ANGLICARE SITE: STURDEE AVENUE, BULLI

Vegetation Management Plan

For:

Anglicare Pty Ltd

August 2018

Final

PO Box 2474

Carlingford Court 2118

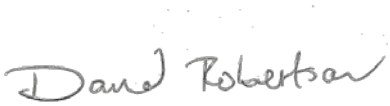
Report No. 17145RP2

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
1	19/07/2018	TP/GK	Draft
2	7/08/2018	GK	Draft
3	10/08/2018	GK	Final Draft
4	28/08/2018	GK	Final

Approved by: David Robertson

Position: Director



Signed:

Date: *28 August, 2018*

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Chapter 1

Introduction

1.1 Purpose

Cumberland Ecology has been commissioned by Anglicare to develop a Vegetation Management Plan (VMP) to prescribe the management measures to be implemented in land located outside of the development footprint of a proposed development located at Sturdee Avenue, Bulli (Lots 2 and 3 DP 1176767) (the 'Anglicare Property').

The purpose of this VMP is to guide the management of the vegetation to be retained and enhanced within the Anglicare Property, in particular for the revegetation and ongoing management of the patch of remnant Turpentine Forest and Cookson's Creek within the subject site in order to increase the ecological values of the site over time.

1.2 Background

The Anglicare property forms part of a larger site known as Sandon Point, which is located within the suburbs of Thirroul and Bulli, approximately 14km north of Wollongong. Sandon Point is to be jointly developed by Anglicare (formerly ARV) and Stockland Development Pty Ltd with some lands to be dedicated to Wollongong Council.

The Sandon Point Concept Plan was approved by the Minister for Planning on 21st December 2006 as Concept Plan Approval No MP06_0094. Stockland has modified the Concept Plan on four separate occasions and development on those lands is now substantially complete. To date no development has occurred on the Anglicare (ARV) lands.

Anglicare now proposes an additional modification to the concept plan approval under Section 75W of the EP&A Act. Secretary's Environmental Assessment Requirements (SEARs) have been received from DP&E which describe what Anglicare are required to prepare for the s75W modification submission.

The SEARs require a VMP to be prepared for the riparian vegetation that is to be retained outside of the development footprint area and for the patch of Turpentine Forest that is present on the Anglicare Property. Wollongong City Council has also provided further detail of its requirements for the VMP in a response to Request for Key Issues for the project, including detailed specifications of what the VMP must contain.

This VMP has been prepared to address the requirements of the SEARs and the requirements of Wollongong City Council and provides a detailed description of the

management measures that will be implemented to manage the area of retained Turpentine Forest and riparian areas of Cookson's Creek.

Please note that the Statement of Commitments refer to management items and requirements based on a previous concept plan. Therefore items that are not applicable to the currently proposed concept plan layout have not been addressed in this VMP.

It should also be noted that this VMP focuses only on vegetation within the Anglicare Property. We acknowledge that the Statement of Commitments states that a VMP is required for Tramway Creek but the majority of the channel and banks for Tramway Creek lie outside of Anglicare owned property and is therefore not covered by this VMP. If a VMP is to be prepared for Tramway Creek in negotiation with Stockland, it should include plantings and management zones similar to those identified in this VMP for Cooksons Creek and parts of Tramway Creek in the south-west corner of the subject site (see **Section 3.1**).

As the Anglicare property is connected to adjacent Council lands via Cooksons Creek, it is acknowledged that additional management of Council lands will also be required in conjunction with management of Anglicare lands, particularly in relation to weed management. However management of Council lands is also outside of the scope of this VMP.

1.3 Proposed Development Layout

The Anglicare property is zoned R2 – Low Density Residential and E2 – Environmental Conservation. Under the approved concept plan, the development footprint is largely contained within the R2 zone while the E2 zone is to be retained and managed. However, minor incursions into the E2 zone for creek crossings and creation of a weir and associated pond to the west of the weir for flood management and drainage purposes were approved.

The R2 zone within the Anglicare lands is divided into three development precincts, namely the Hilltop Precinct, Oceanview Precinct and Central Precinct. The approved Concept Plan allowed for the following development of the Anglicare lands:

- A residential aged care facility up to four storeys containing up to 120 beds;
- A mix of apartment buildings of up to 3 storeys containing up to 250 independent living units;
- Community facilities and services to support residents of the retirement village;
- Access and car parking;
- Landscaping and access pathways (including a single crossing across Cooksons Creek), including rehabilitation of riparian corridors and forest; and
- Stormwater management and utility services.

The proposed modification application retains the original land uses within the Central Precinct. It also proposes the introduction of standard medium density residential accommodation in the Hilltop and Ocean View Precincts. The proposal also seeks to modify the road layout approved on the site. No change is proposed to the land use zoning (developable area), height or floorspace ratio controls.

The forest and riparian rehabilitation and protection measures for the E2 zone also remain the same. The approved weir and pond within the E2 zone are to be replaced with a boardwalk/footpath and bio-retention/drainage basin. This will result in a reduced 'impact footprint' for the ancillary works within the E2 zone (from ~1800m^2 to ~1600m^2) and will therefore allow for a greater level of revegetation of Cooksons Creek.

The E2 zone (hereafter referred to as the 'subject site') will be managed according to this VMP.

Note that the Statement of Commitments required the provision of a 20 metre setback for development from the Turpentine Forest for the purposes of bushfire protection. The current Bushfire Plan for the project indicates that this is no longer required, and that a 6 m defendable zone is adequate for bushfire protection purposes (Peterson Bushfire 2018). Therefore the 20m setback has been excluded.

1.4 Site Description

The Anglicare Property is located in Bulli and is comprised of Lots 2 and 3 DP 1176767, covering an area of approximately 8 hectares (ha). It is generally bounded by Sandon Drive to the south, Geraghty Street to the west, and Wilkies Street to the north. An un-named walking track borders the site to the east, beyond which is the Pacific Ocean (**Figure 1.1**).

Historically, the Anglicare property has been cleared of native vegetation. The land uses following clearing have included dairy farming, quarrying and industrial development. The southern parts of the property have been developed and built upon for industrial purposes, parts of the northwest corner developed as a dairy farm and parts immediately east of the Turpentine Forest have also been previously cleared for a quarry.

Currently, the Anglicare property is not currently being utilised for any industrial purposes and is not subject to any active management.

A 1st order creek called Cooksons Creek is located just north of the existing industrial development. The creek flows in an easterly direction onto Council lands and discharges into Tramway Creek to the east of the Anglicare property.

The central to western parts of the Anglicare property comprise a Turpentine Forest that has regenerated since the 1930s following widespread clearing in the region and has been declared an Item of Natural Heritage Significance in the Wollongong Local Environmental Plan 1990.

The Turpentine Forest and Cooksons Creek collectively form the E2 zone (the subject site) within the Anglicare property.

1.5 Document Structure

The remainder of this document is structured as follows.

- Methodology (Chapter 2)
- Identification of Management Zones (**Chapter 3**);
- Vegetation Management Measures during Construction (**Chapter 4**);
- Weed Management Strategy (**Chapter 5**);
- Revegetation Plan (**Chapter 6**);
- Monitoring and Reporting (**Chapter 7**); and
- Timing and Responsibilities (**Chapter 8**).

Legend

Subject Site

Anglicare Property

Image Source:
Image © NearMap 2018
Dated: 2/5/2018

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 50 100 150 200 m

I:\...\17145\Figures\RP2\20180807\Figure 1.1. Site Location

Figure 1.1. Site Location

Chapter 2

Methodology and Site Description

2.1 Literature Review

The preparation of the VMP involved a literature review to determine the most up to date methods of weed control for exotic species that are present in the study area. This literature review involved a variety of sources including government fact sheets and websites. Cumberland Ecology staff with expertise in bushland maintenance were also consulted on current best practice methods and techniques.

In order to prepare species planting lists for revegetation, and determine revegetation strategies, the following documents were reviewed in conjunction with a review of field survey data:

- Atlas of NSW Wildlife (OEH 2018)
- NPWS (2002). Native Vegetation of the Illawarra Escarpment and Coastal Plain;
- Cumberland Ecology (2004). Flora and Fauna Constraints Analysis at Lot 2 Sandon Point, Bulli. Prepared for Anglican Retirement Villages (Ref: 4047 Let1);
- Cumberland Ecology (2006). Flora and Fauna Assessment of Proposed Concept Masterplan for Residential Aged Care Facility at Sandon Point, Bulli. Prepared for Anglican Retirement Villages (Ref: 4047RP1);
- Cumberland Ecology (2012). Green and Golden Bell Frog Surveys at Lots 1 and 2 in DP 224431, Sturdee Avenue Bulli. Prepared for Anglican Retirement Villages (Ref: 12090 Let 3);
- Cumberland Ecology (2017). Commonwealth Assessment: Anglicare Site, Sturdee Avenue Bulli. Prepared for Anglican Retirement Villages (Ref: 17145Let2); and
- NSW Office of Water (2012) The Guidelines for Vegetation Management Plans on Waterfront Land.

The species list prepared for revegetation areas within the subject site not only includes species listed as diagnostic for remnant vegetation, but also includes additional species that were recorded as naturally occurring local endemics as well as species listed under final determinations for endangered ecological communities in riparian/wetland areas.

2.2 Field Surveys

The vegetation within the subject site was recently surveyed by Cumberland Ecology on two separate occasions. Surveys were conducted on 16 August 2017 primarily for the purposes of assessing vegetation in relation to matters under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and on 29 June 2018 for the purposes of preparation of a Biodiversity Development Assessment Report (BDAR) under the Biodiversity Conservation Act 2016 (BC Act). The data collected during general flora surveys within the subject site during these surveys has been utilised within this VMP.

General flora surveys involved undertaking detailed meander surveys across the subject site) to ground-truth the extent and condition of vegetation. Photographs were taken at several locations to record condition of the vegetation. The locations of these photopoints are shown in **Figure 2.1**. All plant species encountered were recorded and notes were made regarding whether plants were indigenous, planted or exotic.

All vascular plants recorded were identified using keys and nomenclature provided in Harden (1990-1993). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from *PlantNET* (Botanic Gardens Trust 2018).

2.3 Vegetation of the Subject Site

Vegetation within the subject site comprises a significant patch of regrowth forest in the central to western parts (**Figure 2.2**).

The canopy of the regrowth forest comprises mainly *Syncarpia glomulifera* (Turpentine) and *Eucalyptus pilularis* (Blackbutt). The understory contains *Pittosporum undulatum* (Sweet Pittosporum), the climber *Tylophora barbata* (Bearded Tylophora) and *Lomandra longifolia* (Spiny-headed Mat-rush) (**Photograph 2.1**). The understory was also infested with weeds, including mainly the shrubs *Ochna serrulata* (Mickey Mouse Plant), *Ligustrum sinense* (Small-leaved Privet) and *Ligustrum lucidum* (Broad-leaved Privet with an increasing occurrence of *Lantana camara* (Lantana) toward the margins of the forest (**Photograph 2.3)**.

Photograph 2.1 Turpentine Forest within subject site (PP2)

Photograph 2.2 Weedy understorey within Turpentine Forest (PP3)

Photograph 2.3 Dense Lantana growth on edges of Turpentine Forest (PP10)

The riparian areas of Cooksons Creek are highly infested with weeds, primarily *Ageratina adenophora* (Crofton Weed) within the main channel (**Photograph 2.4**) and *Ipomoea indica* (Morning Glory), *Olea europaea subsp. cuspidata* (African Olive) and *Lantana camara* on the banks. Native vegetation within the riparian area is largely limited to scattered occurrences of *Typha orientalis* (Cumbungi) in the main channel and *Glochidion ferdinandi* (Cheese Tree) and *Pittosporum undulatum* on the upper banks (**Photograph 2.5**).

Parts of the subject site along the banks of Cooksons Creek, mainly the northern bank, are largely dominated by the colonising *Acacia longifolia subsp. sophorae* as well as exotics such as *Lonicera japonica* (Japanese Honeysuckle) and *Lantana camara*. Despite the high levels of colonising Acacias and exotics, there are scattered occurrences of native species that are tolerant of ephemeral conditions such as *Imperata cylindrica* (Blady Grass) and *Pittosporum undulatum*.

Photograph 2.4 Heavy weed infestation of *Ageratina adenophora* within Cooksons Creek (PP9)

Photograph 2.5 Scattered Typha occurrences within Cooksons Creek (PP15)

2.4 Fauna Habitat

Fauna habitats vary across the study area in relation to vegetation density, structure and floristics, as well as the presence of specific features such as hollow-bearing trees and wetlands. The quality of habitat within the subject site has been reduced by historic land clearing and weed invasion.

Habitats within the subject site provide limited potential roosting or breeding habitat for native vertebrate fauna species as the majority of the trees are species that either generally do not form hollows (e.g. Casuarinas) or are too young to form hollows. However, the native and exotic species provide a variety of foraging resources for native fauna.

Moderately dense shrubs provide appropriate cover for ground-dwelling fauna species and foraging habitat for birds, bats and arboreal mammals. Fallen timber and leaf litter provide habitat for invertebrates, amphibians, reptiles and small ground-dwelling mammals as well as foraging habitat for ground foraging birds.

It is considered that the subject site provides only very marginal habitat for the GGBF due to the significantly degraded (weed infested plus very high vegetation density) conditions. However the creek and wetland areas provide suitable habitat for common, disturbance tolerant amphibian species such as *Crinia signifera* (Eastern Froglet).

Legend

- Subject Site
- Anglicare Property
- Survey Locations

Image Source:
Image © NearMap 2018
Dated: 2/5/2018

Coordinate System: MGA Zone 56 (GDA 94)

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0 50 m

I:\...\17145\Figures\RP2\20180719\Figure 2.1. Survey Locations

Figure 2.1. Survey Locations

Figure 2.2. Vegetation of the Subject Site and Anglicare Property

Chapter 3

Vegetation Management Zones

3.1 Management Zones

Four management zones have been identified within the subject site that will undergo revegetation and management in accordance with this VMP:

- Zone 1 –Turpentine Forest;
- Zone 2 –Turpentine Forest APZ;
- Zone 3 – Cookson's Creek Wetland Rehabilitation; and
- Zone 4 – Cookson's Creek Riparian Corridor

The management zones within the subject site are shown in **Figure 3.1** and are discussed in more detail below.

3.1.1 Zone 1 – Turpentine Forest

Zone 1 comprises 0.86 ha of mature Turpentine Forest vegetation. This community contains predominately native canopy species with a mixture of native and exotic understorey species.

As this vegetation community is in reasonably good condition it is expected that reduced management actions are required. Initial actions within this management zone will be clearing of exotic shrubs and ground covers present. All of the existing native canopy and shrub species will be retained. Following the removal of any exotic species, it is likely that native species will recolonise the ground cover, however if necessary characteristic Turpentine Forest species can be planted. A species list for Turpentine Forest planting is provided in **Appendix B.**

An existing dirt track approximately 2 m wide currently runs through the central parts of this zone (see Drawing SK1 – 04 and SK1 – 06 of plans by JSA Studio). It is proposed to upgrade this track to a standard paved walking path with educational signage on the ecological and cultural significance of the Turpentine Forest. As the existing dirt path is currently utilised for potential illegal access and rubbish dumping, the creation of the path is not expected to impact the forest further current conditions in the long-term.

The objectives for management of this zone include the following:

- Retain native species present in all strata;
- Control environmental weeds;
- Construct a walking path with minimal impacts on surrounding vegetation; and
- Revegetate where required with a diversity of native canopy, understorey and ground cover species

3.1.2 Zone 2 - Turpentine Forest APZ

The original Concept Plan assessments allowed for a 10 m APZ, if required for the project, to be located within the outer perimeter of the Turpentine forest. Although the current project modification has located the APZ/defendable zone completely within the R2 zone, i.e. outside the subject site, there is potential for the final APZ layout to extend partly into the Turpentine Forest.

Although every effort will be made to avoid and minimise extent of APZ areas within the Turpentine Forest, for the purposes of this VMP, the original approved APZ allowance of 10m has been delineated as a separate management zone (Zone 2).

If Zone 2 is not required to be used as an APZ, then the management of this area will be as described for Zone 1 – Turpentine Forest. If it is required to function as an APZ, then Zone 2 will be managed to comply with the specifications of an APZ and so some tree removal may be required to achieve the required canopy separation of the trees. There may also need to be some management of understorey and ground stratum fuels within these areas, while continuing to manage the area for biodiversity, including weed management.

The objectives for management of this zone include the following:

- Management of vegetation for the purposes of bushfire mitigation;
- Retention of mature canopy trees, providing they have some separation between crowns);
- Removal of smaller trees and understorey shrubs and vegetation where required to achieve appropriate spacings for bushfire protection;
- Removal of ground fuel to a minimum level; and
- Control environmental weeds

3.1.3 Zone 3 – Freshwater Wetland

Zone 3 comprises an area extending 10 m either side of the centre line of Cookson's Creek (a total of 20 m) as well as a bio-retention basin that will be rehabilitated into Freshwater Wetland (see **Figure 3.1**). Tramway Creek occurs to the south-west of the subject site; however the majority of the creek does not occur on land owned by Anglicare, and therefore

management measures are limited to the areas present in the south-east corner of the subject site.

Zone 3 is currently highly degraded and comprised mainly of exotic weed species. Accordingly, it is expected that broad-scale weed control and subsequent revegetation will be required in this area to establish a functioning wetland ecosystem.

The objectives for management of this zone include:

- Retain native species in all strata where possible;
- Control environmental weeds; and
- Revegetate with a diversity of native wetland species to create a freshwater wetland in this area that will provide suitable habitat for a variety of amphibian species, including Green and Golden Bell Frog.

The original concept plan approval allowed for construction of a weir towards the western extent of Cooksons Creek. The updated development plan has resulted in the removal of a weir and construction of a boardwalk in the approximate weir location (see Drawing SK1 – 06 of plans by JSA Studio).

Boardwalks allow for access to wetland areas with minimal disturbance to the wetland habitat, thus enabling recreational activities such as birdwatching and viewing points for public education purposes. Boardwalks can also provide additional shelter for mobile fauna and increased space (e.g. the pylons) for attachment of non-mobile invertebrates (e.g. barnacles).

As the boardwalk will be elevated above the creekline, vegetation, comprising more shade tolerant species, can still be planted below the boardwalk.

3.1.4 Zone 4 – Swamp Oak

Zone 4 comprises the outer areas of the Cooksons Creek Riparian Corridor (**Figure 3.1**). This zone extends for ~10 m either side of Zone 3 along the majority of Cooksons Creek. Within this area rehabilitation will take place with the objective of creating a riparian community that largely conforms to a Swamp Oak forest community the riparian zone of Cooksons Creek.

In common with Zone 3, this area is currently highly degraded and comprised mainly of exotic weed species. Accordingly, it is expected that broad-scale weed control and subsequent revegetation will be required in this area to establish a high quality Swamp Oak riparian corridor.

The objectives for management of this zone include:

- Retain native species in all strata where possible;
- Control environmental weeds;

- Revegetate with a diversity of native canopy, riparian, understorey and ground cover species to form a high-quality Swamp Oak riparian corridor; and
- Establish native species along the bank to enhance erosion control.

3.2 In-perpetuity Management

The recommended works under this VMP are to be carried out over a five year timeframe. As the land is zoned E2 – Environmental Conservation management and maintenance of the vegetation is required in perpetuity, as specified in the Council input for the SEARs.

The long-term strategy for ongoing maintenance of the vegetation will be dependent on the condition of the vegetation at the end of this five-year VMP. As the condition of the vegetation within the subject site will be influenced by conditions of connected vegetation in adjacent Council lands and Stockland Land (for Tramway Creek), an agreement is required for concurrent management of wetlands on adjacent Council and Stocklands lands.

The in-perpetuity management for the subject site should be developed based on vegetation conditions towards the end of the life of this VMP. Indicative management actions required for in-perpetuity management are described further in **Chapter 6**.

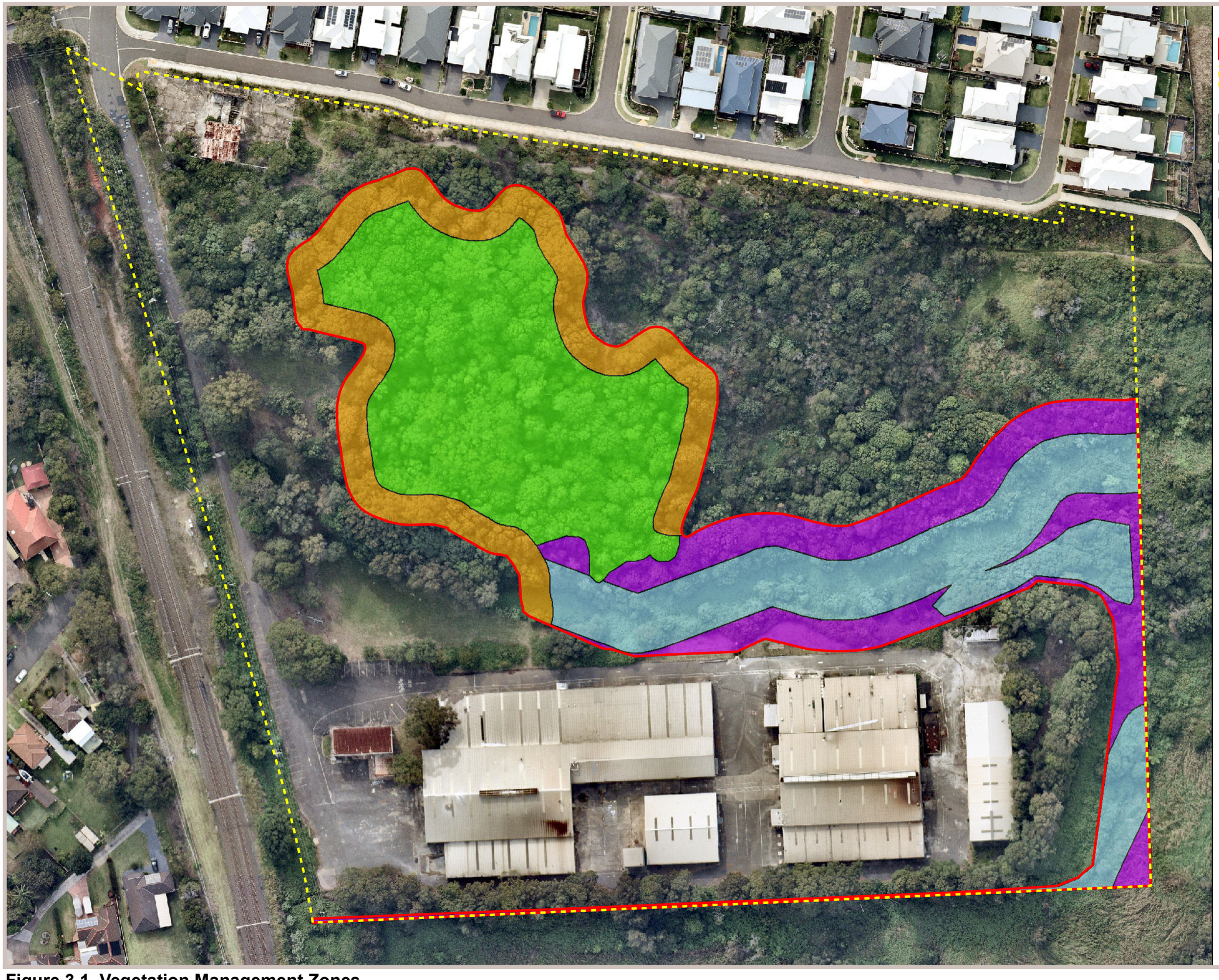

Figure 3.1. Vegetation Management Zones

Chapter 4

Vegetation Management Measures During Construction

This chapter outlines the protocols to be followed during clearing and construction in the adjacent development area to minimise the impacts on native flora and fauna occurring in the construction area and the subject site.

4.1 Fencing

4.1.1 Marking Limits of Clearing

Disturbance will be limited to the minimum necessary for clearing during each stage of the development. Prior to clearing being undertaken, the edge of the vegetation to be cleared will be clearly identified and delineated. Clearing limits can be marked with high visibility tape, fencing, or other appropriate boundary markers. To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance will be restricted to the delineated area. No stockpiling of equipment, soils, or machinery will occur beyond the boundary.

4.1.2 Green and Golden Bell Frog Exclusion Fencing

Prior to the commencement of construction in the adjacent R2 zone, the construction area will be fenced with appropriate materials to exclude the Green and Golden Bell Frog (if present) from entering the construction area. In particular, this will be erected to form a barrier between the riparian zone of Cookson's Creek and the development areas. The design of the fence will be in accordance with the fence design indicated in **Figure 4.1** below.

Temporary Amphibian Exclusion Fence Design

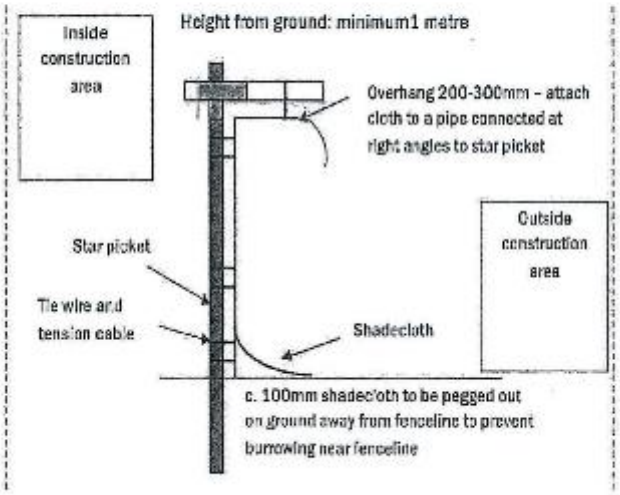

Figure 4.1 Green and Golden Bell Frog Exclusion Fence Design

4.2 Pre-clearing Surveys

A pre-clearing survey will be undertaken prior to clearing of any vegetation in the subject site and wider Anglicare Property. This will be undertaken by an experienced ecological consultant and during this time, and flora and fauna habitat to be impacted will be identified.

Habitat features that have high ecological value and potential to support native fauna species will be identified prior to clearing. Such habitat features includes older, large Turpentine (*Syncarpia glomulifera*) trees, hollow-bearing trees, hollow-bearing logs and bush rock. Habitat features will be clearly marked prior to clearing with high visibility pink flagging tape and a large. "H" will be spray painted on both sides of the trunk/log/bushrock.

If parts of the Turpentine Forest are used for an APZ, pre-clearance surveys will identify habitat features, in particular hollow bearing trees and older Turpentine trees that are a priority for retention to inform the final APZ design.

4.3 Salvage of Habitat Features

Where feasible, the habitat features identified above will be salvaged for the purpose of habitat rehabilitation. These habitat features will be stockpiled in designated areas until they can be placed within the areas of retained native vegetation in the subject site. These salvaged items will complement the complexity of habitat in this area and such items are expected to be widely utilised by a variety of invertebrate, reptile and small mammal species.

Trees and stags containing hollows felled during the clearing process will be relocated to areas of retained Turpentine Forest within the subject site. Similarly, any logs with hollows and any bushrock that is present in the clearing areas will be relocated into the retained Turpentine Forest in the subject site.

Hollows and logs to be translocated will be those that are structurally sound to the extent that they survive the trees felling and subsequent translocation. The suitability of each hollow is to be determined during pre-clearance surveys by an ecologist.

All salvageable items must be translocated and placed in areas where they will do minimal harm to planted vegetation. Large logs must not be placed closer than 10m to each other following translocation.

4.4 Hygiene Protocols

Amphibian Chytrid Fungus is a disease known to occur in over 40 species of native amphibians in Australia, including the Green and Golden Bell Frog. Infection with Chytrid fungus is believed to be a major cause in the decline and local extinction of many frog populations. In accordance with the NSW Office of Environment and Heritage recommendations and protocol, hygiene procedures for control of disease in frogs must, therefore, be followed on site to prevent spread of the fungus to local frog populations. These include:

- Disinfection of footwear and equipment prior to entering areas with frog habitat on site;
- Removal of large chunks of mud from vehicles, especially tyres; and
- Conduction of disinfection process well away from frog sensitive areas such as ponds or drainage lines.

Further details of necessary protocols are provided in the *Threatened Species Management Information Circular No. 6: Hygiene protocol for the control of diseases in frogs* (NSW NPWS 2008).

4.5 Construction of Paths

i. Turpentine Forest

As described in **Section 3.1.1**, the dirt track currently running through Zone 1 will be upgraded to a standard paved walking path. This is not expected to directly impact on the Turpentine Forest as a path of bare earth already exists, however indirect impacts such as dust may occur. In order to minimise these impacts, construction of this path will be timed to coincide with weed control measures being undertaken in Zone 1 (**see Chapter 5**). Weed control has potential to result in some soil disturbance and potential impacts to surrounding vegetation and the path will be constructed during this period in order to minimise risk of indirect impacts to planted vegetation.

Machinery utilised for paving of the existing dirt track should be the smallest feasible size and should fit within the existing pathway to avoid removal of further native vegetation.

Educational signage will be placed at several locations along the path to inform pedestrians of the environmental (ecological and cultural) significance of the Turpentine Forest, to encourage them to value and respect this area. This may include identification signs of some of the main plant species present, the cultural heritage values as well as an overall description of Turpentine Forest.

ii. Cooksons Creek and Bio-retention Basin

As outlined in Section 3.1.3, a boardwalk will be constructed across one section of Cooksons Creek. It is noted that the proposed location, as indicated on Drawing SK1 – 06 of plans by JSA Studio, may be shifted to an alternate location near the proposed bio-retention basin towards the eastern boundary of the subject site. However as both locations currently comprise areas largely infested with weeds with limited native species, a change in location is not considered likely to result in any significant impacts to ecological values.

In order to minimise impact to replanted vegetation, the construction of the boardwalk and bio-retention basin should ideally commence following the primary weeding within Cooksons Creek. If feasible, the boardwalk surface should include gaps between horizontal boards or a mesh structure to allow light to filter down to the vegetation below the boardwalk.

4.6 Weed Management during Construction

Prior to clearing, all plant equipment entering the site will be washed down in designated wash down areas to ensure weed material from off-site locations do not establish or spread into native vegetation within the study area. Machinery involved in weed management will also be washed down prior to removal from site to prevent weeds from spreading into off site areas.

Any weed materials will need to be carefully removed off site in a manner appropriate to the species or at the direction of the ecologist and Wollongong City Council guidelines so as to prevent the spread of propagules to undisturbed areas of native vegetation, both on and off site.

4.7 Sediment and Erosion Control

Erosion and migration of sediment from the study area into adjacent vegetation has the potential to facilitate weed invasion through the introduction of weed seeds and nutrients that favour weed species. As weed species are removed from the subject site, the soil may become susceptible to erosion during periods of rain, particularly along Cookson's Creek. As such erosion control measures will be installed where appropriate following weed removal.

This potential impact will be avoided through the implementation of appropriate erosion and sediment control measures that includes measures such as:

- Stabilisation of areas of bare soil using jute matting or mulch;
- Stabilisation of areas of bare soil by re-vegetating immediately with appropriate local native plants;
- Covering soil stockpiles; and
- Control of sediment by installation of erosion fences around all construction works prior to commencement of any earthworks to avoid potentially nutrient and seed rich run-off entering neighbouring areas of vegetation.

On slopes on the site, logs should be used in combination with wooden stakes to stabilise soils following weed control. The logs can be left on site indefinitely, as they will break down after native plants have re-established. In steep areas in which natural regeneration is not occurring, logs should be used in addition to planting native species to stabilise the soil surface.

In areas that channel water with no native regeneration following weed control, biodegradable jute matting should be used to stabilise the soil surface, with native species planted through the matting.

Chapter 5

Weed Management Plan

5.1 Introduction

This Weed Management Plan applies to all management zones identified in the subject site. It provides an overview of legislation relevant to weed control, identifies the weed species present in the subject site, and then identifies appropriate weed control methods and the stages of weed control to be implemented.

It is expected that Zone 1 – Turpentine Forest will require the least amount of weed control, as it has lower levels of weed invasion, however Zones 2, 3 and 4 are highly impacted by weeds and their control will form a significant component of the rehabilitation of these areas.

5.2 Relevant Legislation

5.2.1 Biosecurity Act 2015

The NSW *Noxious Weeds Act 1993* was repealed on the 1st July 2017 and problematic weeds are now managed under the NSW *Biosecurity Act 2015*. Under the Biosecurity Act the state has been divided into 11 regions with weed management in each directed by a regional weed committee. Each committee has prepared a Regional Strategic Weed Management Plan.

Under the Biosecurity Act there are weeds which have legislated management requirements under controls and regulations of the act. These are known as State Priority Weeds. All 32 Weeds of National Significance (WoNS) are now listed as State Priority Weeds. WoNS are species that have been identified by Australian governments based on their invasiveness, potential for spread, and environmental, social and economic impacts and are priorities for control.

A further two sets of weeds are detailed within the management plan for each region. Regional Priority weeds are required to be managed as per the proposed objectives in the management plan to fulfil a General Biosecurity Duty which applies to all land owners and managers under the act. “Other weeds of regional concern” is the second category weeds have been assigned to. These weeds may have legal management requirements by a managing authority to be controlled as part of the General Biosecurity Duty in circumstances where they may impact upon an asset such as the environment or human health.

The study area is located within the South Eastern Management Region and as such weeds are required to be managed as directed by the South East Regional Strategic Weed Management Plan 2017 – 2022 (LLS, South Eastern, 2017).

5.2.2 Pesticides Act 1999

The *Pesticides Act 1999* controls the use of herbicides within New South Wales. Under the Act is illegal to use herbicides for species not listed on a particular herbicides' label, or in a concentration or manner not outlined on the label. Off-label use of a particular herbicide is permitted only upon obtaining a specific permit.

5.3 Weed Species in the Subject Site

Weeds identified by Cumberland Ecology are occurring within the subject site make up the weed species list used for the basis of this VMP. A full list of weed species recorded within the subject site and wider Anglicare property and the control methods for the weed species identified is provided in **Appendix B.** The priority weed species for control identified within the subject site are listed in **Table 4.1**.

Table 5.1 Priority weeds for control within the Subject Site

Family	Scientific Name	Common Name	Status
Asteraceae	*Ageratina adenophora*	Crofton Weed	OWC
Iridaceae	*Aristea ecklonii*	-	OWC
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	SP
Convolvulaceae	*Ipomoea indica*	Morning Glory	OWC
Verbenaceae	*Lantana camara*	Lantana	SP
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	SP
Fabaceae (Faboideae)	*Ulex europaeus*	Gorse	SP

*Notes: *SP = State Priority Weed, OWC = Other Weed of Regional Concern*

5.4 Best Management Practice

Contractors for weed removal within the subject site will have regard to the following, to minimise impacts upon existing vegetation and habitats:

- The main principles of the Bradley Method of bush regeneration, i.e. not over clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter;
- Removal of fruiting/seeding parts of weeds carefully, to minimise spread of plant propagules;

- Use of chemicals and sprays only during suitable weather conditions (i.e. not during wet or windy conditions), and only during appropriate seasons;
- All equipment should be thoroughly cleaned prior to entering the site to minimise contamination; and
- Presence of native fauna or nesting/breeding sites.

Any weed materials will need to be carefully removed off site in a manner appropriate to the species or at the direction of the ecologist or requirements of the Wollongong City Council so as to prevent the spread of propagules to uncleared areas of native vegetation, both on and off site.

In addition to weed control, a 1m high sediment fence should be installed temporarily outside of revegetation areas in which works are to be undertaken. This will prevent run-off of soil erosion during weed control works, and prevent wind dispersed seeds of exotic species blowing into the revegetation area during weed control works.

Machinery and tools involved in weed management will also be washed down prior to entry to the site and following activities on site to prevent new weed infestations on site and on site weeds from spreading to offsite areas.

5.5 Weed Control Methods

Bush regeneration weed control is to be implemented throughout the subject site using the strategies outlined below.

5.5.1 Manual Weed Removal

Manual removal, or hand weeding, is an effective form of weed control when all viable parts of the plant are removed from the soil (roots, fruiting material and rhizomes) where practical. All weeds removed by hand will be handled according to best practice bush regeneration techniques to prevent subsequent seed set from the removed weeds.

The bushland regenerator can manually clear small plants with mattocks, brushcutters or other suitable equipment. The root structures of exotic shrubs can be retained in order to stabilise the soil if required, and if the plant has been killed with herbicide to avoid re-sprouting.

Non-herbaceous larger weed species such as *Lantana camara* and *Rubus fruticosus* (Blackberry) will need other methods of removal besides spraying with herbicide, such as by cutting and painting cut stems with herbicide. Areas of occurrence of these weeds should be controlled prior to the spraying of the groundcover species to allow easier accessibility to weeds in the groundcover.

5.5.2 Use of Herbicides

All herbicides should be used according to recommendations on the herbicide label.

Some herbaceous weeds such as *Ageratina adenophora* (Crofton Weed) reach heights that make control with herbicide impractical as spraying at these heights can be dangerous, and will result in a higher instance of herbicide drift which can harm non-target native shrubs and trees. In these instances mechanical means such as use of a brush cutter can be used, followed by spraying with herbicide when plant remnants at the ground level resprout leaves.

Although native species are to be retained where feasible, the dense growth of the colonising *Acacia longifolia ssp sophorae*, especially along the banks of Cooksons Creek may require removal to enable planting of groundcover wetland species. The density of this species, if required to be reduced should be done by mechanical means prior to spraying with herbicide.

In order to minimise instances of native dieback through herbicide drift during spraying, the site should be searched thoroughly prior to herbicide use for non-colonising native plants in the understorey/ground layer. Native species in the ground layer that occur on the subject site should have plastic tree guards installed around them to prevent the native plants from being harmed by herbicide drift. Native species (**Appendix A**) that have been recorded as occurring in the ground layer that should be protected with tree guards include *Commelina cyanea* (Scurvy Weed)*, Hibbertia scandens* (Climbing Guinea Flower), *Lomandra longifolia* (Spiny Mat-rush)*,* and *Imperata cylindrica* (Blady Grass) as well as seedling juveniles of shrubs and trees recorded such as *Breynia oblongifolia* (Coffee Bush), *Casuarina glauca* (Swamp Oak) and *Melaleuca styphelioides* (Prickly-leaved Tea Tree). Some of these species such as *Lomandra longifolia* may be too large for installation of tree guards. In these cases individuals should be flagged with flagging tape and care taken to spray around these with a hand operated backpack sprayer on a non-windy day.

Appropriate Personal Protective Equipment (PPE) should be worn and consideration given to time of day, likelihood of rainfall, wind direction and speed and likely impact on native species as per guidelines on the label. Use of Glyphosate will be appropriate for most species. Glyphosate is the preferred herbicide for use in environmentally sensitive areas as it is rapidly broken down by microbes in the soil so residue is short lived and will not affect remnant and planted native individuals in the long term following application. It is important to note that there can be legal restrictions and permit requirements for use of specific herbicides for specific plants, and chemical labels and permit requirements always need to be researched prior to herbicide application. While the recommended methods for weed treatment detailed in **Appendix B** are effective, some will require a permit to be undertaken. The relevant permit number is PER9907. Herbicide permits need to be obtained from the Federal Government body, the Australian Pesticides and Veterinary Management Authority.

5.5.3 Weed Suppression

In areas of the subject site dominated by exotic weed species, following initial treatment of the weed species that currently occur on site, a layer of biodegradable matting, or mulch can to be laid down on the ground to suppress regrowth of weeds.

Jute matting is a commonly used biodegradable form of matting for bushland regeneration works. The heavier available forms of this product suppress weed growth. Holes would be needed to be cut in the matting if used to allow it to be placed around remnant native plant

individuals occurring on the site, and holes would also need to be cut to plant tube stock into. As this is quite labour intensive, the most cost-effective method of weed suppression for the subject site would be using mulch.

Mulch can be easily laid across the site in areas that contain no native plants. In areas containing native plants, the mulch can be spread on the ground surface around the occurrences of remnant native plants. If mulch is used, a certified weed-free mulch of known provenance should be used. While mulch, or any other form of weed suppressing layer across the ground will inhibit regrowth of weeds, it will also inhibit regrowth of native plants from seed. For this reason, weed suppression matting or mulch should only be used initially to establish parts of the subject site where intensive weed control is needed, and be allowed to biodegrade over time without being reapplied.

5.6 Stages of Weed Control

5.6.1 Priority Weeds

The first priority for weed treatment in the subject site will be targeting mature individuals of the priority weed species and weeds of regional concern. These species are perennial and take several years to reach reproductive maturity so are easily controlled providing juveniles are continuously eradicated before reaching maturity.

It is recommended that all priority woody exotic shrubs/ midstorey be cut at the base with a chainsaw, brush cutters or other suitable equipment. Immediately after cutting, the base of the stump should be sprayed with Glyphosate. A marker dye should be used in the herbicide solution to ensure areas are not missed. This and other methods to be used to treat exotic species are outlined in detail in **Appendix B.** Knapsack sprayers with a spray cone to direct the spray towards the ground should be used to prevent herbicide drift into adjacent vegetated areas.

5.6.2 Primary Weeding

Following control of mature individuals of the main priority and regional concern weed species, primary weeding will be undertaken throughout the subject site. Primary weeding is the first stage of bushland regeneration and may involve techniques such as:

- The selective spraying of weeds, with selective and non-selective herbicides;
- Cutting/scraping and painting deep rooted woody weeds and climbers with hand tools, chainsaws and brush cutters and painting cut stumps with herbicides containing Glyphosate or Picloram; and
- Selective hand removal of weeds and wicker wiping of tall herbaceous weeds in situations where damage to proximate, low growing native plants can be avoided.

The aims of primary weeding are to eliminate woody weed species and any large, dominant infestations of exotic herbs and grasses. Prior to chemical treatment any seed on mature

exotic plants should be bagged to prevent seed fall and addition to the exotic soil seed bank of propagules.

5.6.3 Maintenance Weeding

Follow-up, or maintenance weeding will be undertaken throughout the subject site in areas that have received past primary weeding treatments in the preceding months, to treat any regrowth of weeds.

Follow-up weeding involves the selective removal or treatment of weeds, whilst allowing regenerating or planted native plants to increase in size, abundance and percentage cover. All weeds should be targeted during the follow-up weeding phase, although it is recommended that woody weeds, climbers, and key herbaceous weeds are subject to a programme of intense follow up weeding around any patches of regenerating native herbaceous plants to encourage the spread of the native plant species. During site visits for weed control, priority weeds and WoNS will be prioritised for control. Individual plants of these species on site should not be allowed to achieve a reproductive stage in their life cycles. In order to eliminate the occurrence of these species they need to be controlled before they have a chance to set seed, otherwise progress on the site will not be made.

The most cost and time effective method of controlling weed regrowth in a revegetation area or weedy bushland area is by spraying a non-selective Glyphosate herbicide. The following sequential steps are recommended to manage each area of the site effectively for each site visit:

1. Initially the bushland regeneration team visiting the subject site should sweep from one end to the other. During this sweep regrowth individuals of harder to manage weeds that require other techniques such as sawing, digging, drilling etc. should be targeted.

2. A member of the team should then sweep the entire area, spraying or manually removing all regrowth weeds

It is important during site visits for ongoing weed maintenance that as many weeds as possible are controlled so individuals are not able to achieve maturity and set seed between site visits. Some weed species such as *Bidens pilosa* (Cobbler's Pegs) are prolific seeders, and many exotic plants can have seed that remains viable in the soil for long periods of time.

Ongoing maintenance of the subject site will occur for a five year period, and the site should be covered in its entirety once every month for the first two years and then once every two months for years 3 -5 , to diminish the soil seed bank of exotic weed species present on site until weeds are at negligible levels. Site visits may be more frequent if it is determined necessary. After the five-year follow-up and maintenance period has been completed, a review should be conducted to determine further on-site maintenance requirements.

Chapter 6

Revegetation Plan

6.1 Introduction

Revegetation will be undertaken in the subject site where required to increase the ecological value of the subject site and to re-establish native vegetation communities. Due to the high degree of weed invasion along Cooksons Creek, Management Zones 3 and 4 currently contain few native plant species and following weed control (see **Chapter 4**), near complete revegetation of these areas will be required in order to create self-sustaining wetland and riparian communities.

Zone 1 (Turpentine Forest) is likely to require little replanting due to the low levels of weed invasion and dominance of native species. If required, supplementary planting of native plant species (infill planting) may be undertaken in the patch of Turpentine Forest where gaps currently exist in the canopy or understorey, or if large gaps are created by weed removal and restoration of absent stratum elements (canopy, mid-storey or groundcover) are required to re-establish a fully structured vegetation community.

Although allowance has been made for an APZ (Zone 2), where feasible the APZ should be avoided along the western margins of the existing Turpentine Forest and additional revegetation should be implemented to mitigate impacts of the APZ encroachment in the north-west on Lot 2 as per the original Consent approval.

Appropriate plant species to be used for revegetation of each zone are provided in **Appendix C**, and plants from the appropriate list are to be used for selection for re-vegetation of the management zones in the subject site.

6.2 Revegetation Species

Species to be planted in the subject site should be selected from the appropriate lists for each management zone in the subject site that are provided in **Appendix C**. Management Zones 1 and 2 will be planted with species characteristic of Turpentine Forest, Zone 3 will be planted with species characteristic of freshwater wetlands, and Zone 4 will be planted with species characteristic of Swamp Oak Forest.

It should be noted that although *Pittosporum undulatum* is present on site, it is not included in the species lists for planting. This species can grow quickly and have the potential to shade out other plantings. The species is easily dispersed by birds and will recolonise the revegetation on site without assistance over time.

All tubestock to be planted should be of local provenance, ideally from not more than 10 km from the subject site, and sourced from nurseries that specialise in growing seedlings of native plants with seed sourced from local bushland, to avoid planting of horticultural cultivars. If sufficient local plants are not available, it may be necessary to collect or source suitable quantities of local provenance native seed for propagation to ensure suitable numbers of plants are available for the proposed revegetation programme.

Local native plants should be grown in "Hiko" tube, maxi cell or viro-tube, or Forestry Tube-type containers.

It is likely that not all species will be available, but as many species as are available from the lists should be planted, to maximise the floral biodiversity of the subject site.

6.3 Planting Density Guide

This section provides an approximate guide on appropriate planting densities for areas to be revegetated in each Management Zone following weed control (see **Table 6.1** to **Table 6.4** respectively). Management Zone 1 comprises the Turpentine Forest and will be planted as required to achieve higher densities of native plants for biodiversity value purposes, while Management Zone 2 is the APZ area, and will be planted at lower densities, if required, to comply with bushfire protection objectives. If the APZ is not required, areas mapped at Zone 2 will be revegetated at the same densities as Zone 1.

Management Zone 3 will be planted with a range of sedges, rushes and other wetland plants, and Management Zone 4 will be planted with Swamp Oak trees and associated understorey plants for this community.

In areas where the ground cover, shrub, small tree, and canopy strata contain intact, remnant occurrences of native species, supplementary planting should only take place in areas that do not already contain native vegetation in particular strata, or in areas where the density of native plants is too low. In areas that are currently devoid of native vegetation, complete reconstruction of bushland will occur and plantings will follow the density guidelines in below. This is likely to be required in Management Zones 3 and 4.

In areas where juvenile shrub or canopy species are present regrowing on site, planting of shrub and canopy species is not needed. Groundcover individuals can be planted clumped within each square metre if considered appropriate to allow ease of access for weed control of the site.

Table 6.1 Planting Density Guide

Stratum	Zone 1 density	Zone 2 density	Zone 3 density	Zone 4 density
Canopy	3 unit/10m^2	1 unit/20m^2	-	5 unit/10m^2

Table 6.1 Planting Density Guide

Stratum	Zone 1 density	Zone 2 density	Zone 3 density	Zone 4 density
Shrubs	5 unit/5m^2	1 unit/10m^2	-	5 unit/5m^2
Groundcovers/Vines	10 units/m^2	5 units/m^2	10 units/m^2	10 units/m^2

6.3.1 Characteristic Planting Units

It is advised that species should be planted in characteristic planting units to correspond with the topology, aspect, soil type and proximity to water.

Grasses may be planted in clumps of 3+ (spaced 15–20 cm apart within clumps) to generate physical / structural support for each other and microclimates. Wind pollinated grasses such as *Microlaena stipoides* (Weeping Grass) may be particularly planted in clumps to aid fertilisation and to create a natural grassland understorey within the subject site.

6.4 Planting Guide

The following is a guide to ensure success of tube stock plantings.

- Mulch needs to be scraped back to expose soil surface;
- Holes for tube stock should be dug deep enough that at least a few centimetres of the plant are below the soil surface;
- Soil should be filled back in surrounding the tube stock;
- Mulch should be spread back to surround the new planting, but not smother it;
- Plants need to be watered once immediately following planting; and
- A plastic tree guard should be installed around each plant (or clump of planted groundcovers) following planting and watering to protect them from herbivory, and herbicide drift during site visits for weed control.

6.5 Maintenance of Plantings

During site visits for weed control of the revegetation site, the contracted bushland regeneration team should monitor the plantings for death of individual plants. These should be replaced with another individual of the same vegetation form during subsequent site visits to ensure at the end of the initial two year period there are not gaps in vegetation cover. Although native plants generally only need to be watered once upon planting, drought periods or hot, dry weeks in warmer months of the year can result in death of plantings. The

contracted bushland regeneration team should water plantings during site visits or more frequently if required in these periods to prevent the loss of plantings from dehydration.

6.6 Costs

Table 6.5 provides a high level estimated costings for the materials and plant supply for the life of this VMP. All estimations are based on previous projects and prices quoted during the writing of this report. Although every effort has been made to provide accurate cost estimates, final costs are still subject to a high degree of variability based on the availability of resources and other unforeseen economic factors. Therefore, the costing provided should be considered a general guide as totals may vary over the life of the VMP.

6.6.1 Inclusions

For the purposes of costing, it is assumed that an APZ is not required and that Zone 2 will be revegetated at the same density as Zone 1.

Although Zone 1 and Zone 2 will be allowed to regenerate naturally, an allowance for assistive revegetation has been incorporated into the costing for each lot by calculating revegetation costs for 10% of the area of Zone 1 and Zone 2. The requirement for assistive regeneration will be determined during the initial monitoring periods and will be implemented in Year 1 if required.

Maintenance visits include ongoing weeding, watering until establishment, plant replacement at 5% of total plant costs in first year and 2.5% in second year. Maintenance visits also include CPI increases of 3% each year. However the number of hours labour is assumed to decrease overtime as less maintenance is likely to be required.

6.6.2 Exclusions

Due to the high level and density of weed cover, particularly in Zones 2, 3, and 4, a high level of initial site preparation and weeding is estimated to be required. Although a high level estimate has been provided, the level of weeding required may require additional hours so the estimate provided should be treated as a minimum requirement. Quotes will need to be obtained from bush regenerating contractors in order to appropriately estimate labour costs associated with the implementation of the VMP.

Costings for seed collection have not been included in these estimates as the full extent of area from which seed is to be collected is currently unknown as the collection of an adequate supply of seeds will vary with seasons and plant conditions.

As the full extent of frog proof fencing is yet to be determined, costs for the frog exclusion fencing have not been included.

Table 6.2 High Level Cost Estimate for VMP

Task	Establishment	Year 1	Year 2	Year 3	Year 4	Year 5
Site Preparation (Initial Weeding) - 5 days for bush regen team @ $2500 per day	$12,500.00					
10,700 m^2 Jute matting (or hardwood mulch) (Zones 3 and 4)	$74,900.00					
Hiko Planting Ground Cover (10 units/m^2 for 10700 m2)(Zone 3 and 4)	$267,500.00					
Hiko Planting Shrub (5 unit/5 m^2 for 4600 m^2)(Zone 4)	$11,500.00					
Hiko Planting Canopy (5unit/10m^2 for 4600 m^2)(Zone 4)	$5,750.00					
Hiko Planting Ground Cover (10 units/m^2 for 1300 m^2)(10% of Zone 1 and 2)		$32,500.00				
Hiko Planting Shrub (5 unit/5 m^2 for 1300 m^2)(10% of Zones 1&2)		$3,250.00				
Hiko Planting Canopy (3unit/10m^2 for 1300 m^2)(10% of zone 1 and 2)		$975.98				
Sediment Fence (~2500 m)	$11,000.00					
Tree guards (for trees and shrubs)	$10,250.00					
Maintenance Visits (Weeding and Plant Replacement)		$41,276.01	$32,998.01	$12,360.00	$9,270.00	$6,180.00
Photomonitoring and reporting		$2,575.00	$2,575.00	$1,802.50	$1,802.50	$1,802.50
Total Establishment Costs	$393,400.00	$80,576.99	$35,573.01	$14,162.50	$11,072.50	$7,982.50
		12 Maintenance Visits 2 Monitoring Visits	12 Maintenance Visits 2 Monitoring Visits	6 Maintenance Visits 1 Monitoring Visits	6 Maintenance Visits 1 Monitoring Visits	6 Maintenance Visits 1 Monitoring Visits

**Maintenance visits includes watering until establishment, plant replacement at 5% of total plant costs in first year and 2.5% in second year. Also includes CPI increases based on 3% each year. Number of hours labour is assumed to decrease overtime as less maintenance is likely to be required.*

Chapter 7

Monitoring and Reporting

It is recommended that a project manager/supervisor with a bushland regeneration contractor be assigned to coordinate, supervise and manage all works and correspondence with respect to the management of the subject site. The project manager must be available for the duration of the project and become familiar with the site and progress of all aspects of works undertaken.

The project manager will be responsible for allocation of maintenance tasks to personnel in response to establishment issues and other factors as monitoring results are reported (e.g.: plant losses/re-planting, weed control, irrigation). Regular monitoring and feedback from personnel will assist in the allocation of labour relative to available funds.

7.1 Monitoring Program

A qualified bushland management or ecological consultant will carry out a program of regular monitoring of the implementation of the VMP in each management zone. The consultant will be responsible for ensuring the measures outlined in this VMP are implemented and that plant stock is replaced, as needed.

The monitoring program will be carried out for the duration of the VMP and a monitoring survey will be completed every six months in Year 1 and 2 and then annually for the remainder of the five year management period of the VMP.

General observations of the nature and condition of the vegetation in each management zone will be undertaken along with the collection of quantitative data during monitoring including:

- Establishment of a series of fixed monitoring points in each management zone of the subject site. Indicative locations for monitoring points are shown in **Figure 7.1**;
- Take photographs annually from each monitoring point in a north, south, east, and west direction. Compare photographs to previous years;
- Use the photograph point to form a corner of a 20m x 20 m quadrat at each monitoring point. Note any weeds occurring in the quadrat and state relative abundance of weed species (using Braun-Blanquet scale), as well as projective foliage cover of native species in each strata. Record numbers of failed plantings in each quadrat;

- Estimates of the success rate of plantings and natural regeneration, and assessment of plant replacement requirements;
- Weed abundance and locations of woody weeds and priority weeds in each management zone;
- Note areas where erosion control is inadequate and needed; and
- Recommendations for corrective measures and/or vegetation management.

Monitoring will be conducted before weed control commences to document the baseline condition of the subject site, then every six months for the life of the VMP (5 years). During the period of six-monthly monitoring, if maintenance weeding is conducted, each patch of land where weed control has occurred should be checked approximately a month afterwards, or after rain, in order to determine whether more weeding is required.

7.2 Reporting

Based on the results of six monthly/annual inspections the monitoring inspections a brief and concise annual report will be prepared and submitted to Wollongong City Council. This report will document the progress of restoration works and provide recommendations for the next year's works. The report will include the following:

- Describe the reconstruction works undertaken;
- State the findings of the monitoring activities;
- Discuss any problems encountered in implementing the VMP; and
- Recommend any adaptations or additions to the VMP.

The report should contain the photographs, as well as a short description of weeds in each quadrat and a short comparison of the photographs to the previous years. Any other notable occurrences of weeds should also be reported. The report should also recommend and prioritise areas where weed control should be targeted.

A final report will be prepared at the end of the five year maintenance period documenting the success of the works against performance criteria.

Following the completion of works under this five-year VMP, vegetation management and maintenance within the subject site is required in perpetuity under the current land zoning and protection zones.

Long term management should include ongoing weed control, assistive regeneration (if required) in areas where natural regeneration does not occur and monitoring. The frequency for each of these actions should be determined based on vegetation condition at the end of the life of this VMP and a new ongoing management plan should be prepared accordingly.

Figure 7.1. Indicative monitoring locations

Chapter 8

Timing and Responsibilities

The subject site is to be managed in a series of phases as follows:

- Phase 1 – Site preparation;
- Phase 2 – Vegetation management works;
- Phase 3 – Maintenance; and
- Phase 4 – Monitoring and reporting.

Timing and responsibilities at each phase of management within the management zones are shown within **Table 8.1** below.

Table 8.1 Timing and responsibilities

Action	Responsibility	Performance Criteria	Timing
Phase 1 Site Preparation			
Seed Collection	Bush Regeneration Contractor	Seed from native plants germinated (if applicable).	Immediately
Delineation of clearing boundary	Property Owner or Subcontractor	Marking using GPS and high visibility flagging tape and boundary markers.	Before construction works commence
Establish fixed monitoring points	Bush Regeneration Contractor or Ecologist	Using star pickets and GPS establish a series of monitoring sites that can be used for photograph comparison, measuring weed and plant retention.	Prior to commencement of vegetation management works
Clearance	Contractor	Removal of vegetation from the development area	TBC
Phase 2 – Vegetation			

Table 8.1 Timing and responsibilities

Action	Responsibility	Performance Criteria	Timing
Management			
Baseline vegetation monitoring	Bush Regeneration Contractor	Photographs of monitoring points before initial weeding.	Prior to commencement of vegetation management in each zone
Primary weeding	Bush Regeneration Contractor	Main weed infestations and noxious weeds and WONS removed - Reproductively mature plants absent from site.	First two months of vegetation management works
Revegetation	Bush Regeneration Contractor	Native plants have been planted (species from **Appendix C**) in all vegetation strata.	Following primary weeding
Vegetation monitoring	Bush Regeneration Contractor	Photographs of fixed monitoring sites to compare the survival and retention of plantings.	Every 6 months for Year 1&2 then annually for the life of the VMP.
Secondary weeding	Bush Regeneration Contractor	Weed regrowth following primary weeding removed. Work has commenced on control of annual weed species.	Following primary weeding, site visits monthly for year 1 and 2, then every two months for year 3 -5
Phase 3 – Maintenance			
Maintenance weeding throughout vegetation zones.	Bush Regeneration Contractor	Existing weed growth minimised or controlled. Regrowth following secondary weeding controlled. No new weed species or infestations.	monthly for year 1 and 2, then every two months for year 3 -5
Maintenance of plantings	Bush Regeneration Contractor	Any dead plantings replaced. Plants watered when	monthly for year 1 and 2, then every two months for

Table 8.1 Timing and responsibilities

Action	Responsibility	Performance Criteria	Timing
		drought stressed. Additional plantings where required due to observed gaps in any strata.	year 3 -5
Phase 4 - Monitoring and reporting			
Inspection of site.	Bushland Management or Ecologist	Site inspection completed as outlined in Chapter 6.	Every 6 months for Year 1&2, then annually over 5 year maintenance period of VMP
Progress report preparation	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works.	Annually for the 5 year maintenance period of VMP
Final Inspection of subject site	Bushland Management or Ecologist	Final Inspection carried out at completion of VMP.	After 5 years of maintenance under VMP
Final Report.	Bushland Management or Ecologist	Final report detailing success of restoration or outlining further works needed.	After 5 years of maintenance under VMP

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Peterson Bushfire. 2018. Bushfire Assessment - Sandon Point Concept Plan MO06 - 0094 MOD5.

Appendix A

Flora Species List

Table A.1 Native Plant Species recorded within the Subject Site

Family	Species Name	Common Name
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower
Apocynaceae	*Marsdenia rostrata*	Milk Vine
Apocynaceae	*Tylophora barbata*	Bearded Tylophora
Araceae	*Gymnostachys anceps*	Settler's Twine
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine
Blechnaceae	*Doodia aspera*	Prickly Rasp Fern
Convolvulaceae	*Dichondra repens*	Kidney Weed
Cyperaceae	*Carex longebrachiata*	
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine
Fabaceae (Mimosoideae)	*Acacia longifolia subsp. sophorae*	Coastal Wattle
Fabaceae (Mimosoideae)	*Acacia maidenii*	Maiden's Wattle
Lamiaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea
Myrsinaceae	*Myrsine variabilis*	
Myrtaceae	*Eucalyptus pilularis*	Blackbutt
Myrtaceae	*Syncarpia glomulifera*	Turpentine
Oleaceae	*Notelaea venosa*	Veined Mock-olive
Phormiaceae	*Dianella caerulea var. producta*	
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree
Pittosporaceae	*Pittosporum revolutum*	Rough Fruit Pittosporum
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Poaceae	*Cynodon dactylon*	Common Couch
Poaceae	*Imperata cylindrica*	Blady Grass
Poaceae	*Microlaena stipoides*	Weeping Grass
Poaceae	*Oplismenus aemulus*	Australian Basket Grass
Poaceae	*Oplismenus imbecillis*	Creeping Beard Grass

Table A.1 Native Plant Species recorded within the Subject Site

Family	Species Name	Common Name
Ranunculaceae	*Clematis aristata*	Old Man's Beard
Rutaceae	*Acronychia oblongifolia*	White Aspen
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
Sapindaceae	*Guioa semiglauca*	Guioa
Violaceae	*Viola hederacea*	Ivy-leaved Violet

Appendix B

Weed Species Recorded and Control Methods

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
Anthericaceae	Chlorophytum comosum	Spider Plant	-	Hand removal with hand tools. Ensure all roots and runners are removed and disposed of correctly offsite.
Apocynaceae	Gomphocarpus fruticosus	Narrow-leaved Cotton Bush	-	Spot Spray Glyphosate F10/1L, Cut and Paint Glyphosate 50mL/100mL, Hand Weed Juveniles.
Asparagaceae	Asparagus aethiopicus	Asparagus Fern	SP	Dig out with hand tools - Care needs to be taken to remove all tuberous masses and rhizomes. Tuberous masses need soil excavation around and careful levering with hand tools to remove without leaving plant material behind to resprout.
Asteraceae	Ageratina adenophora	Crofton Weed	OWOC	Hand Weed, Spot Spray with Glyphosate 5mL/1L, Slash large individuals with brushcutter and spray regrowth foliage with Glyphosate 5mL/1L
Asteraceae	Ageratina riparia	Mistflower		Hand Weed, Spot Spray with Glyphosate 5mL/1L, Slash large individuals with brushcutter and spray regrowth foliage with Glyphosate 5mL/1L
Asteraceae	Cirsium vulgare	Spear Thistle	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Asteraceae	Conyza sumatrensis	Tall fleabane	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Asteraceae	Hypochaeris radicata	Catsear	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Caprifoliaceae	Lonicera japonica	Japanese Honeysuckle	-	Hand weed seedlings, Cut and scrape vine stems with undiluted glyphosphate, Spray low lying foliage, regrowth foliage, and seedlings with Glyphosphate & metsulfuron methyl(e.g. Brush-Off) 10.5g/10L &

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
				non ionic surfactant Roots of plant can be dug up.
Caryophyllaceae	Paronychia brasiliana	Chilean Whitlow Wort, Brazilian Whitlow	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Convolvulaceae	Ipomoea indica	Morning Glory	OWOC	Hand pull taking care to remove root system and stem - plant will resprout from stem segments not removed from site, Cut vine at 1m or less above ground height and pull remaining plant out of the ground at the roots, Spray any ground hugging vines with Glyphosate 10mL/1L (will require follow up spraying of regrowth over several months as plant will resprout).
Euphorbiaceae	Euphorbia peplus	Petty Spurge	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Fabaceae (Caesalpinioideae)	Senna pendula var. glabrata	-	-	Hand weed juveniles, spray juvenile individuals with glyphosphate '10mL/1L, Cut and paint mature individuals with undiluted glyphosphate.
Fabaceae (Faboideae)	Ulex europaeus	Gorse	SP	Hand removal, cut and paint stump with Glyphosate, slash large individuals.
Gentianaceae	Centaurium tenuiflorum	Branched Centaury, Slender centaury	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Iridaceae	Aristea ecklonii	-	OWOC	Hand weed/crown out small patches. Herbicide application (Weed wipe) of large patches 1g Metsulfuron-methyl 600g/kg + 150ml Glyphosate + 10ml penetrant/10L. Herbicide application (Spray) 3g Metsulfuron-methyl 600g/kg + 150ml Glyphosate + 10ml penetrant/10L
Iridaceae	Dietes spp.	-	-	Hand Weed, Spot Spray with Glyphosate 10mL/1

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
Lauraceae	Cinnamomum camphora	Camphor Laurel	-	Hand weed juveniles, spray juvenile individuals with glyphosphate '10mL/1L, Cut and paint mature individuals with undiluted glyphosphate, Cut shrub and mature individuals as close to ground as possible with loppers or Hand saw and treat stump with undiluted glyphosphate, Drill holes with power Drill with thick Drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosphate.
Malvaceae	Modiola caroliniana	Red-flowered Mallow	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Malvaceae	Sida rhombifolia	Paddy's Lucerne	-	Hand Weed, Spot Spray with Glyphosate 10mL/1, Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted Glyphosate
Myrsinaceae	Lysimachia arvensis	Scarlet Pimpernel	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Ochnaceae	Ochna serrulata	Mickey Mouse Plant	-	Stems of all juvenile and mature plants should be scraped and painted with undiluted glyphosphate - follow up treatment may be needed on regrowth stems around base of plant in following monthly site visits.
Oleaceae	Ligustrum lucidum	Large-leaved Privet	-	Hand weed juveniles, spray juvenile individuals with glyphosphate '10mL/1L, Cut and paint mature individuals with undiluted glyphosphate, Cut shrub and mature individuals as close to ground as possible with loppers or Hand saw and treat stump with undiluted glyphosphate, Drill holes with power Drill with thick Drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosphate. Once glyphosphate has been absorbed refill holes with undiluted glyphosphate several times.

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
Oleaceae	Ligustrum sinense	Small-leaved Privet	-	Hand weed juveniles, spray juvenile individuals with glyphosphate '10mL/1L, Cut and paint mature individuals with undiluted glyphosphate, Cut shrub and mature individuals as close to ground as possible with loppers or Hand saw and treat stump with undiluted glyphosphate, Drill holes with power Drill with thick Drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosphate. Once glyphosphate has been absorbed refill holes with undiluted glyphosphate several times.
Oleaceae	Olea europaea subsp. cuspidata	African Olive	-	Spray juveniles with glyphosphate 10mL/1L, Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosphate, Drill holes with power drill with thick drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosphate. Once glyphosphate has been absorbed refill holes with undiluted glyphosphate several times.
Oxalidaceae	Oxalis corniculata	Creeping Oxalis	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Passifloraceae	Passiflora suberosa	Cork Passionfruit	-	Hand pull taking care to remove root system and stem - plant will resprout from stem segments not removed from site, Cut vine at 1m or less above ground height and pull remaining plant out of the ground at the roots, Spray any ground hugging vines with Glyphosate 10mL/1L (will require follow up spraying of regrowth over several months as plant will resprout).
Plantaginaceae	Plantago lanceolata	Lamb's Tongues	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Plantaginaceae	Veronica arvensis	Wall Speedwell	-	Hand Weed, Spot Spray with Glyphosate 10mL/1

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
Poaceae	Andropogon virginicus	Whisky Grass		Hand Weed Spot Spray with Glyphosate 10mL/1
Poaceae	Axonopus fissifolius	Narrow-leafed Carpet Grass	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Briza subaristata		-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Cenchrus clandestinus	Kikuyu Grass	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Ehrharta erecta	Panic Veldtgrass	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Eleusine indica	Crowsfoot Grass	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Paspalum dilatatum	Paspalum	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Setaria parviflora	-	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Poaceae	Stenotaphrum secundatum	Buffalo Grass	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Rosaceae	Rubus fruticosus sp. agg.	Blackberry complex	SP	It is possible to spray with 10mL/1L Glyphosate however it will leave dangerous thorned stems, Wearing thick clothing and leather glove uses loppers to cut close to base and apply undiluted Glyphosate to cut stems (remove cut foliage and stems cautiously), Spray regrowth foliage with Glyphosate 10mL/1L
Scrophulariaceae	Verbascum virgatum	Twiggy Mullein	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Solanaceae	Solanum mauritianum	Wild Tobacco Bush	-	When working with this plant additional PPE may be required as some individuals are sensitive to the shedding fine hairs of the species - Recommended PPE is a dust mask, long sleeve shirt and pants + gloves, Hand weed juveniles, Mature individuals can be cut and painted with Glyphosate 10mL/1L.

Table B.1 Weed species recorded within the subject site and their relevant treatment methods

Family	Scientific Name	Common Name	Status	Control Methods
Solanaceae	Solanum nigrum	Black-berry Nightshade	-	Hand Weed, Spot Spray with Glyphosate 10mL/1
Verbenaceae	Lantana camara	Lantana	SP	Hand weed juveniles and regrowth from small pieces, Cut near ground level and paint with undiluted glyphosphate, Some individuals will have stumps which will still regrow foliage, spray regrowth foliage with glyphosphate 10mL/1L, Slash using brushcutter, or hand cut with loppers, and spray regrowth foliage with glyphosphate 10mL/1L.
Verbenaceae	Verbena bonariensis	Purpletop	-	Hand Weed, Spot Spray with Glyphosate 10mL/1, cut large individuals and paint with undiluted Glyphosate
Zingiberaceae	Hedychium gardnerianum	Ginger Lily	-	Cut, bag, and remove mature seed heads from plants, Dig up with mattock or hand pull mature plants, taking care to remove all fleshy rhizomes. Rhizomes need to be removed from site, or crushed and piled on site to rot (monitor for regrowth)Cut plant as close to rhizome as possible and treat with undiluted metsulfuron methyl at 6g/1 L (winter) or 1g/1 L (summer).

Note: Includes species recorded in the wider Angliclare property that may spread into the subject site.

Appendix C

Species Planting List

Table C.1 Proposed Planting List

Vegetation Zone	Scientific Name	Common Name
Freshwater Wetland	*Baumea articulata*	Jointed Twig Rush
	Carex appressa	Tussock Sedge
	Eleocharis sphacelata	
	Phragmites australis	Common Reed
	Schoenoplectus mucronatus	Sedge
	Tetragonia tetragonioides	Warragul Greens
	Typha orientalis	Cumbungi
Turpentine Forest	*Acacia maidenii*	Maiden's Wattle
	Allocasuarina torulosa	Forest Oak
	Breynia oblongifolia	Coffee Bush
	Calochlaena dubia	Rainbow Fern
	Carex longebrachiata	
	Clematis glycinoides	Headache Vine
	Clerodendrum tomentosum	Hairy Clerodendrum
	Commelina cyanea	Native Wandering Jew
	Dianella caerulea	Blue Flax-lily
	Dichondra repens	Kidney Weed
	Doodia aspera	Prickly Rasp Fern
	Entolasia marginata	Bordered Panic
	Eucalyptus paniculata subsp. *paniculata*	Grey Ironbark
	Eucalyptus pilularis	Blackbutt
	Eustrephus latifolius	Wombat Berry
	Geitonoplesium cymosum	Scrambling Lily
	Hibbertia dentata	Trailing Guinea Flower
	Hibbertia scandens	Climbing Guinea Flower
	Imperata cylindrica	Blady Grass
	Lomandra longifolia	Spiny-headed Mat-rush
	Marsdenia rostrata	Milk Vine
	Myrsine variabilis	
	Notelaea venosa	Veined Mock-olive
	Oplismenus imbecillis	
	Pandorea pandorana subsp. *pandorana*	Wonga Wonga Vine

Table C.1 Proposed Planting List

Vegetation Zone	Scientific Name	Common Name
	Pittosporum revolutum	Rough-fruit Pittosporum
	Pittosporum undulatum	Sweet Pittosporum
	Pseuderanthemum variabile	Pastel Flower
	Rubus parvifolius	Native Raspberry
	Smilax australis	Lawyer Vine
	Stephania japonica var. *discolor*	Snake Vine
	Syncarpia glomulifera	Turpentine
	Synoum glandulosum subsp. *glandulosum*	Scentless Rosewood
	Trochocarpa laurina	Tree Heath
	Tylophora barbata	Bearded Tylophora
Swamp Oak Floodplain Forest		
	Acmena smithii	Lilly Pilly
	Alphitonia excelsa	Red Ash
	Alternanthera denticulata	Lesser Joyweed
	Apium prostratum	Sea Celery
	Atriplex australasica	
	Baumea juncea	
	Blechnum indicum	Swamp Water Fern
	Callistemon salignus	Willow Bottlebrush
	Calystegia sepium	
	Carex appressa	Tall Sedge
	Casuarina glauca	Swamp Oak
	Centella asiatica	Indian Pennywort
	Commelina cyanea	Native Wandering Jew
	Crinum pedunculatum	Swamp Lily
	Cupaniopsis anacardioides	Tuckeroo
	Dianella caerulea	Blue Flax-lily
	Entolasia marginata	Bordered Panic
	Enydra fluctuans	
	Eustrephus latifolius	Wombat Berry
	Gahnia clarkei	Tall Saw-sedge
	Geitonoplesium cymosum	Scrambling Lily

Table C.1 Proposed Planting List

Vegetation Zone	Scientific Name	Common Name
	Glochidion ferdinandi	Cheese Tree
	Hypolepis muelleri	Harsh Ground Fern
	Imperata cylindrica	Blady Grass
	Isolepis inundata	Club-rush
	Juncus kraussii subsp. *australiensis*	Sea Rush
	Juncus planifolius	
	Juncus usitatus	
	Lobelia anceps	
	Lomandra longifolia	Spiny-headed Mat-rush
	Lophostemon suaveolens	Swamp Mahogany, Swamp Turpentine
	Marsdenia rostrata	Milk Vine
	Maundia triglochinoides	
	Melaleuca ericifolia	Swamp Paperbark
	Melaleuca styphelioides	Prickly-leaved Tea Tree
	Myoporum acuminatum	Boobialla
	Notelaea venosa	Veined Mock-olive
	Oplismenus imbecillis	
	Pandorea pandorana subsp. *pandorana*	Wonga Wonga Vine
	Parsonsia straminea	Common Silkpod
	Persicaria decipiens	Slender Knotweed
	Persicaria strigosa	
	Phragmites australis	Common Reed
	Pittosporum undulatum	Sweet Pittosporum
	Pseuderanthemum variabile	Pastel Flower
	Samolus repens	Creeping Brookweed
	Selliera radicans	Swamp Weed
	Smilax australis	Lawyer Vine
	Sporobolus virginicus	
	Stephania japonica var. *discolor*	Snake Vine
	Tetragonia tetragonioides	New Zealand Spinach
	Viola banksii	