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Vegetation Management Plan



Lot 104 // DP 1232553 and Lot 2 // 10834, 1150 Picton Road, Wilton, NSW, 2571

Proposed super lot subdivision

Prepared for: Walker Corporation

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Glossary and abbreviations

Acronym	Description
BC Act	<i>Biodiversity Conservation Act 2016</i>
CEEC	Critically Endangered Ecological Community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
KPI	Key Performance Indicator
LGA	Local Government Area
LLS	Local Land Services
MZ	Management Zone
NSW	New South Wales
PCT	Plant Community Type
SEPP 2006	State Environmental Planning Policy (Sydney Region Growth Centres) (SEPP) 2006
SSTF	Sandstone Transition Forest
WONS	Weeds of National Significance
VMP	Vegetation Management Plan

1 Introduction

1.1 Purpose of this Vegetation Management Plan

This Vegetation Management Plan (VMP) has been prepared for the proposed subdivision of Lot 104 // DP 1232553 and Lot 2 // 10834, 1150 Picton Road, Wilton (the 'study area') into three super lots (**Figure 1.1**). The State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (Growth Centres SEPP) applies to the study area. Therefore, any proposed development, or subdivision in or adjoining E2 – Environmental Conservation zoned land requires a VMP for all E2 zoned land in accordance with the South East Wilton Precinct Plan. As such, this VMP has been prepared for all E2 zoned land within the study area, which is subsequently referred to as the VMP 'subject site'.

The aims of this VMP are to conserve and protect existing ecological and environmental values in the subject site as outlined in **Section 2**. These values include threatened ecological communities representing potential habitat for threatened flora species and habitat for the threatened fauna species. Given the undisturbed nature of most of the vegetation within the subject site, including a low occurrence of weeds, the focus of this VMP is the protection of existing conservation values and measures to avoid impacts to these values. More specific objectives of this VMP, as they relate to individual vegetations zones are outlined within **Section 3**.

This VMP will guide the management of vegetation within the subject site from the time of approval of the subdivision until such time that a Biodiversity Stewardship Agreement is in place.

In this VMP there are references to actions to be undertaken by Walker Corporation, and performance measures to be achieved within the South East Wilton Precinct. For clarity, it is noted that should ownership of the South East Wilton Precinct change, that adoption of the VMP by successors in title via a special condition in any Contract for Sale of Land stipulating is to occur (except for individual residential lot purchasers). Thus, any references to actions to be undertaken by Walker Corporation in this document should be read as applying to the landholder(s) at that point in time, in particular the landholder of E2 conservation lands.

1.2 Site description

The suburb of Wilton is located in the Wollondilly Local Government Area (LGA) within the Macarthur Region of New South Wales (NSW) and the Wilton Priority Growth Area (**Figure 1.2**). The western portion of the study area consists of heavily cleared land with scattered paddock trees and small fragmented patches of native vegetation. The south eastern portion of the study area contains a large area of vegetated land associated with Allens Creek and its tributaries. The study area comprises approximately 294.34 ha and the subject site comprises approximately 165.69 ha.

Allens Creek is situated along the eastern perimeter of the subject site and passes under Picton Road in the central portion of the subject site (**Figure 1.3**). An un-named 2nd order tributary of Allens Creek is situated in the north west of the subject site. The 2nd order watercourse flows in a north easterly direction, where it subsequently flows into Allens Creek approximately 250 m to the south of Wilton Road.

Intact native vegetation comprises a majority of the subject site (163.69 ha, or approximately 98.8 %). The remainder of the subject site (2.00 ha, or approximately 1.2 %) consists of grassland with a high proportion of native grasses. Where grazing has been less intensive inside the outer perimeter of the subject site, colonising species, such as *Kunzea ambigua* (Tick Bush) have begun to recruit. Where recruitment is more advanced in previously cleared areas of the site, juvenile *Eucalyptus* sp. were observed growing amongst established patches of *K. ambigua*.

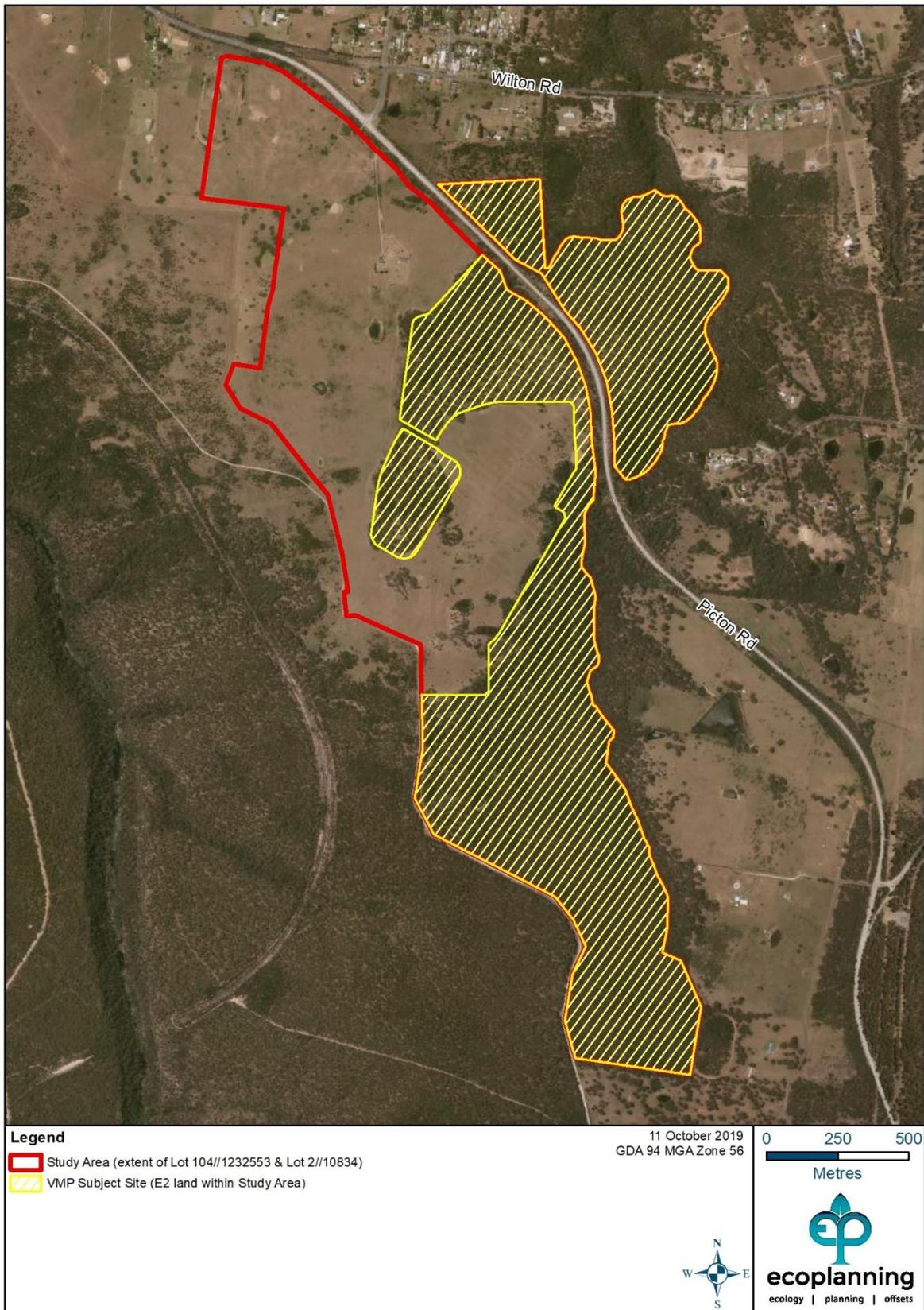


Figure 1.1: Study area and VMP Subject site.

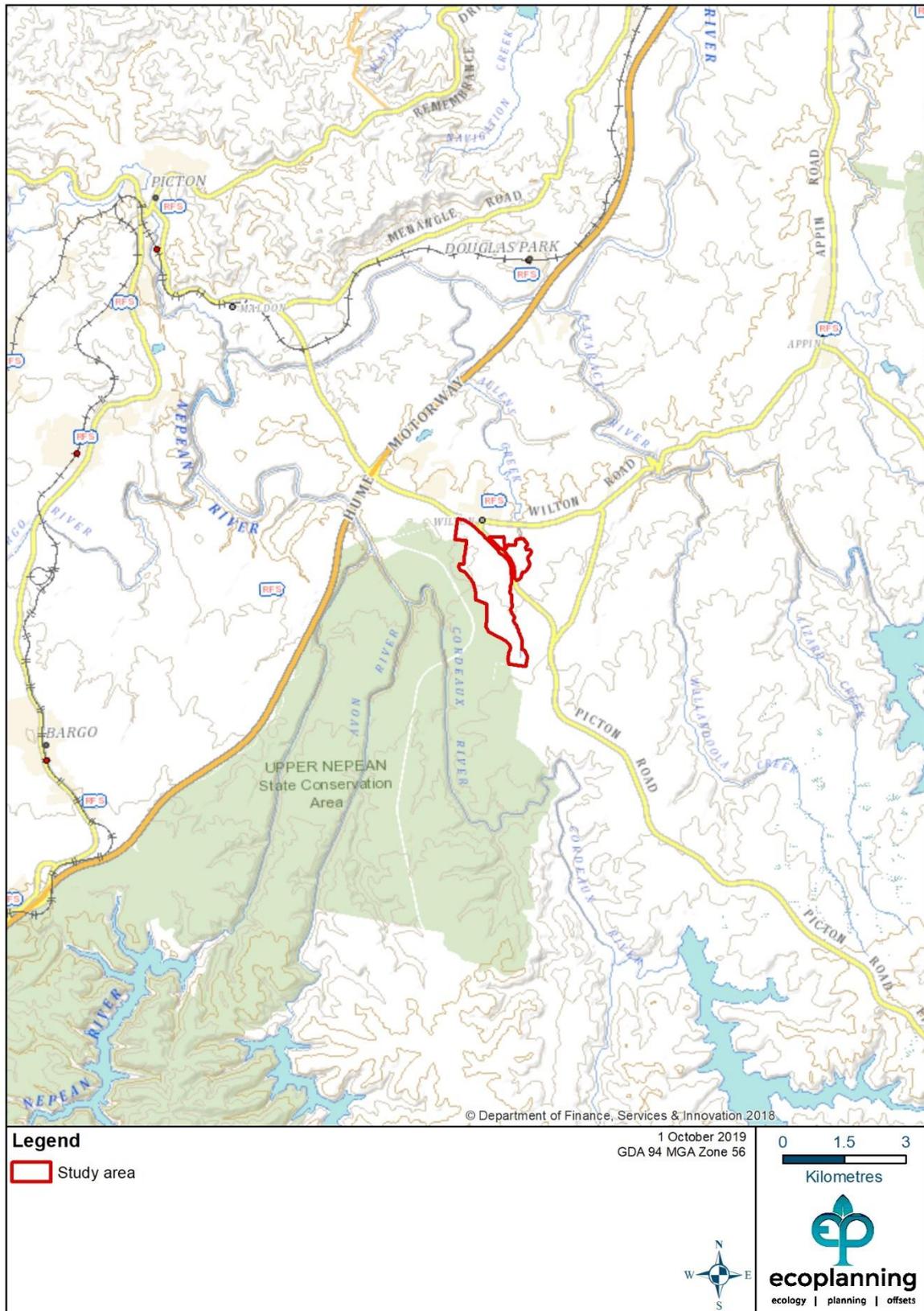


Figure 1.2: Locality of the study area depicting surrounding suburbs and landscape features.

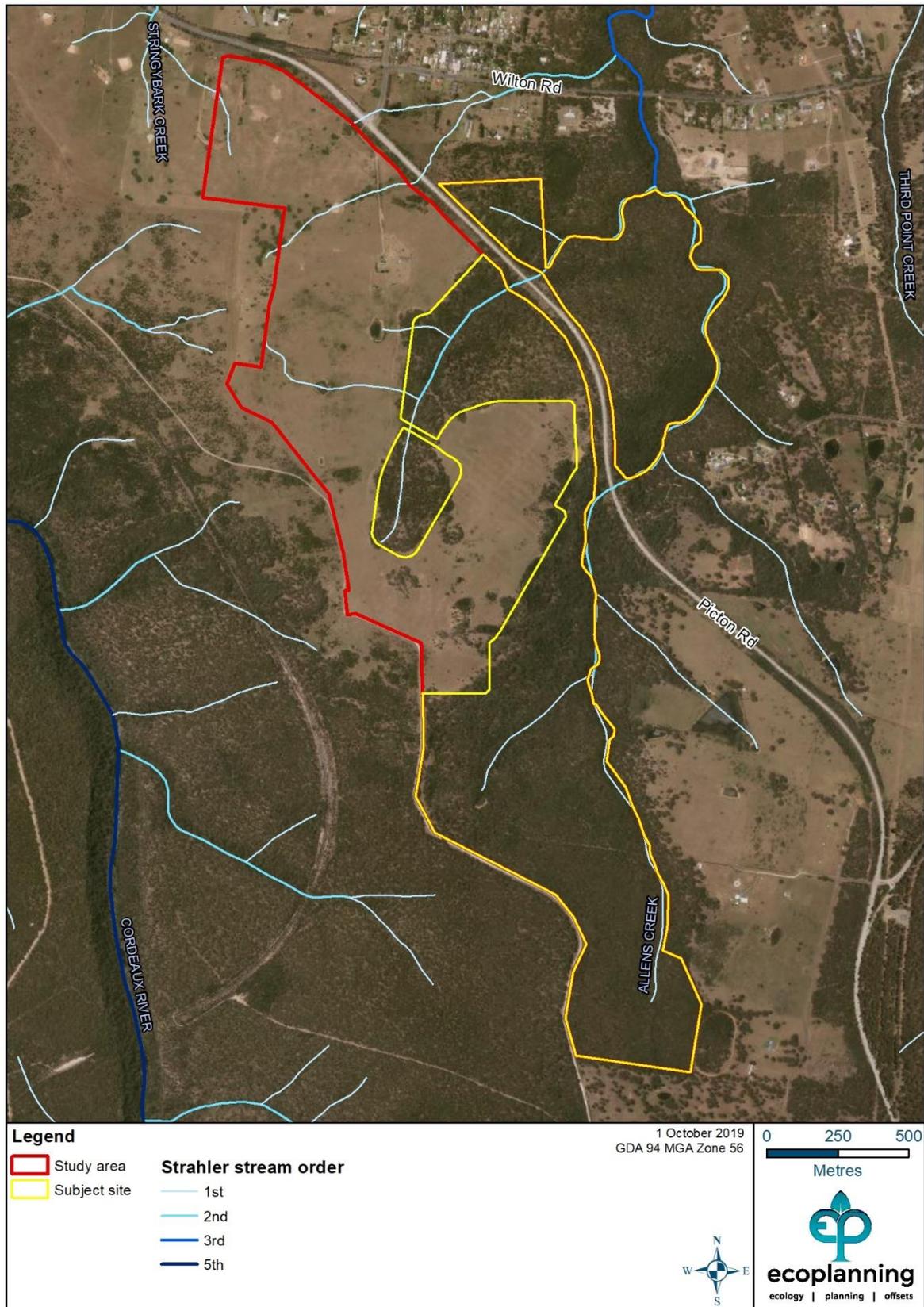


Figure 1.3: Strahler stream order and riparian buffer zones in the study area (DPI Water 2012).

2 Ecology and conservation values of the site

2.1 Methods

A field survey was undertaken on 3 September 2019 by Brian Towle (Senior Botanist) and Thomas Hickman (Ecologist). The weather conditions on the day were cool – warm, with clear skies (**Table 2.1**). During the field assessment all areas of the subject site were traversed to validate previous vegetation mapping (OEH 2015), observe vegetation condition and record the presence of weeds and other disturbances. No systematic plot or transect based surveys of vegetation were conducted as part of this report.

Table 2.1: Daily weather observation at Campbelltown (Mount Annan)– station 068257 (approximately 23 km north east of the study area).

Date	Temp (°C)		Rainfall (mm) ¹	Max wind	
	Min	Max		Direction	Speed (km/h)
02/09/2019	4.8°C	22.5°C	0	SSW	19.0

The field assessment aimed to determine the overall resilience of the subject site, and therefore its capacity to respond to regeneration works. Appropriate management methods to achieve the rehabilitation of the land were considered during the field assessment. The subject site was surveyed to identify any problematic exotic species and aimed to identify all priority weeds and Weeds of National Significance (WoNS). During the field assessment, appropriate weed control techniques for the dominant exotic species were also considered with regard to site context. All vegetation patches were assessed to determine their location and extent, and to confirm their structure and floristics.

2.2 Results

2.2.1 Vegetation communities and condition

A review of vegetation mapping of OEH (2015) identified three Plant Community Types (PCTs) within the subject site (**Figure 2.1**), namely:

- Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion (PCT 1181)
- Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion (PCT 1395)
- Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin Bioregion (PCT 1081)

The field assessment confirmed the presence of PCT 1181 and PCT 1395, although identified a greater proportion of the subject site as PCT 1395 compared to the previous vegetation mapping of OEH (2015) (**Figure 2.2**). Additionally, an area of 'Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion' (PCT 849) was

also identified within the subject site (**Figure 2.2**). Identification of the occurrence and distribution of PCTs was made during traverses of the subject site and was based upon field observations of vegetation structure, including dominant species as well as abiotic factors including landscape position and the presence or absence of sandstone outcropping. The differences in mapping of PCTs between the regional assessment of OEH (2015; **Figure 2.1**) and the site specific assessment undertaken as part of this report (**Figure 2.2**) are not unexpected. The vegetation mapping of OEH (2015) was based upon field samples across a broad region followed by spatial modelling and aerial photographic interpretation. Mapping included within this report is based on targeted field assessments. No quantitative data has been collected to justify the changes made to regional vegetation mapping. However, the location of changes to vegetation mapping were visited with Council representatives during a site inspection on 19 February 2020 and vegetation mapping was endorsed.

Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest corresponds with Shale Sandstone Transition forest, which is listed as a Critically Endangered Ecological Community (CEEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Biodiversity Conservation Act 2016* (BC Act). Grey Box – Forest Red Gum grassy woodland (Shale Plains Woodland) is part of Cumberland Plain Woodland in the Sydney Basin Bioregion, which is also listed as a CEEC under the EPBC Act and the BC Act. Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest is not listed as a threatened ecological community under the EPBC Act or the BC Act.

2.2.2 Site resilience

Resilience is a measure of a sites capacity to respond to restoration works and is often an indication of the extent and severity of past disturbance. Field assessment determined that the majority of the subject site contains intact vegetation with a high resilience. Small areas of cleared land were identified along the perimeter of the subject site, particularly in the north of the subject site. Whilst these areas have been cleared of native canopy species, the ground layer remains relatively intact, and native midstorey species, such as *K. ambigua* were recruiting, often in dense thickets. As such, the site will mostly be restored through the fencing of the boundaries of the conservation area to prevent grazing and promote assisted natural regeneration. Given the high resilience of a majority of the vegetation in the subject site, revegetation is not considered necessary. Where natural regeneration does not occur or is slow, supplementary planting of local native vegetation will be required.

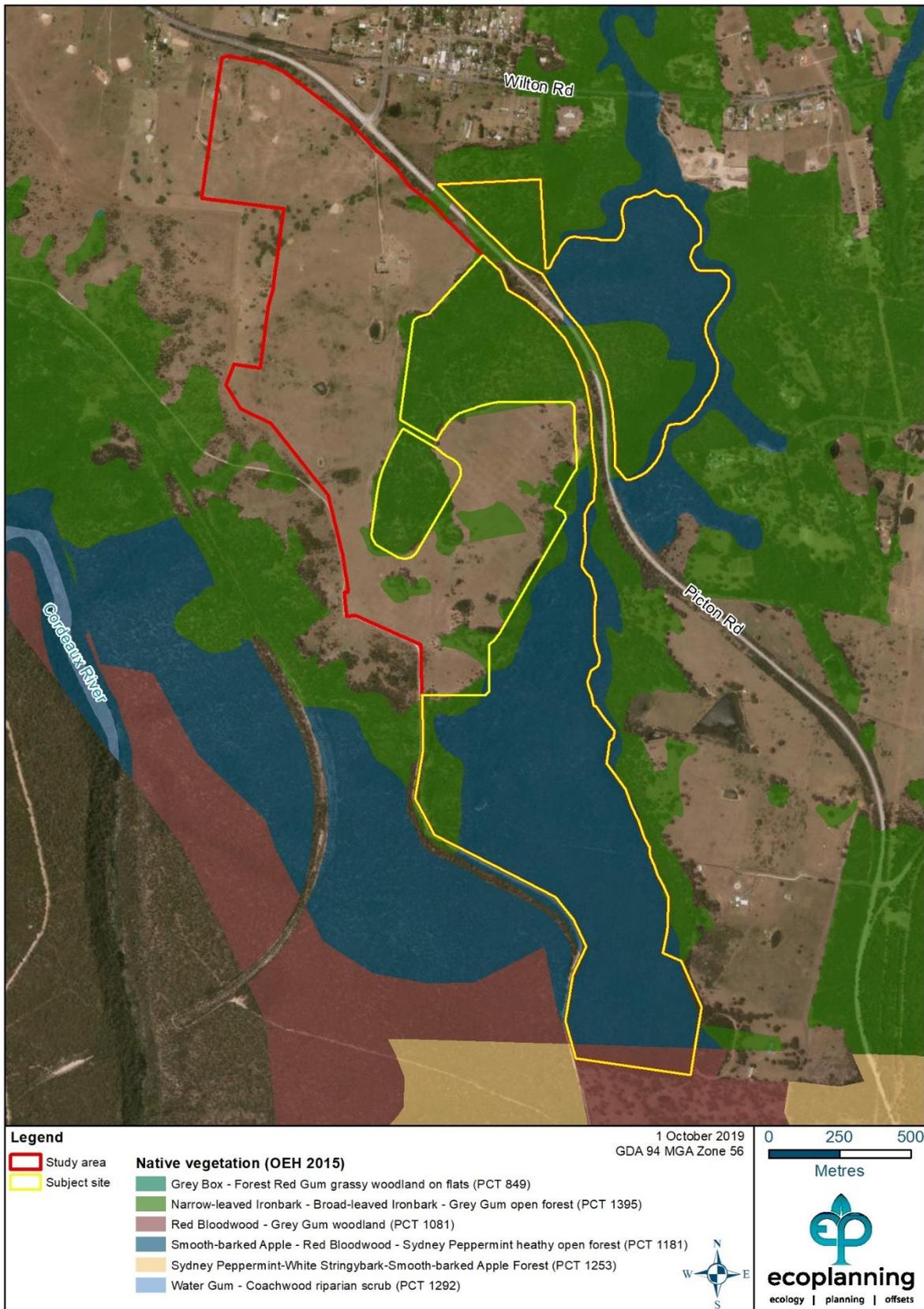


Figure 2.1: Regional vegetation mapping (OEH 2015).

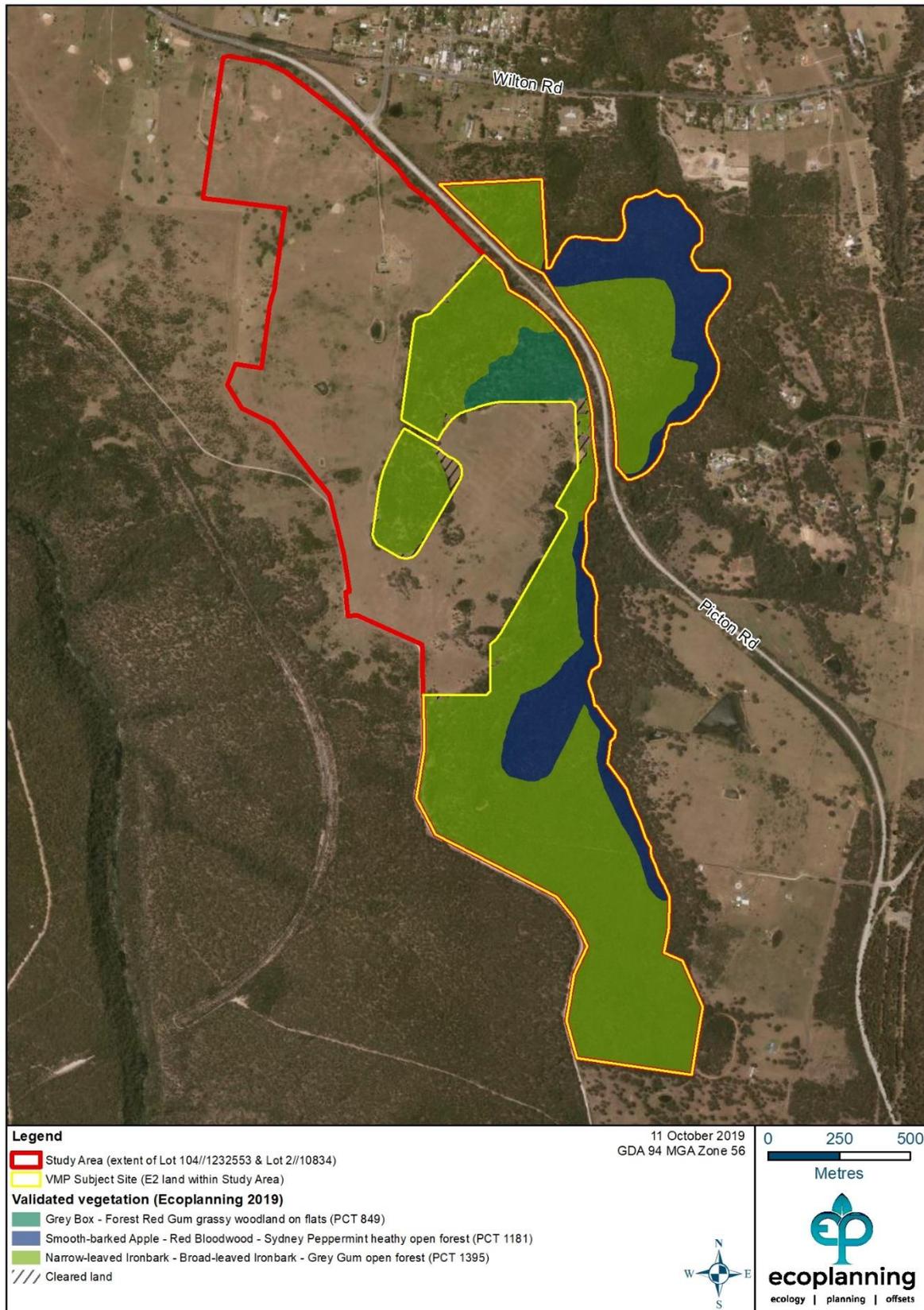


Figure 2.2: Vegetation mapping in the subject site (Ecoplanning 2019).

2.3 Flora species

The field assessment aimed to identify exotic flora within the subject land, particularly priority weeds listed under the NSW *Biosecurity Act 2015* for the Greater Sydney Region and WoNS. A total of ten exotic flora species were identified within the subject site (**Appendix A**), of which three are both priority weeds and WoNS (**Table 2.2**). It is acknowledged that other less problematic exotic flora species are likely occur within the subject site.

Table 2.2: Priority weeds and Weeds of National Significance (WoNS).

Common name	Scientific name	WoNS	Duty
Bridal Creeper	<i>Asparagus asparagoides</i>	Y	Prohibition on dealings <i>Must not be imported into the State or sold</i> *this requirement also applies to the Western Cape form of bridal creeper.
Blackberry	<i>Rubus fruticosus</i> species aggregate	Y	Prohibition on dealings <i>Must not be imported into the State or sold</i> All species in the <i>Rubus fruticosus</i> species aggregate have this requirement, except for the varieties Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree
Fireweed	<i>Senecio madagascariensis</i>	Y	Prohibition on dealings <i>Must not be imported into the State or sold</i>

2.3.1 Threatened flora

No threatened flora species were identified within the subject site during the field assessment or in a search of the Atlas of NSW Wildlife (OEH 2019). Whilst no threatened flora species are known to occur within the subject site, the vegetation in the subject site provides potential habitat for a number of threatened flora species. Regardless of the potential presence or absence of threatened flora species within the subject site, only minimal intervention is required to facilitate the long-term management of threatened flora species habitat onsite. Given the generally intact condition of vegetation across the vast majority of the subject site, actions outlined within this report which aim to protect vegetation from further disturbance will facilitate long-term management of threatened flora species habitat. **Section 4** of this report includes specific actions to be implemented if monitoring, or other subsequent surveys, detect threatened flora within the subject site.

Fencing around the perimeter of the subject site will prevent vegetation disturbance, removal and impacts to potential threatened flora species habitat through ongoing grazing. The subject site has a low cover and abundance of exotic species, which for the most part, are confined to small areas around the perimeter of the subject site. The removal of the small number of herbaceous weeds and exotic grasses along the perimeter of the subject site will prevent their further encroachment into the potential habitat for the threatened flora species in the more intact areas of the subject site.

The consideration of the fire regime and application of ecological burns for the management of potential habitat for threatened plant species is considered beyond the scope of this VMP,

as it will set management strategies for only a limit period of time (until a Biodiversity Stewardship Agreement is in place). The application of fire management for biodiversity is usually undertaken over longer time periods (see **Section 3.6**).

2.4 Threatened fauna and fauna habitat

Three threatened fauna species were recorded in the subject site during the field assessment for this VMP, being *Artamus cyanopterus* (Dusky Woodswallow), *Calyptorhynchus lathami* (Glossy Black-cockatoo) and *Glossopsitta pusilla* (Little Lorikeet) (**Figure 2.2**). Additional species recorded in the subject site and directly adjacent to the subject site (OEH 2019) (**Figure 2.3**) included *Phascolarctos cinereus* (Koala), *Hieraaetus morphnoides* (Little Eagle), *Petroica boodang* (Scarlet Robin) and *Ninox strenua* (Powerful Owl). The subject site is likely to contain habitat for numerous other threatened fauna species and contains habitat values associated with intact woodland and forest, such as mature canopy trees, hollow bearing trees, rocky outcropping and crevices, coarse woody debris, small dams and ephemeral drainage lines.

As habitat for threatened fauna species (including species recorded within the subject site and species recorded directly adjacent to the subject site) is present throughout the entirety of the subject site, no specific areas have been delineated as part of this report as representing, or not representing, habitat for these species. Additionally, given the relatively intact and uniform condition of vegetation across the subject site, no specific areas have been identified as requiring additional actions as habitat for threatened fauna. Management actions are recommended which aim to protect vegetation, avoid any further disturbance and thereby retain the habitat values for threatened fauna species. Specific management actions required for the koala are included within EMM (2020).

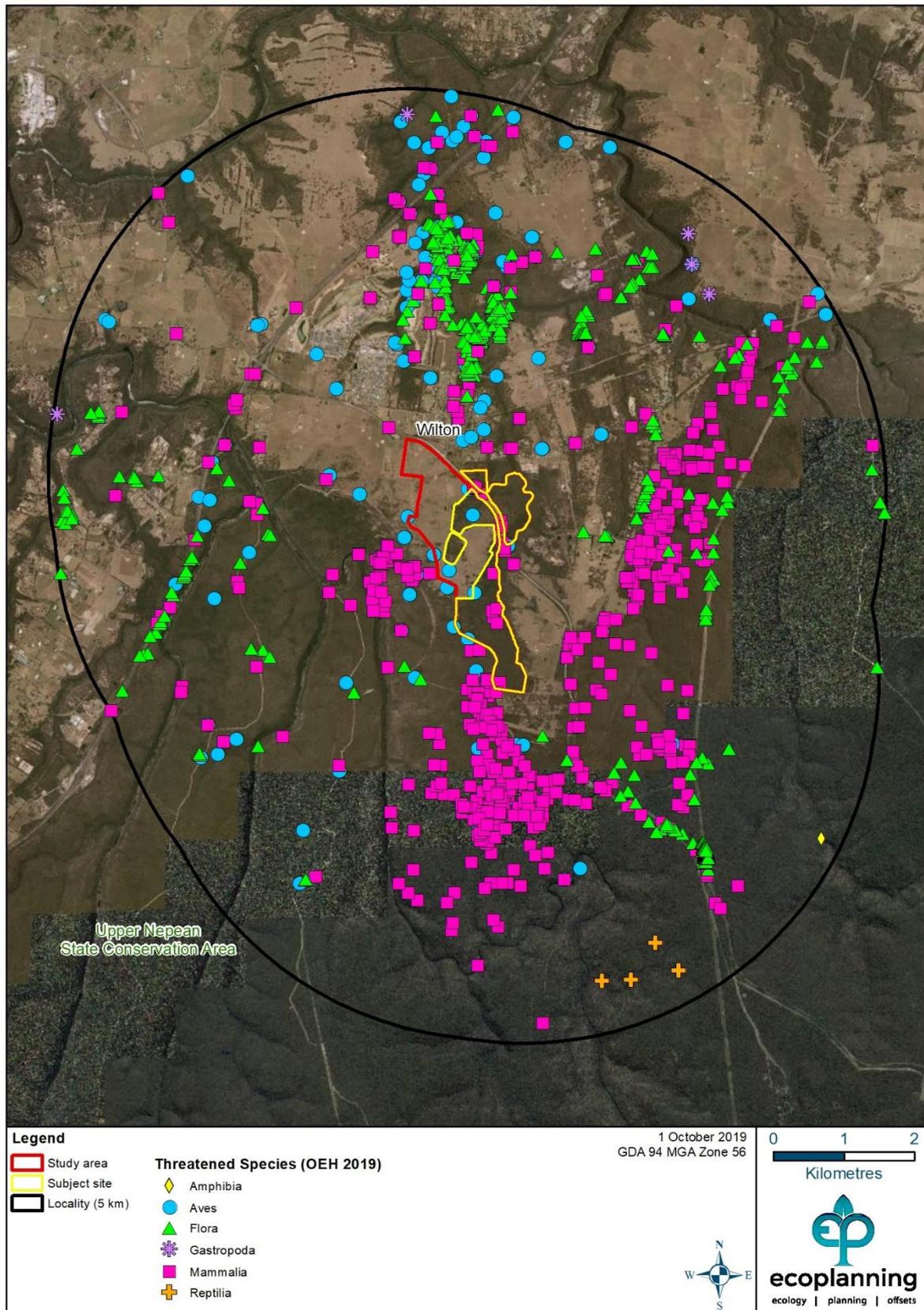


Figure 2.3: Threatened species within 5 km of the study area (OEH 2019a).

3 Vegetation Management

3.1 Aims

The aims of this VMP are to conserve and protect existing ecological and environmental values in the subject site as outlined in **Section 2**. These values include potential populations of threatened flora species and habitat for the seven threatened fauna species (Dusky Woodswallow, Glossy Black-cockatoo, Little Lorikeet, Koala, Little Eagle, Scarlet Robin and Powerful Owl). Furthermore, this VMP aims to ensure that the CEEC SSTF and Cumberland Plain Woodland are retained in their current, intact condition and enhanced where possible. Given the undisturbed nature of most of the vegetation within the subject site, including a low occurrence of weeds, the focus of this VMP is the protection of existing conservation values and measures to avoid impacts to these values. This VMP aims to achieve the following specific management aims and objectives:

- Protect vegetation and avoid any further human disturbances to vegetation including threatened species habitat.
- Maintain existing vegetation condition in woodland and forest areas and maintain current levels of low weed cover
- Promote and enhance natural regeneration within grassland areas around the margins of the subject site.

Specific measurable objectives linked to these objectives and management actions are detailed within **Section 4**.

3.2 Management actions

This section discusses the management actions required to be implemented as part of this VMP. A detailed summary of management actions, their requirements as well as performance criteria are included within **Section 4**. The following management actions, which have been developed from OEH's standard management actions for Biodiversity Stewardship Agreements, are to be implemented as part of the management of the conservation area:

- Preliminary works/establishing the conservation area
- Weed management
- Management of human disturbances
- Management of fire for conservation
- Vertebrate pest management

Vegetation condition is largely consistent across the subject site and consists of intact forest and woodland. However, small areas of cleared land are situated along the perimeter of the subject site, which require a slightly different management approach for improving vegetation condition. Therefore, the subject site has been separated into two separate Management Zones (MZs) (see **Section 3.4**) which separate the currently cleared and vegetated portions of the subject site. In general, the cleared areas of the subject site retain a high cover of native grasses and grazed down rootstock and have a reasonable likelihood of responding to assisted natural regeneration. By preventing any ongoing disturbance, as is the aim for the conservation area as a whole, natural regeneration of the cleared areas of the subject site is

expected to be relatively quick and no initial, or supplementary planting would be necessary. Where natural regeneration does not occur or is slow (as measured against performance criteria outlined in within **Section 4**), supplementary planting may be required.

3.2.1 Establishing the VMP subject site

It is a requirement that all E2 zoned land is conserved in accordance with the Growth Centres SEPP. Fencing of the subject site is to be consistent with EMM (2020). Specifically, Koala exclusion fencing is to consist of a 2.1 m high chain mesh, with a 600 mm high sheet metal strip attached to the fence facing the side with koala habitat (EMM 2020). Koala exclusion fencing exists adjacent to Picton Road, and is proposed along the north western perimeter of the subject site (**Figure 3.1**). Fencing along eastern perimeter of the subject site and the northern perimeter (north of Picton Rd) is not proposed as these areas are currently protected by existing property fencing outside the subject site and fencing these boundaries would require removal of native vegetation. Fencing in this location is only required where there is evidence of unauthorised access from these locations and damage to native vegetation.

All fencing should be regularly maintained and monitored for damage and unauthorised entry points. Specific actions which fencing of the subject site aims to restrict include:

- No unauthorised clearing of vegetation within the subject site.
- Restricting access to the subject site as a result of future development adjacent to the subject site. No formalised walking trails are proposed within the subject site.
- No collecting of, or disturbance to, logs, standing dead wood, bushrock or other natural features within the conservation area.
- Preventing grazing and unpermitted fuel reduction within the conservation area.

Signage which identifies the significance of native vegetation and discourages collection of flowers, plant material, dead timbers and bushrock should also be incorporated into fencing of the subject site. As a minimum one sign should be installed approximately every 200 m along the subject site, particularly along the interface between the subject site and adjoining cleared land.

3.3 Weed Management

Weed management will consist of maintenance works to prevent the further establishment of exotic grasses and herbaceous weeds. The majority of the subject site consists of resilient bushland with no established woody weeds, and a relatively low cover of herbaceous weeds and exotic grasses, which are restricted to small areas around the perimeter of the subject site. Weed control will consist of mechanical removal techniques, given the high cover of native grasses and groundcovers across the subject, although natural shading techniques are preferred and are likely to suitably suppress exotics herbaceous weeds, such as *Gamochaeta* sp. Targeted spot spraying should be conducted where no off-target damage will occur to native grasses and groundcovers.

Weed control objectives and treatment techniques are outlined below (**Appendix B**) in accordance with weed type. A suitably qualified and experienced bush regeneration contractor



as per **Section 4.1** must be engaged to carry out vegetation management works. Disturbance of the soil during the weed management process should be minimised at all times (Buchanan 1989, Bradley 1988).

3.3.1 Primary and Secondary Weed Control

Primary weed control is the initial removal of weed species and is typically when a majority of the standing weed biomass is removed. Secondary weed control involves repeated follow-up treatments during the restoration phase after primary treatment has triggered an ecological response. Primary and secondary weed control will not form a part of the implementation of the VMP, as the cover and abundance of exotic species is generally low and large areas of woody weeds and exotic vines are not present. As such, weed control will begin in the maintenance stage, as most of the management required consists of selected hand weeding of exotic grasses and herbaceous weeds. Techniques to assist natural regeneration, including brush-matting, pile burns and broadcasting of seed are required within previously cleared areas of the subject site (MZ1), with details of this discussed in **Section 3.4**.

3.3.2 Maintenance

Maintenance is the long-term management of a site to prevent weeds from becoming re-established after primary and secondary work. Substantial effort should be focussed on reducing the weed seed bank, eradicating problematic weeds, removing weeds prior to seeding and establishment and promoting the recruitment of native species where possible. Techniques to promote recruitment of native seeds are to include brush-matting, pile burns, seed broadcasting and removal of exotic perennial grasses.

Maintenance weed control works would involve infrequent (quarterly) sweeps of the subject site to identify any new weed infestations and to manage edge effects including encroachment of exotic grasses and herbaceous weeds from adjacent areas outside the subject site. Contractors undertaking these sweeps will need to be cognisant of regional environmental weeds which may become established within the subject site including those identified in **Appendix A**.

3.3.3 Weed Disposal

All seeding herbaceous/grass material and tubers should be bagged, removed from site and disposed of at an appropriate green waste facility. No woody weeds have been detected within the conservation area. If woody weeds are recorded within the conservation area, and subsequently removed, woody material should be left within the subject site and used as habitat piles, where appropriate to do so.

3.4 Vegetation Management Zone

The conservation area has been categorised into two MZs, based on the different restoration actions required across the site (**Figure 3.1**). The splitting of vegetation MZs by the bush regeneration contractor into smaller units beyond what has been described below may be necessary for reporting purposes.



3.4.1 Management Zone 1 – Assisted natural regeneration and protection

This zone covers 2.00 ha or approximately 1.2 % of the subject site and encompasses the small areas of cleared land around the perimeter of the subject land. This zone has been separated from the intact, resilient vegetation within the subject site (MZ2) based on its current regrowth state and the presence of a moderate amount of exotic grasses and herbaceous weeds.

This MZ has a moderate-high regeneration potential; therefore, revegetation is not necessary unless performance criteria for regeneration are not met. Techniques to encourage and promote existing regeneration are to be undertaken including brush-matting, pile burns, broadcasting seeds and weed control. This management zone also represents potential areas for introduction of coarse woody debris or stag trees which may be removed from adjacent development areas. Where natural regeneration is slow, or does not occur, planting of local native species is to occur. Maintenance works will focus on the removal of exotic grasses and herbaceous weeds prior to their establishment and seeding. This will be achieved by conducting regular sweeps for target species, which will be treated through a combination of hand removal and spot spraying. Care should be taken to avoid off target spraying, hence spot spraying should be avoided where native grasses and groundcovers are dense in cover.

3.4.2 Management Zone 1a – Assisted natural regeneration and protection

Within Management Zone 1, a distinct sub-unit has been recognised (MZ1a) which represents a unique location within the subject site which facilitates north-south movement of fauna species to areas beyond the subject site (**Figure 3.1**). All the management techniques discussed with reference MZ1 are applicable to MZ1a, however an increased rate of natural regeneration is desirable within this area in order to improve opportunities for fauna dispersal across the landscape. Consequently, different performance indicators are identified for this area reflecting the desire for an increased rate of natural regeneration across this zone.

3.4.3 Management Zone 2 – Protection

This zone covers 163.69 ha or approximately 98.8 % of the subject site and incorporates all the intact, resilient vegetation. Very limited weed control is required in this MZ, as no exotic grasses and herbaceous weeds were recorded. Nevertheless, it is recommended that sweeps are infrequently conducted (quarterly) in the MZ, particularly between the boundary of MZ1 and MZ2. The aim of these sweeps will be to identify and control any new weed infestations and to prevent encroachment of exotic grasses and herbaceous weeds further into MZ1. Spraying will be strictly prohibited within this MZ, given the absence of exotic species and the intact condition of the vegetation.

3.5 Management of human disturbance

The management of human disturbances within the subject site will largely be controlled through appropriate fencing, which will restrict access of vehicles to the subject site. The proposed koala proof fencing, in accordance with EMM (2020; **Figure 3.1**), will also restrict pedestrian access to the subject site, although may not completely isolate the subject site from pedestrian access. No formalised walking trails within the subject site are proposed and

erecting of signage is recommended to educate residents of the importance of the flora and fauna, including their habitats, within the subject site.

3.6 Management of fire for conservation

Appropriate management of fire should play an important part in the long-term management of the recognised conservation values in the subject site. Inappropriate fire regimes are recognised as altering the structure and floristic composition of Shale Sandstone Transition Forest (TSSC 2014).

The recommended fire interval for SSTF is between 13 to 20 years (Keith 2010). Fires applied more frequently than 13 years are likely to lead to the localised decline or extinction of species which are killed by fire but which recruit profusely from seeds stored in the seedbank, while fire frequency greater than 20 years may lead to localised decline or extinction of species which are dependent on fire to stimulate flowering or seed release.

The recommended fire interval for Cumberland Plain Woodland is between 5 and 12 years (DECCW 2010). Western Sandstone Gully Forest falls into the vegetation formation dry sclerophyll shrub forest (Kenny et al. 2004). The domain of acceptable fire intervals for this vegetation formation is 7 to 30 years, with some intervals greater than 25 years desirable. Given the recommended fire intervals for the vegetation communities within the subject site (between 13-20 years for SSTF), a detailed fire management plan is considered beyond the scope of this VMP which will last until a Biodiversity Stewardship Agreement is in place for the subject site. The Biodiversity Stewardship Agreement Management Plan template includes a 'Fire for Conservation Management Plan' which would be prepared for the subject site as part of entering into a Biodiversity Stewardship Agreement. The Fire for Conservation Management Plan would also consider impacts to fauna species, particularly the koalas from any proposed ecological burns.

3.7 Vertebrate pest management

Scats and digging of *Oryctolagus cuniculus* (European Rabbit), were observed in the subject site during the field survey. Additional pest species likely to occur within the subject site include *Rattus rattus* (Black Rat), *Vulpes vulpes* (European Red Fox) and *Felis catus* (Feral Cat). No targeted surveys have been conducted to confirm the presence of these feral species within the subject site. Foxes and cats, if present, within the subject site are likely to prey upon native fauna, particularly medium-sized ground-dwelling and semi-arboreal mammals and ground nesting birds. European Rabbits can cause damage to vegetation and soils whilst also providing a food source for foxes and feral cats.

Proposed koala fencing, as outlined in **Section 3.2**, will restrict access of pest species to the subject site. As the current impacts of vertebrate pests within the conservation area is unknown, any pest management strategy or control should follow best practices guidelines including the following steps:

Step 1: Understand the problem and assess the impact

Step 2: Determine clear, measurable objectives

Step 3: Develop & implement a plan of action



Step 4: Monitor, evaluate and modify

Control of these pest species within the site will have the best chance of success if a coordinated approach involving surrounding landholders is undertaken. Liaison with the Local Land Services (LLS) should be undertaken to identify what programs/actions are already being implemented to control vertebrate pests within the local area and to determine what additional actions can be undertaken within the site.

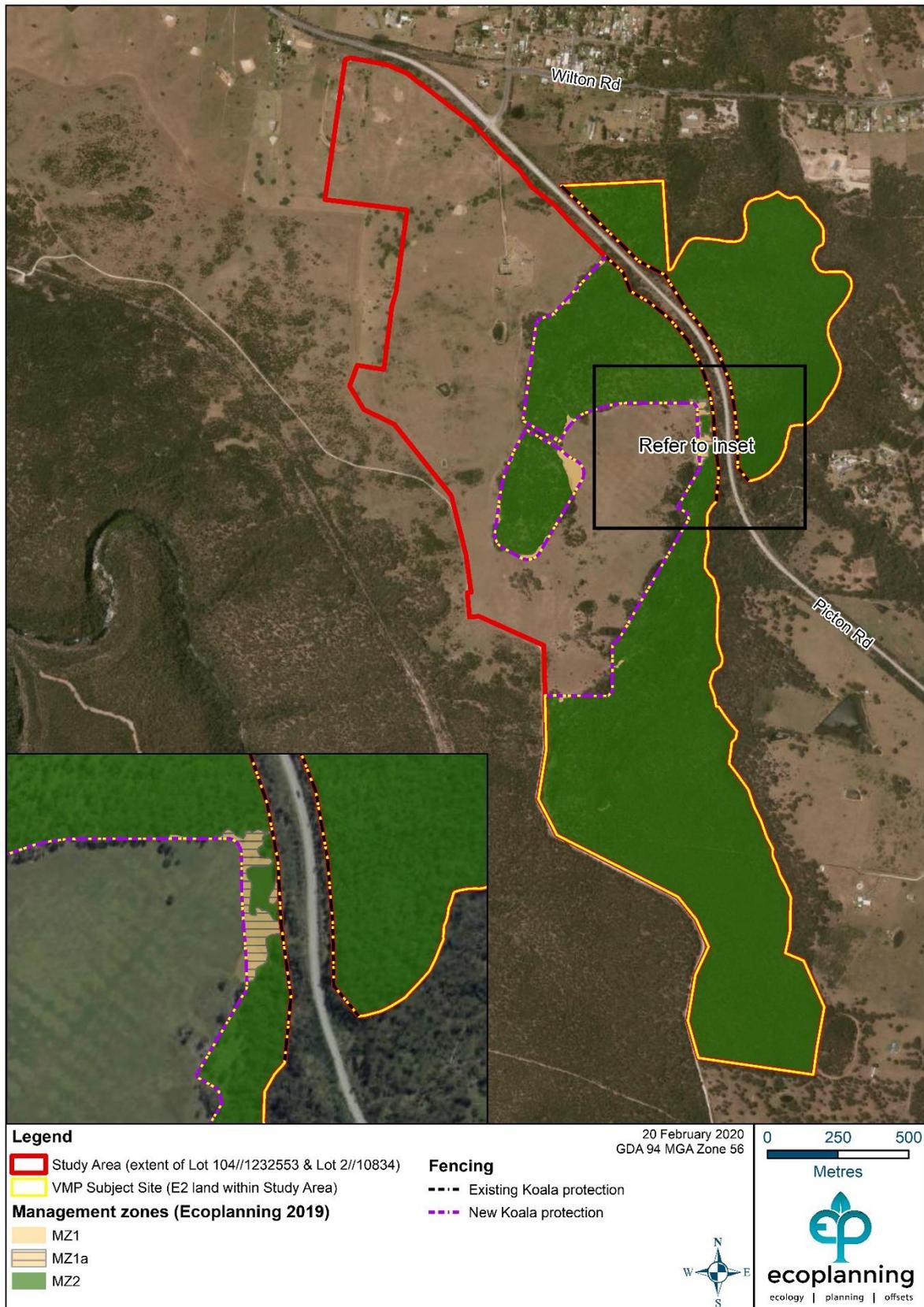


Figure 3.1: Management zones within the VMP subject site.

3.8 Waste

No waste material has been identified as occurring within the subject site. However, small areas of dumped rubbish may be present. All waste present within the subject site will be removed as part of the establishment of the subject site. Inspections of the subject site are to be undertaken to identify the location and type of any dumped waste. An initial inspection should be undertaken at the initiation phase of this VMP (i.e. within the first 3 months), with future inspections undertaken as part of weed management works by the bush regeneration contractor. The experienced bush regeneration contractor would be able to assist in the removal of the waste or provide advice on appropriate removal methods.

3.9 Monitoring and reporting

The progress and compliance with the VMP will be monitored and reviewed annually. This process will involve either the bush regeneration contractor or an independent ecologist assessing the performance criteria within **Section 4**. The assessment of performance criteria will be based regular inspections of site condition including general site monitoring for unauthorised access, rubbish dumping, human disturbances and new weed infestations including subsequent weed control. The monitoring report will determine the effectiveness of the works undertaken and record changes to the vegetation as a result of vegetation management works. The monitoring report will present results from specific monitoring points and more general notes and observations made during site inspections, although specifically referencing the performance criteria detailed within **Section 4** (i.e. fencing damage observed or not observed).

Monitoring points are proposed to be established within 16 locations across the subject site, with indicative locations shown in **Figure 3.2**. These 16 locations have been selected to provide a representative sample of each of the management zones, vegetation types as well as the edge of the subject site where 'edge effects' may occur. At each of these sites marked photo-points are to be monitored on a regular basis (initially 6-monthly) to identify whether performance criteria are being met, specifically:

- Any disturbances including human disturbances (i.e. rubbish dumping, unauthorised clearing) or natural disturbances (i.e. storm or fire damage, flooding etc.)
- Any weed species present within an approximately 10 x 10 m (100 m²) area centred on the photo-point, including their cover (% foliage percent)
- Vegetation structural data (height range, % foliage cover and dominant species within each of the vegetation structural layers present)
- Presence or absence of any regenerating canopy or shrub species
- Any evidence of pest animal species
- Records of any threatened flora or fauna species, including counts of the number of individuals.

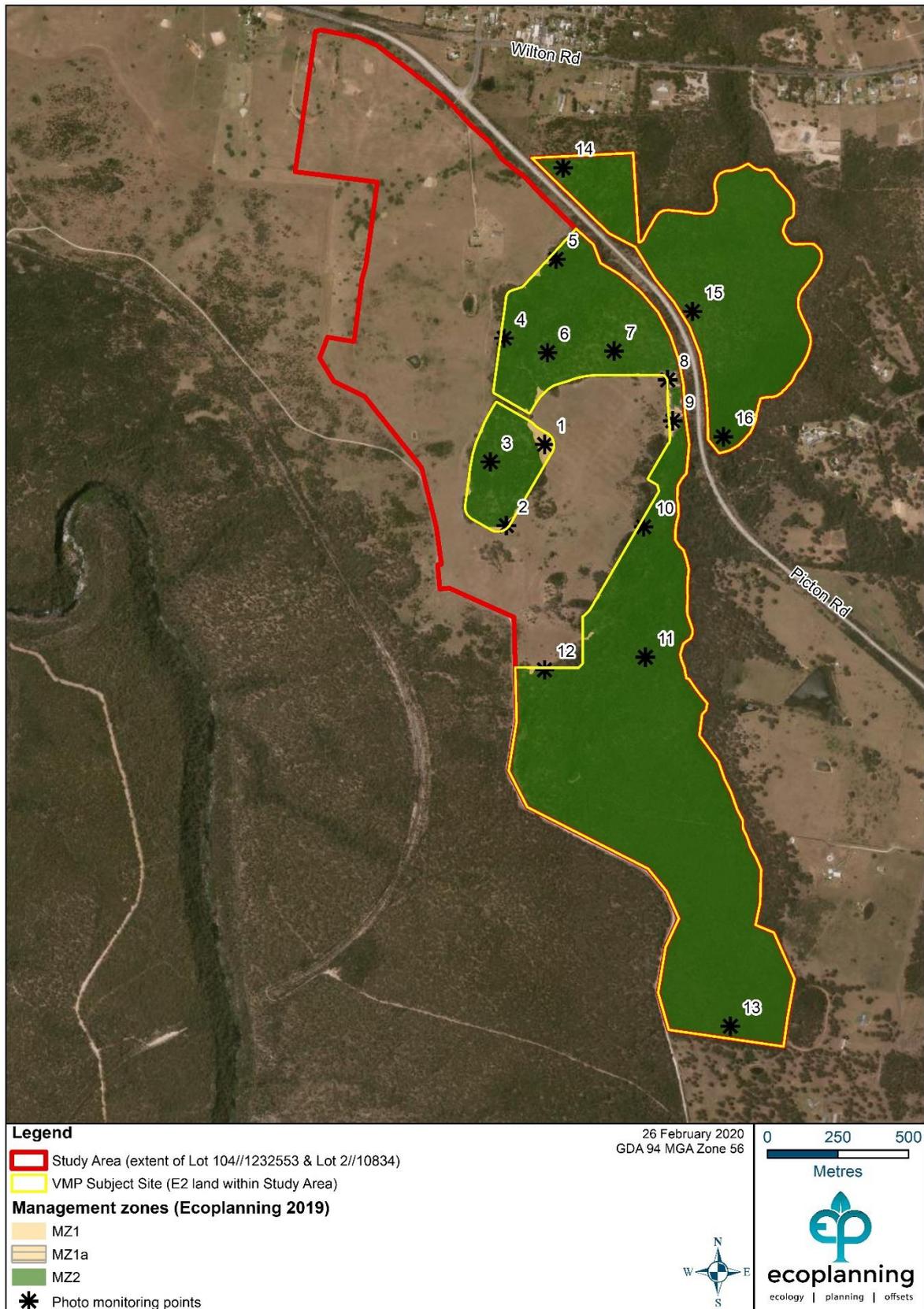


Figure 3.2: Proposed photo point monitoring locations

4 Performance criteria and monitoring

The management actions required as part of this VMP, the performance criteria against which the success will be measured are detailed within **Table 4.1**. Also included within **Table 4.1** are actions to be undertaken if performance criteria are not achieved.

Table 4.1: VMP Objectives, management actions and performance indicators

Objectives & management actions	Management actions	Ongoing works	Performance indicator	Actions if performance criteria not met
Protect existing native	Fencing of the subject site is required in location shown on Figure 3.1 of this VMP. Fencing to be installed prior to any construction activities on adjacent land.	Regular monitoring for damage to fencing, rubbish dumping and unauthorised entry points to be undertaken by bush regeneration contractors or other land managers. At a minimum, quarterly inspections of fencing should be undertaken by bush regeneration contractors in conjunction with maintenance weed inspections.	No damaged fencing / unauthorised entry points.	Fencing to be repaired / reinstated by landowner or appointed contractor.
			No damage to vegetation (including rubbish dumping, vehicle tracks or evidence of livestock). associated with unauthorised access from eastern boundary or northern boundary (north of Picton Rd).	Entry points for unauthorised access to be identified and access restricted through fencing or other barriers. Fencing/barrier installation to be undertaken by landowner or appointed contractor. Assisted natural regeneration to occur across area of damaged vegetation as per MZ1.
	All waste to be removed from the subject site.		No dumped rubbish within subject site.	Waste to be removed by landowner or appointed contractor.
Assisted natural regeneration (MZ1)	Bush regeneration contractor engaged and actions to promote natural regeneration undertaken.	Assisted natural regeneration works including brush-matting with material from adjacent development areas, pile burns, weed control. Specific measures to be determined by bush regeneration contractor at time of works and based upon site conditions	MZ1 Years 0 -3: Natural canopy regeneration present within zone (canopy species present with diameter at breast height <10 cm).	Locally native canopy species to be planted a 1 plant / 100 m ² in locations without natural regeneration.

Objectives & management actions	Management actions	Ongoing works	Performance indicator	Actions if performance criteria not met
		and availability of brush-matting material etc.	Perennial exotic grasses to comprise less than 30% of the groundcover vegetation.	Increased frequency of site visits by bush regeneration until exotic groundcover less than 30 %.
			MZ1 Years 4 +: Regenerating canopy species present within zone at average density of > 1 individual / 100m ² .	Locally native canopy species to be planted a 1 plant / 100 m ² in locations without natural regeneration.
			Evidence of regenerating shrub layer.	Locally native canopy species to be planted a 1 plant / 100 m ² in locations without natural regeneration
			Perennial exotic grasses to be less than 5% of the groundcover vegetation.	Increased frequency of site visits by bush regeneration until exotic groundcover less than 30 %.
			Native groundcovers species present across 10 % of the understorey	Locally native groundcover species to be planted a 1 plant / 100 m ² in locations without natural regeneration.

Objectives & management actions	Management actions	Ongoing works	Performance indicator	Actions if performance criteria not met
Assisted natural regeneration (MZ1a)			<u>MZ1a Years 0 -3:</u> Regenerating canopy species present within zone at average density of > 1 individual / 100m2.	Locally native canopy and sub-canopy species to be planted a 1 plant / 100 m ² in locations without natural regeneration.
			Perennial exotic grasses to comprise less than 30% of the groundcover vegetation.	Increased frequency of site visits by bush regeneration until exotic groundcover less than 30 %.
			<u>MZ1a Years 4 +:</u> Evidence of regenerating shrub layer.	Locally native canopy species to be planted a 1 plant / 100 m ² in locations without natural regeneration
			Perennial exotic grasses to be less than 5% of the groundcover vegetation.	Increased frequency of site visits by bush regeneration until exotic groundcover less than 30 %.
			Native groundcovers species present across 10 % of the understorey	Locally native groundcover species to be planted a 1 plant / 100 m ² in locations without natural regeneration.
Maintain existing vegetation condition in woodland and forest areas (MZ2).	Quarterly (3 monthly) visits of the subject site by bush regeneration contractor to identify and control any new weed infestations.	Weeds to be removal and maintained at current levels. At a minimum, quarterly visits by bush regeneration contractors to occur.	No new weed species established in MZ2. Weed cover maintained at < 1 % across the management zone, as	Increased frequency of visits by bush regeneration contractor (monthly) until newly established weeds are eradicated and weed

Objectives & management actions	Management actions	Ongoing works	Performance indicator	Actions if performance criteria not met
			measured within photo-point monitoring sites.	cover maintained at less than 1 %.
		Record location and counts of any observations of threatened flora species within the subject land.	Map of any threatened flora observations to be included in annual reports.	Landowner to engage botanist / ecologist to undertake targeted surveys for threatened flora.
		Regular monitoring for damage to vegetation by pest species (including rabbit warrens etc.) to be undertaken by bush regeneration contractors or other land managers. Consultation with Local Land Services (LLS) about regional pest control works being undertaken.	No damage to vegetation from pest species.	Pest control works to be undertaken which target pest species causing damage. Pest control methods to be determined in consultation with LLS.
Monitoring and reporting	Annual monitoring reports and annual bush regeneration work reports prepared and provided to Council.	Annual reporting of the life of the VMP.	Annual reports prepared and submitted to council.	Landowner to engage botanist / ecologist to prepare monitoring report.

4.1 Bush Regeneration Contractors

Suitably qualified and experienced bush regeneration contractors that are members of the Australian Association of Bush Regenerators or fulfil the membership criteria must undertake all vegetation management works. In addition to this, team leaders should hold a Certificate III in Conservation & Land Management or possess equivalent field experience and certification. The contractor should carry out best practice bush regeneration techniques as described by Buchanan (1989). The bush regeneration contractor is required to provide annual reports documenting the works undertaken to achieve the aims and objectives of the VMP (this reporting may form a component of the annual monitoring reports). An example works report is detailed in **Table 4.2**, the report should include:

- Works carried out, including weed species targeted and their location;
- An approximation of the time spent on each task;
- Any observations, such as the occurrence of new weed species;
- Rates of regeneration of native species;
- A description of any problems encountered and how they were overcome;
- A summary of how the site-specific objectives have been met (or not);
- Herbicide and other chemicals used, including quantity, dilution rate and other relevant information;
- Weed control techniques used;
- Climatic conditions which may have influenced weed germination and growth;
- Performance criteria and success; and
- If required, maps of weed distribution and density.

Table 4.2: Example monitoring report template.

Date			
Name of Contractor:			
Hours worked on site since last monitoring report:			
Site Condition:	Zone		
	Weed cover %		
	Herbicide used (in Litres)		
	Other		
Describe relevant weed management techniques and fuel load reduction methods:			
Describe problems; e.g. weed invasions, damage to planted material, etc.:			
Photographic evidence:			
Planned work before next monitoring report:			

5 References

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EMM (2020). Wilton Koala Plan of Management. Prepared for Walker Corporation.

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Kenny, B, Sutherland, E, Tasker, E and Bradstock, R (2004) Guidelines for Ecologically Sustainable Fire Management NSW Biodiversity Strategy. NSW National Parks and Wildlife Service, Hurstville

NSW Office of Environment and Heritage (OEH) (2015). Remnant Vegetation of the western Cumberland subregion 2013 update. VIS ID 4207. Accessed at: <http://data.environment.nsw.gov.au/>

NSW Office of Environment and Heritage (OEH) (2019). BioNet Atlas of NSW Wildlife. Accessed at: http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Threatened Species Scientific Committee (2014). Approved Conservation Advice (including listing advice) for Shale Sandstone Transition Forest of the Sydney Basin Bioregion. Canberra: Department of the Environment.



Appendix A Exotic flora inventory

Family	Species	Common name	Presence within the subject site
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	Observed
	<i>Gamochaeta</i> sp.	-	Observed
	<i>Hypochaeris radicata</i>	Catsear	Observed
	<i>Senecio madagascariensis</i>	Fireweed	Observed
Caprifoliaceae	<i>Lonicera japonica</i>	Japanese Honeysuckle	Regional weed (not observed within subject site)
Clusiaceae	<i>Hypericum perforatum</i>	St. Johns Wort	Regional weed (not observed within subject site)
Oleaceae	<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	Regional weed (not observed within subject site)
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	Observed
Poaceae	<i>Axonopus fissifolius</i>	Narrow-leafed Carpet Grass	Observed
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu Grass	Observed
	<i>Cynodon dactylon</i>	Couch	Observed
	<i>Nassella trichotoma</i>	Serrated Tussock	Observed in proximity to subject site
Primulaceae	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	Observed
Rosacea	<i>Rubus fruticosus</i>	Blackberry	Observed
Sapindaceae	<i>Acer negundo</i>	Box Elder	Regional weed (not observed within subject site)

Appendix B Weed treatment methods

Zone	Objective	Main Weeds	Method
MZ1	<ul style="list-style-type: none"> Control and suppress exotic grasses and herbaceous weeds 	<ul style="list-style-type: none"> <i>Axonopus fissifolius</i>, <i>Cenchrus clandestinus</i>, <i>Cirsium vulgare</i>, <i>Gamochoaeta</i> sp., <i>Hypochaeris radicata</i> and <i>Senecio madagascariensis</i> 	<ul style="list-style-type: none"> Herbaceous weeds and exotic grasses will be treated using a combination of hand weeding and careful spot spraying with Roundup Biactive® (i.e. 1%). Hand weeding should be conducted where off target damage to native species could occur and in preparation for selective spot spraying. Herbaceous weeds and exotic grasses should be removed prior to seeding where possible, removed from site and disposed of at a licenced green waste facility. Herbaceous weeds and exotic grasses occur in low abundance and cover across the site. <i>Gamochoaeta</i> sp. is the dominant herbaceous weed and should be treated where the species is dense and inhibiting the recruitment of native midstorey and canopy species. However, for the most part, the target treatment and eradication of <i>Gamochoaeta</i> sp. is not considered necessary, as this species is likely to reduce in cover as native shrub and canopy species become established in MZ1.
MZ1	<ul style="list-style-type: none"> Control and suppress non-herbaceous (i.e. <i>Senecio madagascariensis</i>) WoNS 	<ul style="list-style-type: none"> <i>Asparagus asparagoides</i> and <i>Rubus fruticosus</i> 	<ul style="list-style-type: none"> Sweeps will be conducted for <i>Asparagus asparagoides</i> and <i>Rubus fruticosus</i>, which occur sporadically throughout MZ1. <i>Asparagus asparagoides</i> will be removed by using a small spade, or mattock to remove all underground tubers, which will be bagged, removed from site and disposed of at a licenced green waste facility. <i>Rubus fruticosus</i> will be treated by scrape and painting all stems with neat Roundup Biactive®. Woody weeds and exotic vines should be removed prior to seeding where possible, removed from site and disposed of at a licenced green waste facility.