecological communities listed under the TSC Act and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) known to occur within the additional managed area.

A.1.2. Background

Cumberland Ecology has previously been commissioned by APG to prepare a flora and fauna assessment (FFA) (our reference – 16245RP3) and vegetation management plan (VMP) (our reference – 16245RP4) to support a Development Application (DA) for 196 Windward Way, Milton (Lot 1 DP 780801 and Lot 1 DP 737576) ('the subject site'). This addendum supports the aforementioned FFA and should be considered alongside that document for all purposes relating to biodiversity assessment of the subject site.

It is noted that the NSW *Biodiversity Conservation Act 2016* (BC Act) has replaced the TSC Act as of 25 August 2017. However, the proposed development fits the required transitional arrangement criteria for the BC Act, as outlined in the *Biodiversity Conservation (Savings and Transitional) Regulation 2017,* to be assessed under the now repealed TSC Act. Therefore, this addendum biodiversity assessment has been prepared as per the requirements of the former TSC Act in accordance with transitional provisions of the BC Act and refers to the TSC Act instead of the BC Act.

A.1.2.1. Zoning

The additional managed area is currently zoned as RU1 (Primary Production) under the *Shoalhaven Local Environment Plan 2014* (the 'Shoalhaven LEP 2014') (**Figure 2**). The objectives of RU1 Zoning are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*

- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To conserve and maintain productive prime crop and pasture land.*
- *To conserve and maintain the economic potential of the land within this zone for extractive industries.*

A.2. Methodology

Flora surveys were undertaken by botanist Bryan Furchert on 5 March 2020 within the additional managed area. Surveys included vegetation mapping and targeted threatened flora searches, in particular targeting *Rhodamnia rubescens* which was recorded in two locations within the adjacent subject site and is listed as critically endangered under the BC Act.

All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (Harden 1990, 1991, 1992, 1993). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from PlantNET.

A.2.1. Vegetation Mapping

Previous broad-scale mapping conducted by the Southeast NSW Native Vegetation Classification and Mapping (SCIVI) as described in Tozer *et. al*. (2010) was utilised to determine potential vegetation communities likely to occur within the additional managed area. Cumberland Ecology previously conducted vegetation surveys in 2016 and 2018 within the subject site to revise and update the vegetation mapping prepared by Tozer *et. al*. (2010), and this was mapping was considered when determining the vegetation within the additional managed area. The vegetation within the additional managed area was ground-truthed to examine and verify the mapping of the condition and extent of the different vegetation communities. Where vegetation community boundaries were found to differ from the OEH mapping, records were made of proposed new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs.

The resultant information was synthesised using a Geographic Information System (GIS) to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the additional managed area.

A.2.2. Targeted Threatened Flora Surveys

Targeted threatened flora searches via random meanders were undertaken within the additional managed area.

The location of targeted searches for *Rhodamnia rubescens* and other threatened flora species are shown in **Figure 3**.

A.2.3. Habitat Assessment

A fauna habitat assessment was undertaken in conjunction with the vegetation surveys on 05 March 2020. The assessment included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks. Structural features considered included the nature and extent of the understorey and ground stratum

and extent of canopy. The survey also included an assessment of the presence of habitat features suitable for use by threatened fauna species known from the locality.

Three threatened fauna species have previously been located within the adjacent subject site. The Grey-headed Flying-fox and Eastern Bentwing-bat were recorded within the subject site by BES (2005) and by Cumberland Ecology (2018), and the Eastern Freetail-bat was also recorded by Cumberland Ecology during the 2018 surveys. Habitat assessment within the additional managed area was targeted towards potential foraging and roosting habitat for these species.

A.3. Limitations

Vertebrate fauna and vascular flora of the locality are well known based upon a sizeable database of past records and various published reports. The surveys by Cumberland Ecology conducted between 2016 and 2019 added to the existing database and helped to provide a clear indication of the likelihood that various species occur, or are likely to occur, within the additional managed area. The data obtained from database assessment and surveys of the subject site furnished an appropriate level of information to support this assessment.

It is considered that the level of flora survey undertaken, with the addition of the detailed literature review and site inspections in 2018 and 2019 within the adjacent subject site, is adequate to assess the potential occurrence of threatened flora within the additional managed area.

While no specific fauna surveys were conducted for this addendum biodiversity assessment, numerous fauna surveys have previously been conducted within the subject site between 2016 and 2019 for the preparation of the FFA that this document supports. Given the vegetation within the additional managed area is directly adjacent to the subject site, and that it was found to be predominantly the same vegetation types as those that occur within the subject site; it is considered the prior fauna surveys provide sufficient information to determine the likelihood of occurrence for threatened fauna species within the additional managed areas.

An assessment of the likelihood of occurrence of threatened and migratory fauna species listed for the locality in the database searches was undertaken for the subject site and included within the FFA. As the habitats within the subject site and the additional APZ are very similar, the species that were recorded within the subject site previously have been assessed within this addendum.

A.4. Results

The vegetation within the additional managed area was found to comprise ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds (**Figure 4**). No threatened flora species were recorded within the additional managed area.

A.4.1. Vegetation Communities

Four vegetation communities were mapped as occurring within the additional managed area, all of which have been mapped within the subject site and described within the FFA. Only one of the four vegetation communities, Clyde Gully Wet Forest, is considered to be representative of any native vegetation community

described for the locality. The remaining three vegetation communities are degraded and weed infested such that they are no longer considered to conform to any known native vegetation communities.

The four vegetation communities within the additional managed area are described below.

A.4.1.1. Clyde Gully Wet Forest

This community is contiguous with a patch that extends from the western side of the adjacent subject site to within the additional managed area. This patch is considered the most degraded of the three Clyde Gully Wet Forest patches within the subject site. The canopy contains a few *Eucalyptus botryoides*, with a sub-canopy that includes *Acacia mabellae* (Mabel's Wattle).

The ground layer comprises the exotic grass *Cenchrus clandestinus* (Kikuyu), along with other mixed natives and exotics, and the fern species *Pteridium esculentum* (Bracken Fern).

A.4.1.2. Native Regrowth and Exotic Weeds

This community comprises a number of patches of native regrowth, the majority of which consist of a canopy of regrowth individuals of the colonising species *Acacia mearnsii* (Black Wattle) ranging from 15-20 m in height (**Photograph 1**). *Pittosporum undulatum* (Mock Orange) is a common species in the sub-canopy and shrub layer, with *Alphitonia excelsa* (Red Ash) and *Melicytus dentatus* (Tree Violet) also frequently occurring as shrubs.

Common species in ground layer include the exotics *Lonicera japonica* (Japanese Honeysuckle), *Cenchrus clandestinus* (Kikuyu) and *Paspalum dilatatum* (Dallas Grass); and the natives *Pteridium esculentum* (Bracken Fern), *Microlaeana stipoides var. stipoides* (Weeping Grass), and *Carex longebrachiata* (Australian Sedge) (**Photograph 2**). This vegetation is typical of the woody areas throughout the adjacent subject site.

Photograph 1 *Acacia mearnsii* dominated regrowth

Photograph 2 *Acacia mearnsii* regrowth with *Pittosporum undulatum* shrubs and varied ground cover

A.4.1.3. Exotic Grassland

Open grassland areas occur throughout the additional managed area where acacia regrowth has been cleared, resulting in a typical field-like appearance that lacks any significant trees or canopy. The exotic grassland species comprise various common exotic species including *Rubus fruticosus sp. agg.* (Blackberry) (forming dense impenetrable thickets in some areas), *Stenotaphrum secundatum* (St Augustine Grass), *Verbena bonariensis* (Argentinean Vervain) and *Paspalum dilatatum*. Native species present include *Pteridium esculentum*, *Microlaena stipoides var. stipoides*, and *Hibbertia scandens* (Climbing Guinea Flower) (**Photograph 3**).

Photograph 3 Exotic grassland

A.4.1.4. Planted Natives/Exotics and Weeds

This vegetation community consists of a massive exotic tree, *Erythrina x sykesii* (Coral Tree), along with the exotic *Solanum mauritianum* (Wild Tobacco) commonly occurring in the surrounding shrub layer (**Photograph 4**).

Photograph 4 Large *Erythrina x sykesii* surrounded by *Solanum mauritianum*

A.4.2. Threatened Flora Species

No threatened flora species were recorded within the additional managed area.

Rhodamnia rubescens was recorded on the adjacent subject site in two locations, however, was not recorded during targeted surveys within the additional managed area. Regardless, as this species has been recorded on the adjacent site an additional Assessment of Significance has been prepared for the species relevant to the additional managed area and is presented in **Appendix B**.

A.4.3. Fauna Habitat

The vegetation within the subject site provides some potential habitat for fauna. There is some foraging habitat potential for woodland birds and arboreal species within the acacia, eucalypt, and coral trees on site; and the dense ground vegetation and few fallen logs may provide shelter for reptiles and other terrestrial species.

Although there are many exotic flora species within the additional managed area, these can provide potential foraging resources for nectivorous mammals and birds that may use the subject site from time to time as part of a larger foraging range.

A.4.4. Threatened Fauna Species

No threatened fauna species were recorded during surveys conducted on 05 March 2020, and only sub-optimal potential foraging habitat for the three species occurs. Regardless, as the Grey-headed Flying-fox, Eastern Bentwing-bat and Eastern Freetail-bat have been recorded on the adjacent subject site, additional Assessments of Significance have been prepared for these species relevant to the additional managed area and are presented in **Appendix B**.

A.4.4.1. Grey-headed Flying-fox

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as Vulnerable under the TSC Act and the EPBC Act.

The Grey-headed Flying-fox has been recorded from the subject site by Cumberland Ecology and by previous surveys in 2005 (BES 2005), and potential, albeit degraded, foraging habitat for this species occurs. The species has previously been observed foraging on the large *Ficus obliqua* in the adjacent subject site, and while there are no *Ficus obliqua* within the additional managed area, the species could potentially forage on the few eucalyptus trees found within the additional managed area. The additional managed area does not constitute a breeding or camp site for the species but is most likely part of a broader foraging range of the highly mobile species. The additional managed area is not considered to be core habitat for the species.

A.4.4.2. Eastern Bentwing-bat

The Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) is listed as Vulnerable under the TSC Act.

The Eastern Bentwing-bat was recorded within the subject site in previous surveys by BES in 2005, and by Cumberland Ecology in the 2018 surveys. Potential foraging habitat for this species occurs within the additional managed area. The species could forage above the canopy of trees found across the additional managed area; however, it does not contain caves suitable for roosting for the species.

A.4.4.3. Eastern Freetail-bat

The Eastern Freetail-bat (*Mormopterus norfolkensis*) is listed as a vulnerable species under the TSC Act.

The Eastern Freetail-bat was recorded using the subject site during the February 2018 Cumberland Ecology surveys. Very limited roosting habitat for this species occurs in the form of small hollow bearing trees and loose bark within the additional managed area, however due to the degraded nature of the vegetation, it is considered unlikely the site constitutes significant roosting habitat for the species. The additional managed area does contain potential foraging habitat and is most likely only used as part of a broader foraging area for this highly mobile species.

A.5. Impact Assessment

The impacts of the proposed development have been assessed using the OEH Threatened Species Assessment Guidelines (DECC 2007).

A.5.1. Vegetation Removal

The primary impact resulting from the proposed development is the potential removal of treed vegetation and the maintenance of the additional managed area as a grassland vegetation community.

The additional managed area is approximately 2.89 ha in size, of which ~0.10 ha is Clyde Gully Wet Forest, ~1.59 ha is Native Regrowth and Exotic Weeds, ~1.09 ha is Exotic Grasslands and ~ 0.11 ha is Planted Natives/Exotics and Weeds. The vegetation within the additional managed area is degraded from previous clearing and a current lack of weed management, and only one of the areas proposed to be impacted is considered to conform to any listed native vegetation communities; which is part of the most degraded of the three patches of Clyde Gully Wet Forest recorded within the adjacent subject site.

Subtropical Rainforest Complex, corresponding to the listed Endangered Ecological Community (EEC) known as Milton Ulladulla Subtropical Rainforest (MUSR), is recorded from the adjacent subject site. This vegetation community was not recorded as occurring within the additional managed area. Therefore, it is not considered that the proposed management of the land within the additional managed area will have an impact on this EEC vegetation community.

A.5.2. Impacts to Flora Species

The proposed management of the additional managed area has the potential to result in a number of direct and indirect impacts to flora species. In addition to the removal and modification of vegetation within the additional managed area, potential indirect impacts to flora species include:

- Weed invasion;
- Run-off, erosion and sedimentation; and
- Modification of microhabitat features resulting from long and short-term edge effects (e.g. weed invasion).

These impacts are the same as those identified to have potential to occur in the subject site, and a number of mitigation measures are proposed to minimise these impacts, including:

- Vegetation protection;
- Revegetation;
- Erosion, sedimentation and pollution controls; and
- Weed control measures.

These are discussed further in **Section 5** of the FFA. Given that the habitats in the additional managed area are very similar to the subject site, it is recommended that the mitigation measures proposed in the FFA are also implemented in the additional managed area. With the implementation of these mitigation measures, the impacts listed above are considered unlikely to impact on the flora species in the additional managed area.

A.5.3. Impacts to Fauna Species

The proposed management of the additional managed area has the potential to result in a number of direct and indirect impacts to fauna species. In addition to the removal and modification of vegetation within the additional managed area, potential indirect impacts to fauna species include:

- Habitat disturbance during the construction phase of the project (e.g. changes in noise);
- Runoff, erosion and sedimentation;
- Increased pollution; and
- Modification of microhabitat features resulting from long and short-term edge effects (e.g. changes in light filtration).

These impacts are the same as those identified to have potential to occur in the subject site, and a number of mitigation measures are proposed to minimise these impacts, including:

- Pre-clearing and clearing surveys;
- Erosion, sedimentation and pollution control; and
- Nest box installation.

Pre-clearing and clearing surveys are detailed below, while the remaining mitigation measures are discussed further in **Section 5** of the FFA. Given that the habitats in the additional managed area are very similar to the subject site, it is recommended that the mitigation measures proposed in the FFA are also implemented in the additional managed area. With the implementation of these mitigation measures, the impacts identified above are considered unlikely to impact on the fauna species in the additional managed area.

A.5.3.1. Pre-clearing and Clearing Surveys

Pre-clearing surveys are to be undertaken by a suitably qualified ecologist. Pre-clearing surveys will include:

- Demarcation of key habitat features such as hollow-bearing trees, fallen logs, bush rock and wombat burrows; and
- Provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature.

To minimise impacts to native fauna species, clearing should be undertaken in the following two-stage process under the supervision of a suitably qualified ecologist:

- The initial phase of clearing will involve clearing around identified habitat features and leaving the features overnight; and
- The second stage will involve clearing of the habitat features left overnight followed by an inspection.

An ecologist should be present while clearing to rescue animals injured during the clearance operation. Provisions will be made to protect any native fauna during clearing activities by the following means:

- All persons working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;
- Animals disturbed or dislodged during the clearance but not injured should be assisted to move to the adjacent bushland; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized.

A.5.4. Impacts to Threatened Species

No threatened flora species were recorded within the additional managed area. The critically endangered species *Rhodamnia rubescens* occurs in two locations on the adjacent subject site, however it was not recorded during targeted surveys within the additional managed area and no significant impact to this species is expected to result from the proposed management of vegetation within this area. An assessment of significance for *Rhodamnia rubescens* relevant to the additional managed area is provided in **Appendix B**.

No threatened fauna species were recorded within the additional managed area. In previous surveys, three threatened fauna species have been located within the adjacent subject site; the Grey-headed Flying-fox, the Eastern Bentwing-bat and the Eastern Freetail-bat. Some sub-optimal potential habitat for these species occurs, however it is considered the establishment and maintenance of the additional managed area would not be likely to result in a significant impact to these species.

A.6. Conclusion

Past and current use of the additional managed area has entailed clearing and modification of the pre-existing native vegetation. The area is currently overgrown and unmanaged, containing only ~0.10 ha of a degraded form of the native vegetation community Clyde Gully Wet Forest. The remaining ~2.79 ha does not contain vegetation that is considered to conform to any listed native vegetation community.

Approximately ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds may be modified in the management of the additional managed area.

No threatened flora species were recorded during targeted surveys, and no significant impact is likely to occur to the local population of *Rhodamnia rubescens* as a result of the proposed management of the additional managed area.

No threatened fauna species were recorded within the additional managed area, however some potential habitat for the three threatened species, previously recorded within the subject site, occurs. The Grey-headed Flying-fox, Eastern Bentwing-bat and Eastern Freetail-bat have the potential to use the site for occasional foraging purposes, however due to its degraded state these highly mobile species are unlikely to rely on the marginal habitat available within the additional managed area. Therefore, no significant impact to any threatened fauna species is likely to occur as a result of the proposed management of the additional managed area.

A range of mitigation measures are recommended to be implemented for the project, which are included within the FFA and VMP previously prepared by Cumberland Ecology. These should be extended to include the additional managed area.

With the implementation of the mitigation measures previously identified for the subject site, no significant impact is predicted to occur to threatened species, populations or communities as a result of the proposed management of the additional managed area. Therefore, the preparation of a Species Impact Statement (SIS) is not warranted. A referral to the Commonwealth Department of Energy and the Environment, under the EPBC Act is also not required.

APPENDIX B :
Assessment of Significance

B.1.1. Rhodamnia rubescens

B.1.1.1. Background

Rhodamnia rubescens (*Scrub Turpentine*) is listed as critically endangered under the TSC Act. This shrub/small tree species occurs along the east coast of Australia, from as far south as Batemans Bay, to inland of Bundaberg in Queensland to the north. The species typically occurs in coastal areas, occasionally extending inland onto escarpments up to 600 m above sea level in areas with 1000 to 1600 mm of rainfall (OEH 2019). The species occupies soils derived from volcanic and sedimentary sources and is associated generally with rainforests and wet sclerophyll forests, although can occur in adjacent areas of dry sclerophyll forest as a pioneer (NSW Scientific Committee 2019).

The species was common and has a large geographic range, with an extent of occurrence within NSW of 123 459km^2. However, the species has been listed as critically endangered due to its extreme susceptibility to the introduced pathogen Myrtle Rust (*Austropuccinia psidii*). Myrtle Rust was introduced in Australia in 2010 and has since established throughout ecosystems in coastal areas of eastern Australia. All parts of *Rhodamnia rubescens* are affected by the rust, including stems, leaves, and flowers. The rust is known to kill flowers, and infect fruit preventing the fruit maturing. Mortality of the species has been recorded at over 50% in studied populations, and it is estimated that within three generations over 80% of plants across its range will be deceased. As a rainforest species, seed dormancy is not expected to be long lived and the soil seed bank is therefore readily extinguished over a short period of time. Seedlings are also highly susceptible to infection by the rust which is widespread and persistent in the environment due to many host species in the Myrtaceae family (NSW Scientific Committee 2019).

Two individuals of the species were recorded within areas of the adjacent subject site containing older trees than the *Acacia* regeneration occurring across large areas of the additional managed area. One individual was recorded under an old growth *Ficus obliqua,* along with an array of regenerating rainforest spp. comprising an occurrence of the Milton Ulladulla Subtropical Rainforest (MUSR) EEC, and the other within Clyde Gully Wet Forest very close to the southern boundary of the site (within 1-2m inside the site as delineated by an old barbed wire fence). Both of these individuals will be retained within the subject site. The two individuals of the species are young, about 40 cm in height, and visibly infected with myrtle rust. Despite efforts to retain the individuals of the species within the site, in the mid to long term there is a high likelihood they will succumb to the infection.

No *Rhodamnia rubescens* were recorded within the additional managed area, and only ~0.10 ha of the Clyde Gully Wet Forest vegetation community that the species is associated with occurs within the additional managed area.

B.1.1.2. Assessment of Significance

(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.

There is very limited potential habitat for the species within the additional managed area due generally to the degraded, regrowth nature of the vegetation which consists predominately of *Acacia* spp. regrowth and open field-like grassland.

The proposed development will modify approximately ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds.

Of these, the three vegetation communities that comprise ~2.79 ha of the ~2.89 ha of the site are not native vegetation communities and are not considered to be suitable habitat for the species. While the ~0.10 ha of Clyde Gully Wet Forest is likely to be the best habitat for the species within the impact area, the patch present within the additional managed area is degraded and is not connected to the patch that one of the *Rhodamnia rubescens* individuals occurs within on the subject. Regardless, searches were conducted throughout the vegetation within the additional managed area and no *Rhodamnia rubescens* were located.

The proposal is not likely to place a viable local population of any of the species at risk of extinction. The species has fruit distributed by birds, and both individuals within the adjacent subject site are to be retained along with suitable habitat for future individuals to grow from seed, particularly areas of Milton Ulladulla Subtropical Rainforest. All occurrences of this community will be retained within the subject site. Both individuals were observed to be infected with Myrtle Rust however, and future fruiting is not assured regardless of the proposed development.

(b) In the case of an endangered population, whether the action proposed is 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.

Not applicable.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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
(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.

(d) 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 action proposed, and
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, 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.

Approximately ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds will be modified as a result of the proposed additional managed area management. The Native Regrowth and Exotic Weeds, Exotic Grasslands and Planted Natives/Exotics and Weeds communities that makeup ~2.79 ha of the ~2.89 ha of the additional managed area, are considered to be poor habitat for the species.

As dispersal of the species is by fauna, particularly birds consuming fruit, the habitat within the additional managed area and the adjacent subject site is not likely to become completely isolated from other areas of habitat in the locality, including areas of Milton Ulladulla Subtropical Rainforest to be retained.

The area of potential habitat for this species that will be modified is not important for these species in the locality as the species was not located within these areas. As the species is thought to have seed germination which occurs within one to two months of seed being deposited into soil, it is unlikely that the habitat to be modified contains a soil seed bank with propagules of the species.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No critical habitat for this species has currently been identified by the Director- General of the OEH.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No specific recovery plan or threat abatement plans have been prepared for this species.

(g) Whether the action proposed 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.

The following key threatening processes are relevant to the proposed development:

- Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae
- Clearing of re-growth native vegetation;
- Invasion and establishment of exotic vines and scramblers;
- Invasion of native plant communities by African Olive (*Olea europaea* L. subsp. *cuspidata*); and
- Invasion of native plant communities by exotic perennial grasses.

The key threatening process 'Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' is highly relevant to *Rhodamnia rubescens*. The proposed development however is not likely to exacerbate the occurrence of the Myrtle Rust in the locality which is already ubiquitous within the region, is spread by wind amongst other natural factors such as fauna movement and is unlikely to be eradicated due to the large number of less susceptible myrtaceous host species occurring throughout the range of the pathogen.

The key threatening process of 'Clearing of native vegetation', could potentially impact potential habitat for this species. However, the vegetation within the additional managed area is not considered to constitute significant habitat for this species. Potential habitat is likely to be widespread in the locality for the formerly common species. As potential habitat will remain in the vicinity, the clearing of native vegetation is not likely to significantly impact habitat for the species.

Exotic species will be controlled within retained areas of vegetation, so the proposed development is likely to mitigate against the three key threatening processes related to invasion by weed species, as long as weed material cleared from the impact area is disposed of appropriately, preventing further spread of weed propagules.

B.1.1.3. Conclusion

A total of ~0.10 ha of vegetation will be modified for the proposed development comprising moderate habitat for the species. Two individuals of the species were recorded within the adjacent subject site, and both will be retained. No individuals were recorded within the additional managed area, or within the patch of Clyde Gully Wet Forest that is shared between the subject site and additional managed area. Habitat for the species is likely to be widespread within the locality and clearing for development is not a significant threat to the formerly common species, which as listed is threatened due to its susceptibility to the introduced pathogen Myrtle Rust.

B.1.1.4. Grey-headed Flying-fox

B.i. Background

The Grey-headed Flying-fox is distributed along the east coast from Bundaberg in Queensland to Melbourne, Victoria. It occurs as far west as the western slopes of the Great Dividing Range in northern NSW. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Grey-headed Flying-foxes migrate according to the availability of native fruits, nectar and pollen. They roost in large "camps" which are generally within 20 km of a food source (NSW Scientific Committee 2004). The Grey-headed Flying-fox is listed as Vulnerable under the TSC Act and the EPBC Act.

B.1.1.5. Assessment of Significance

(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.

The Grey-headed Flying-fox has the potential to use the additional managed area as part of a much larger foraging range. This species is highly mobile with a foraging range of up to 20 km^2 and would not depend upon resources contained within the additional managed area. The Grey-headed Flying-fox roosts and breeds in 'roosting camps' of hundreds of individuals. The additional managed area does not constitute a 'roosting camp' for the Grey-headed Flying-fox. Therefore, the proposal is not likely to place a viable local population of the Grey-headed Flying-fox at risk of extinction due to the limited amount of foraging habitat present within the additional managed area.

(b) In the case of an endangered population, whether the action proposed is 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.

Not applicable.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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
(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.

(d) 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 action proposed, and
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, 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.

Approximately ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds may be modified as a result of the proposed additional managed area maintenance. However, this is not optimum foraging habitat for the Grey-headed Flying-fox as this species would tend to forage in more vegetated forests and woodlands containing flowering gum trees, such as in Meroo National Park south or Narrawallee Creek Nature Reserve to the north-east of the subject site.

The habitat occurring within the additional managed area and immediate surrounds has previously been fragmented by various developments and land uses. Within this area, available habitat for these species exists in fragmented patches in varying conditions. The proposed development will not fragment areas of existing habitat; however, the it predominantly requires vegetation management that may encroach further into remaining habitat rather than creating fragmented habitat patches. The Grey-headed Flying-fox is highly mobile and would be able to move across the remaining fragments.

The proposed action will not remove, modify, fragment or isolate important habitat for the Grey-headed Flying-fox. Habitat within the additional managed area is not important for this species in the locality as it a small area of largely cleared and modified vegetation. The additional managed area would only likely provide minimal foraging habitat. Much larger areas of potential habitat occur throughout the wider locality in more heavily vegetated areas, particularly along Narrawallee Creek or Meroo National Park to the north-east and south, respectively. These tracts of vegetation would provide more favourable roosting and foraging habitat for this species. It is therefore considered that the habitat provided within the additional managed area is not important for the long-term survival of the Grey-headed Flying-fox in the wider locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No critical habitat for the Grey-headed Flying-fox has currently been identified by the Director- General of the OEH.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

A National Draft Recovery Plan for the Grey-headed Flying-fox (DECCW 2009) has been prepared. A number of threats to this species are listed in the Plan, including the removal of critical habitat. The proposal will remove or modify a small amount of marginal foraging habitat for this species, which is not critical habitat and is well-represented throughout the locality. Therefore, the proposal is not considered to threaten the objectives of the Recovery Plan.

(g) Whether the action proposed 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.

The following key threatening processes are relevant to the proposed development:

- Clearing of re-growth native vegetation;
- Invasion and establishment of exotic vines and scramblers;

- Invasion of native plant communities by African Olive (*Olea europaea* L. subsp. *cuspidata*); and
- Invasion of native plant communities by exotic perennial grasses.

The key threatening process of 'Clearing of native vegetation', could potentially impact habitat for this species further than current conditions. However, the vegetation within the additional managed area is not considered to constitute significant habitat for the Grey-headed Flying-fox. As potential habitat will remain in the vicinity, the clearing of native vegetation is not likely to significantly impact habitat for potentially occurring threatened species.

B.i. Conclusion

A total of ~2.89 ha of vegetation may be modified and managed for the proposed establishment and maintenance of the additional managed area that is potential habitat for the Grey-headed Flying-fox. This will result in the removal of modified vegetation, dominated by exotic species. No significant habitat for the Grey-headed Flying-fox will be removed within the additional managed area. The proposal is not likely to place a viable local population of this species at risk of extinction. The Grey-headed Flying-fox is highly mobile and is expected to move between areas of remaining habitat within the immediate vicinity of the additional managed area and wider area. The project is not likely to have a significant detrimental impact upon the Grey-headed Flying-fox.

B.1.1.6. Microbat Species

B.i. Background

The following assessment of significance applies for the Eastern Bentwing Bat and the Eastern Freetail-bat, as these microbat species have similar foraging habitat requirements.

The Eastern Bentwing-bat occurs throughout the east and north-west coast of Australia. They hunt in forested areas above the canopy, and roost primarily in caves, however derelict mines, storm-water tunnels, buildings and other man-made structures can be utilised (OEH 2017b). The species is listed as Vulnerable under the TSC Act.

The Eastern Freetail-bat is found along the east coast from the southern regions of QLD to southern NSW, where it occurs only to the east of the Great Dividing Range. The species inhabits a diversity of forests types including dry and wet sclerophyll forests, woodlands, swamp forests and mangrove forests (OEH 2017d)

This species is mainly solitary in nature; however it is occasionally observed roosting in communal groups. The Eastern Freetail-bat forages nocturnally for insects within the treed forest areas and roosts in suitable tree hollows, under bark, or in man-made structures (OEH 2017d). The Eastern Freetail-bat is listed as a vulnerable species under the TSC Act.

B.1.1.7. Assessment of Significance

(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.

The two species of microbats listed above are likely to use the additional managed area as foraging habitat as part of a much larger foraging range. The additional managed area does not represent a suitable roosting or breeding habitat for the Eastern Bentwing-bat because caves, the habitat used by the species for roosting and breeding, are not present there. This species was recorded in recent surveys and in previous surveys by BES (2005), however the lack of caves suggests the species only uses the additional managed area occasionally as part of its foraging range. They are all highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the portion of the additional managed area for their survival.

There is very limited roosting and potential breeding habitat for the Eastern Freetail-bat as only sub-optimal hollow bearing trees and/or decorticating bark are present within the additional managed area. The proposal is not likely to place a viable local population of any of these species at risk of extinction due to the limited amount of foraging habitat present.

(b) In the case of an endangered population, whether the action proposed is 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.

Not applicable.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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
(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.

(d) 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 action proposed, and
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, 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.

Approximately ~0.10 ha of Clyde Gully Wet Forest, ~1.59 ha of Native Regrowth and Exotic Weeds, ~1.09 ha of Exotic Grasslands and ~ 0.11 ha of Planted Natives/Exotics and Weeds may be modified as a result of the proposed additional managed area management. This represents a relatively small area of potential foraging habitat within the locality for these species. This is not optimum foraging habitat for these threatened microbat species as they would tend to forage in more vegetated forests and woodlands, such as in Meroo National Park south or Narrawallee Creek Nature Reserve to the north-east of the subject site.

The habitat occurring within the additional managed area and immediate surrounds has previously been fragmented by various developments and land uses. Within this area, available habitat for these species exists in fragmented patches in varying conditions. The proposed APZ management will not fragment areas of existing habitat; however, it predominantly requires modification at the edge of treed habitat and will therefore encroach further into remaining habitat rather than creating fragmented habitat patches. The potentially occurring microbats are highly mobile and would be able to move across the remaining fragments.

The proposed action will not remove, modify, fragment or isolate important habitat. Habitat within the additional managed area is not important for these species in the locality as it is a small area of largely cleared and modified vegetation. The additional managed area would only likely provide minimal foraging habitat. Much larger areas of potential habitat occur throughout the wider locality in more heavily vegetated areas, particularly along Narrawallee Creek or Meroo National Park to the north-east and south, respectively, of the subject site. These tracts of vegetation would provide more favourable roosting and foraging habitat for these species. It is therefore considered that the habitat provided within the additional managed area is not important for the long-term survival of these two threatened microbat species in the wider locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No critical habitat for any of these species has currently been identified by the Director- General of the OEH.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No specific recovery plan or threat abatement plans have been prepared for the threatened microbat species assessed.

(g) Whether the action proposed 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.

The following key threatening processes are relevant to the proposed development:

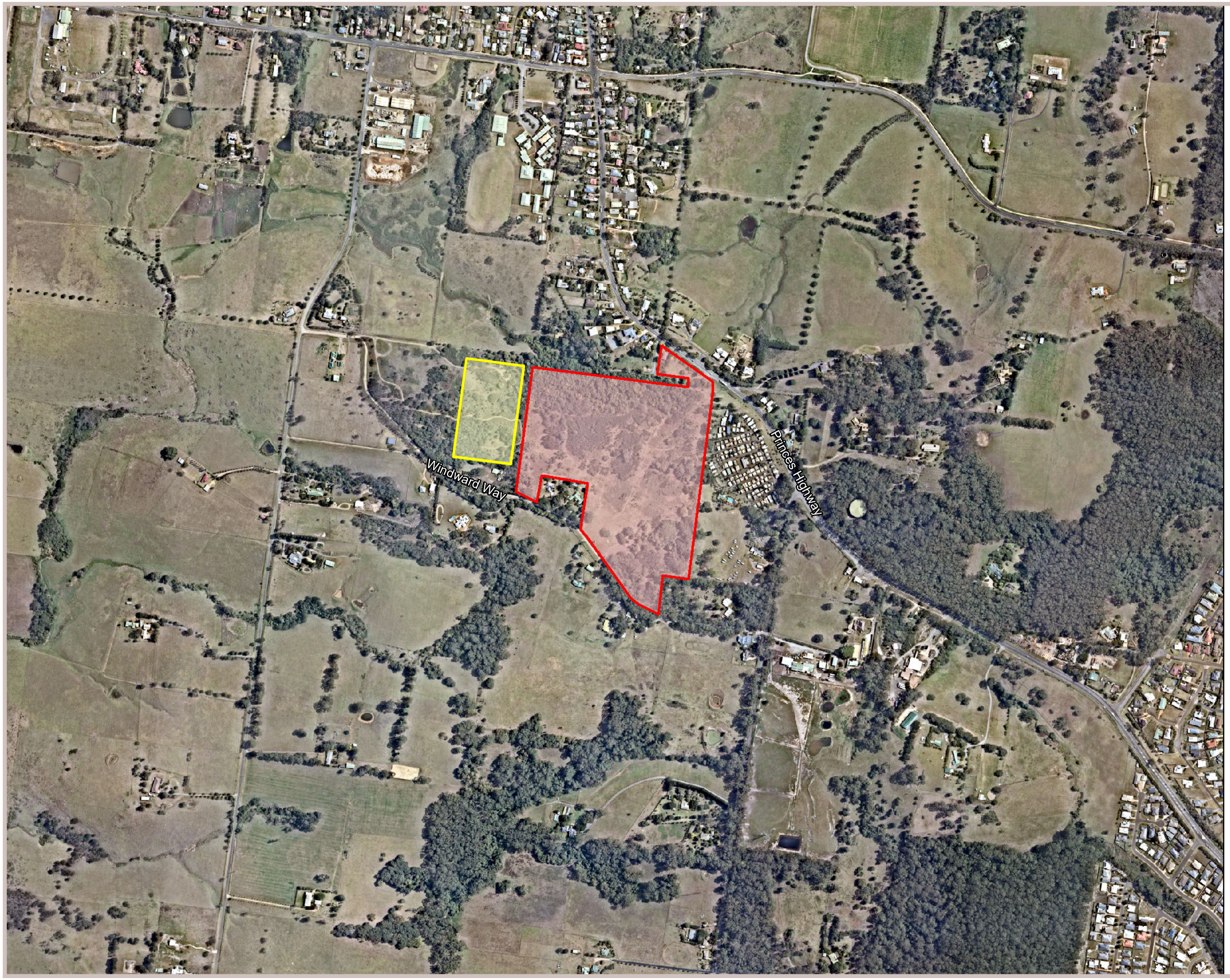
- Clearing of re-growth native vegetation;
- Invasion and establishment of exotic vines and scramblers; and
- Invasion of native plant communities by exotic perennial grasses.

The key threatening process of 'Clearing of native vegetation', could potentially impact habitat for these species further than current conditions. However, the vegetation within the additional managed area is not considered to constitute significant habitat for these microbat species. As potential habitat will remain in the vicinity of the additional managed area, the clearing of native vegetation is not likely to significantly impact habitat for the two potentially occurring threatened microbat species.

B.i. Conclusion

A total of ~2.89 ha of vegetation may be modified for the proposed establishment and management of the additional managed area. The proposed development may result in the modification of vegetation, dominated by exotic species. No significant habitat for the two assessed microbat species will be removed within the additional managed area. The proposal is not likely to place a viable local population of these microbat species at risk of extinction. These species are highly mobile and are expected to move between areas of remaining habitat within the immediate vicinity of the additional managed area and wider area. The project is not likely to have a significant detrimental impact upon any of these two potentially occurring threatened microbat species.

FIGURES



Legend

Subject Site

Additional Managed Area

Image Source:
Image © Nearmap 2020
Dated: 31/1/2020

Coordinate System: MGA Zone 56 (GDA 94)

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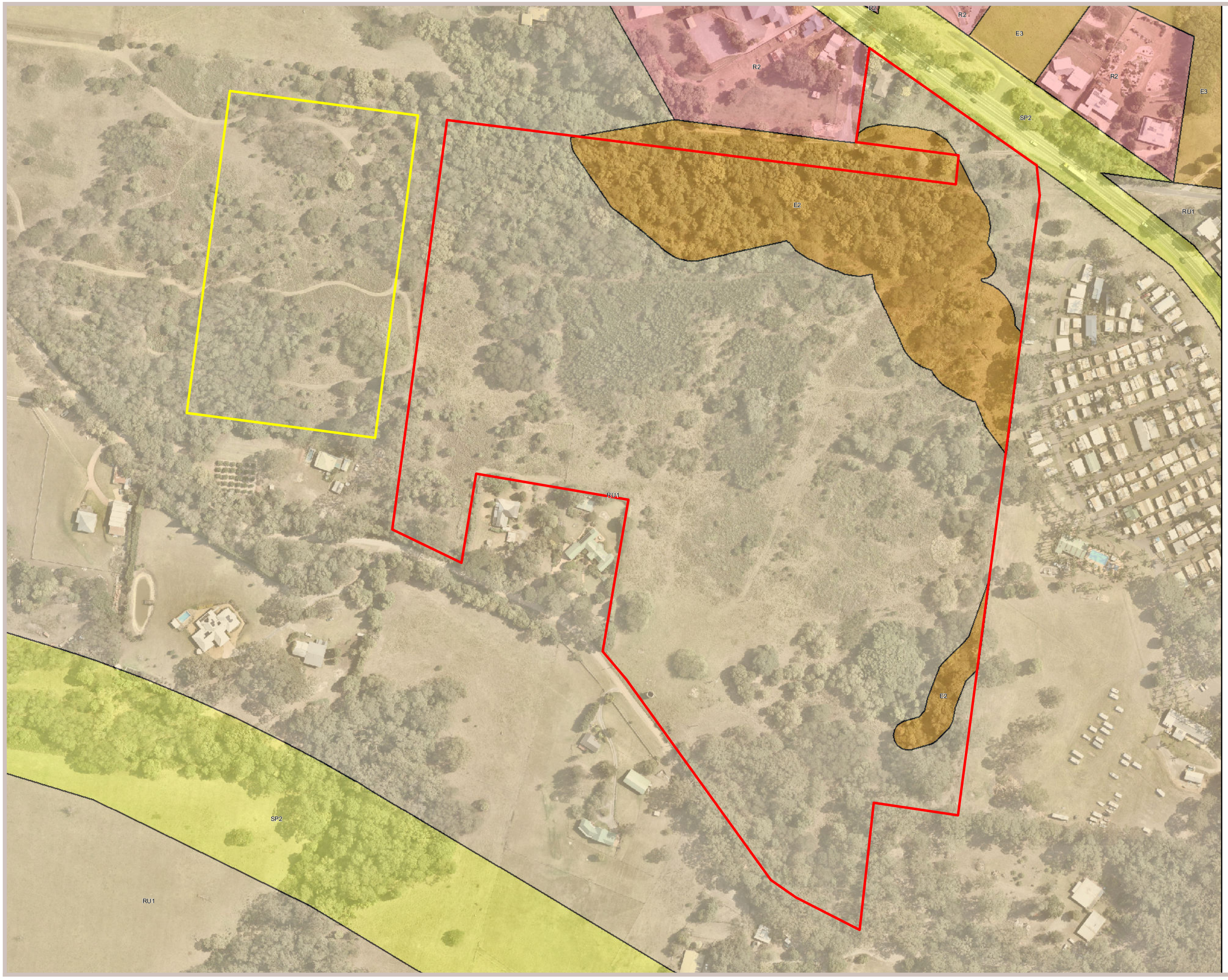
0 50 100 150 200 m

I:\...\16245\Figures\RP5\20200311\Figure 1. Subject Site and Additional Managed Area

Figure 1. Subject Site and Additional Managed Area



Legend

- Subject Site
- Additional Managed Area

Land Zoning

- E2 Environmental Conservation
- E3 Environmental Management
- R2 Low Density Residential
- RU1 Primary Production
- SP2 Infrastructure

Image Source:
Image © Nearmap 2020
Dated: 31/1/2020

Data Source:
NSW Department of Planning (2017)
Standard Instrument
Local Environmental Plan
(LEP) - Land Use Zoning (LZN).

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 50 100 m

I:\...\16245\Figures\RP5\20200310\Figure 2. Land zoning

Figure 2. Land zoning of the Additional Managed Area

Figure 3. Targeted Threatened Flora Surveys within the Additional Managed Area

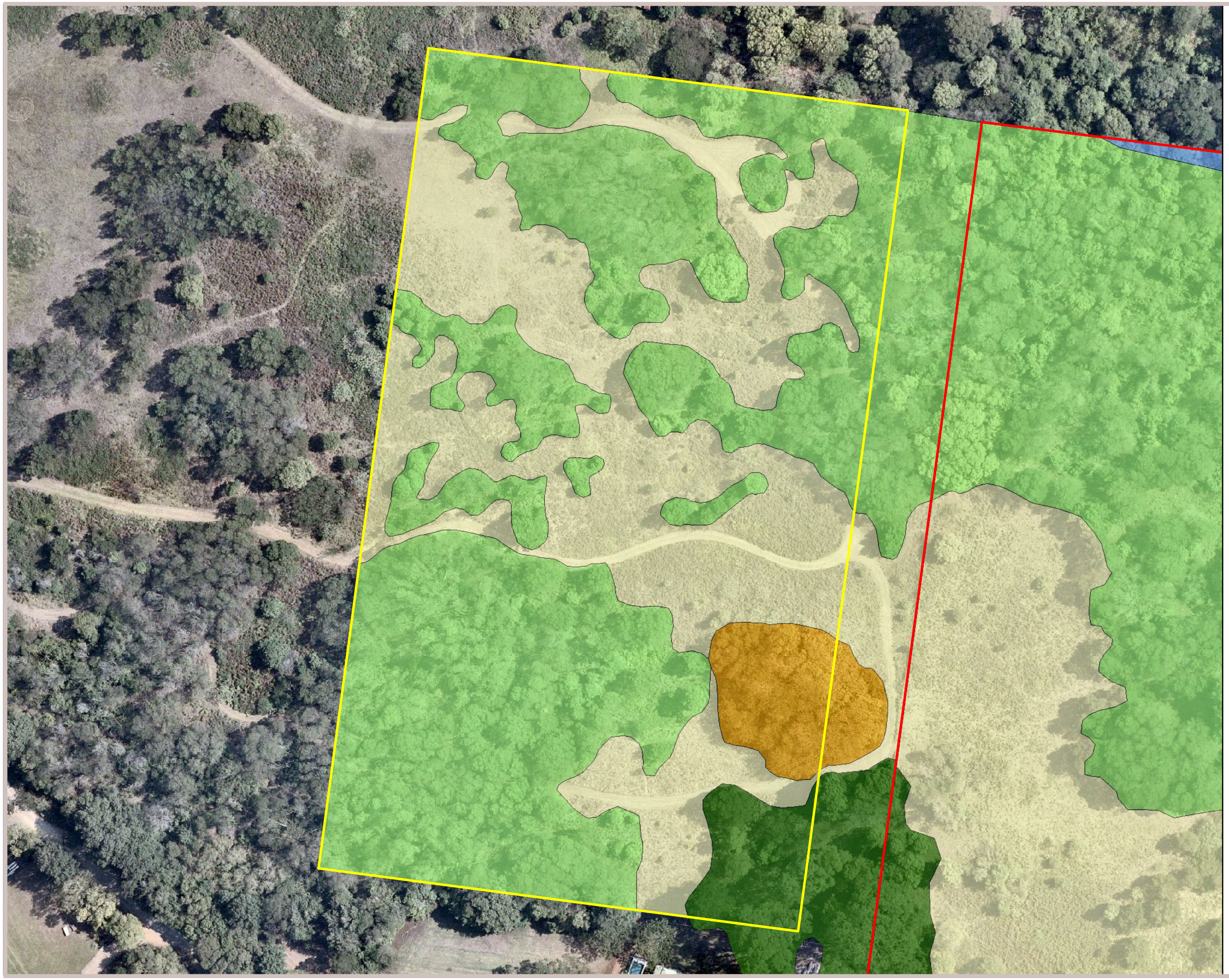


Figure 4. Vegetation mapping of the Additional Managed Area