LOT 16 DP849870, 45-59 DIAMOND CRESENT, BONNYRIGG

Bushland Management Plan

For:

Proust & Gardner Consulting Pty Ltd

June 2015

Final

PO Box 2474
Carlingford Court 2118

Report No. 14129RP1

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.

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Position: Director

Signed: David Robertson

Date: *4 June, 2015*

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Chapter 1

Introduction

1.1 Purpose

Cumberland Ecology has been commissioned by Proust and Gardner Consulting Pty Ltd to develop a Bushland Management Plan (BMP) to satisfy draft conditions of consent issued by Fairfield City Council (Council) for the residential subdivision of lot 16 DP849870, located at 45 – 59 Diamond Crescent, on the corner of Henty Place, Bonnyrigg (referred to as the 'Subject Site'), as shown in **Figure 1.1**. The Subject Site is 5.36ha in size and is located within Fairfield City Council with the Liverpool to Parramatta Transit Way to the northwest, Henty Place to the northeast and urban development to the south and southwest.

The Subject Site is currently zoned under Fairfield LEP as E2 – Environmental Conservation and partly R2 – Low Density Residential. The subdivision will create 41 residential lots within R2 zoned land (referred to as the 'Residential Area'), and one (1) residual lot within the E2 zoned land (referred to as the 'Conservation Area'), as shown in **Figure 1.2**. The Conservation Area is proposed as a public reserve, to be managed by Council, and will include a walking path and associated infrastructure.

This BMP primarily guides the restoration and management of native vegetation retained within the Conservation Area. It also guides the management of native vegetation across the Subject Site during construction works, and ongoing management of vegetation located within the defendable space line (DSL), which is required for bushfire protection.

The BMP consists of three components, a Weed Management Plan (WMP), a Revegetation Plan, and a Bushfire Management Plan, to instruct the revegetation of areas of Cumberland Plain Woodland and River-flat Eucalypt Forest totalling approximately 2,680m^2.

1.2 Background

The Subject Site contains Cumberland Plain Woodland (CPW), which is listed as a Critically Endangered Ecological Community under both the *NSW Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and River Flat Eucalypt Forest (RFEF) and Freshwater Wetlands (FW), both of which are listed as endangered ecological communities under the TSC Act. Collectively, the listed ecological communities are referred to as Threatened Ecological Communities (TECs) for the purposes of this report.

A development application (DA) for the subdivision of the Subject Site was submitted in 2013. As part of the DA, the vast majority of this vegetation will be retained within the Conservation Area, but a small area will also be removed or modified at the edges of the Residential Area to maintain a DSL for the purposes of bushfire protection. A plan of the subdivision is shown in **Figure 1.3**.

A Flora and Fauna Impact Assessment report was prepared by GIS Environmental Consultants (GIS Environmental Consultants 2013) for the DA. In March 2014, Cumberland Ecology conducted vegetation mapping of the Subject Site and prepared an Assessment of Impacts to Vegetation to support a Bushfire Protection Assessment for the subdivision that was prepared by Australian Bushfire Protection Planners (2014) and submitted to the NSW Rural Fire Service for its consideration.

The DA was approved by Fairfield City Council in October 2014 and draft Conditions of Consent were issued. This BMP will address all relevant conditions of consent made by Council to guide the management of vegetation to be retained on the Subject Site and also the regeneration of CPW and RFEF within the Conservation Area. Additionally, a Bushland Management during Construction Plan was required for submission prior to issue of the construction certificate. This plan was prepared to guide the induction of site personnel, protect retained trees on the Subject Site and in the Conservation Area and DSL, and protect fauna species during the construction works (Cumberland Ecology 2014b). A specific Cumberland Plain Land Snail Translocation Plan was also included (Cumberland Ecology 2014b). The Bushland Management During Construction Plan was submitted to Fairfield City Council in November 2014 (Cumberland Ecology 2014b).

The list of conditions of consent made by Council and where they are addressed in this BMP are identified in **Table 1.1**

Table 1.1 Consent Conditions of Relevance to this BMP

Consent Condition Number	Condition Details
5. Bushland Management Plan	Prior to the issue of a subdivision certificate a Bushland Management Plan (BMP) is to be prepared for proposed Lot 42 in the Plan of Proposed Subdivision. This BMP is to be submitted to Council's Natural Resources Unit for review. The BMP is to include the following: (a) Proposals for revegetating approximately 1,570 square metres of land as shown as Proposed Revegetation on the Plan of Proposed Subdivision Drawing No 23034 – DA- 101 Issue A dated May 2014 (b) Means of stabilising the drainage line in the southern portion of proposed Lot 42 and revegetating with suitable local native species (c) A Bushfire Management Plan in accordance with recommendation of

Table 1.1 Consent Conditions of Relevance to this BMP

Consent Condition Number	Condition Details
	Bushfire Protection Assessment for the Forty two lot Subdivision of Lot 16 in DP 849870 Henty Place & Diamond Crescent Bonnyrigg by Australian Bushfire Protection Planners Pty Limited dated 24 March 2014 and which is to identify the fuel management protocols necessary to maintain the vegetation within the reserve to an Overall Fuel Hazard level of moderate, in accordance with the specifications provided in the Overall Fuel Hazard Assessment Guide – Department of Sustainability and Environment [Victoria] – 4th Edition July 2010 and in accordance with Condition No 6. (d) Means of retaining trees of ecological significance within the Defendable Space Line in accordance with recommendations of the Tree Assessment and Management Report Revised & Updated July 2014 in particular trees T4, T5, T8, T16, T26 are to be retained unless their removal is required by the Bushfire Management Plan. (e) Proposals for the long term management of Lot 42 for the conservation of the high ecological values including the Endangered Ecological Communities and Threatened Species that occur on the site (f) The provision of fencing to control access to the areas of vegetation and regrowth having regard to the location of pathways along the edge of the reserve and the management of access for bushfire asset protection; (g) quantifiable goals for weed removal and regeneration; (h) the minimum qualifications of the bush regeneration workers to be used; (i) pre post and during construction ecological monitoring and certification;

Table 1.1 Consent Conditions of Relevance to this BMP

Consent Condition Number	Condition Details
	(j) long-term management work for Lot 42 including weed control, bush regeneration qualification specifications, specific management for each Threatened Species and Endangered Ecological Community, timetable of annual quantifiable ecological data collection for long-term monitoring (min of five years), fire regimes, permanent fencing and permanent signage requirements (k) Permanent signage at any access points to Lot 42 to educate the future lots owners and the general public and create awareness and appreciation of the ecological values of the Council Reserve. The Bushland Management Report should be consistent with the CPW Recovery Plan, the document titled Recovering bushland on the Cumberland Plain, best practise guidelines for the management and restoration of bushland by OEH, the recommendations of the Review of Environmental Factors for the Fairfield Bushland Regeneration Program and the Fairfield Biodiversity Strategy (2010). An appropriate method such as making Lot 42 a bushland reserve for the permanent management of the Endangered Ecological Communities and Threatened Species habitat on the site and to ensure the long-term success of the revegetation and appropriate management of the threatened species and communities on Lot 42 is to be implemented by Council prior to the issue of the subdivision certificate.
6. Bushfire Management	Prior to the issue of a subdivision certificate, a Bushfire Plan of Management shall be prepared by a suitably qualified consultant with regard to fuel management within the proposed public reserve Lot 42 and adjoining residential lots.

Table 1.1 Consent Conditions of Relevance to this BMP

Consent Condition Number	Condition Details
	The Bushfire Plan of Management shall include the provision of a 15m Defendable Space as illustrated in the subdivision plan prepared by Proust & Gardner numbered 23034-LAYOUT-L dated 5 March 2014. The Defendable Space shall be maintained as an Inner Protection Area in accordance with Appendix A5.5 of Planning for Bushfire Protection 2006 and the Rural Fire Service document "Standards for Asset Protection Zones". The Plan of Management is to be incorporated into the Bushland Management Plan in so far as it affects proposed Lot 42.
	Prior to the issue of a subdivision certificate, the recommendations of the report entitled Bushfire Protection Assessment for the Forty two lot Subdivision of Lot 16 in DP 849870 Henty Place & Diamond Crescent Bonnyrigg by Australian Bushfire Protection Planners Pty Limited dated 24 March 2014 are to be implemented.
	Notwithstanding Recommendation 5 of the recommendations of the report entitled Bushfire Protection Assessment for the Forty two lot Subdivision of Lot 16 in DP 849870 Henty Place & Diamond Crescent Bonnyrigg by Australian Bushfire Protection Planners Pty Limited dated 24 March 2014 the 4 metre wide pavement width can comprise a concrete pathway 2.5 wide with the balance of the 4 metres being a compacted gravel base providing a stable pavement for fire fighting vehicles. This compacted base can be topsoiled and turfed and is to be located so as to minimise impacts on trees of ecological significance.
	A Restriction on Use is to be created over all lots affected by the Defendable Space including proposed lots 7, 10, 40, 41, 33, 34, 35, 32, 23 pursuant to Section 88 of the Conveyancing Act, 1919, requiring that the Defendable Space shall be maintained as an Inner Protection Area in accordance with Appendix A5.5 of Planning for Bushfire Protection 2006 and the Rural Fire Service document "Standards for Asset Protection Zones".

In summary, the following objectives have been included in the BMP:

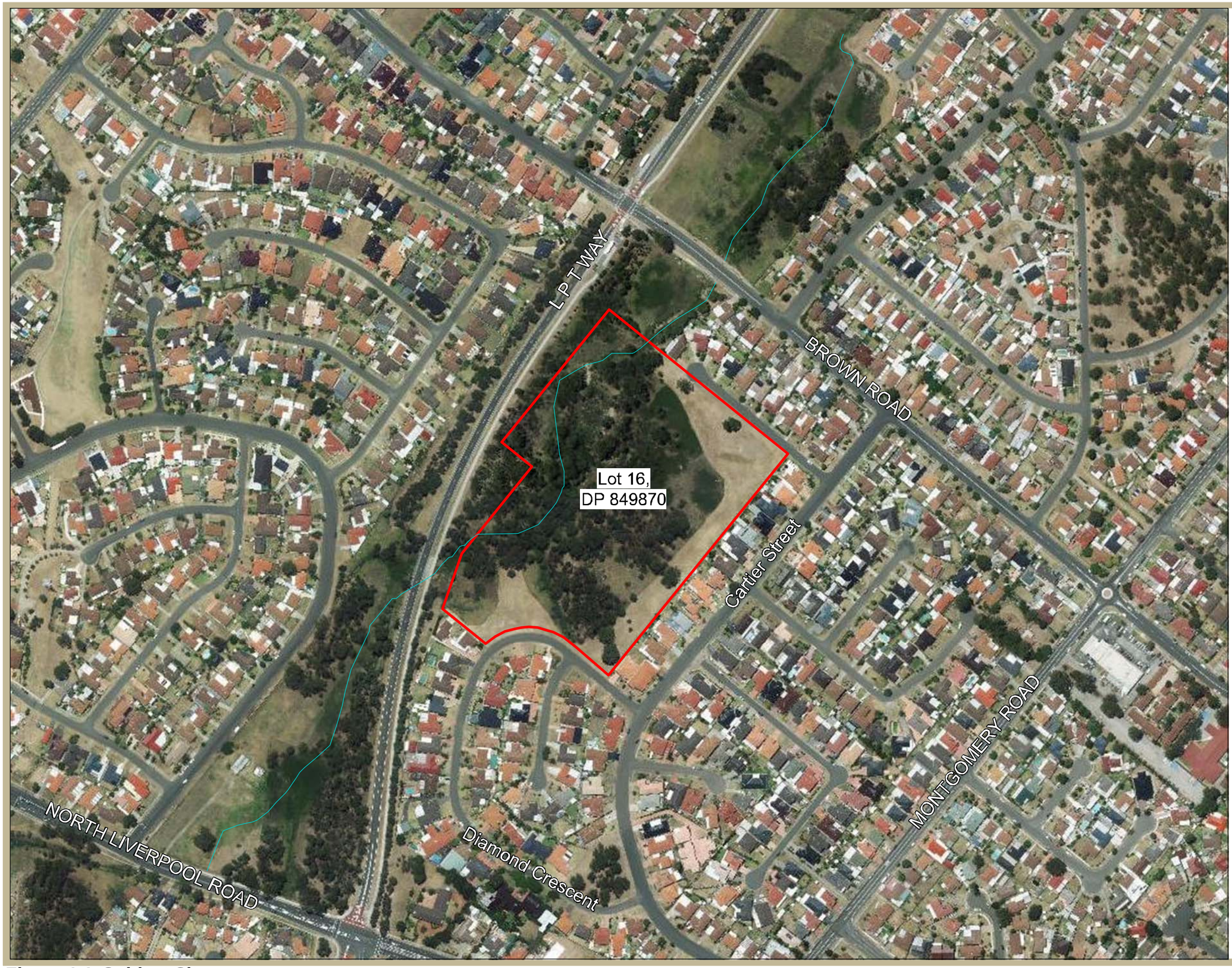
- Revegetation of 1,570m^2 of CPW and RFEF within the Conservation Area, in areas identified as Proposed Revegetation Area A in **Figure 1.3**;
- Stabilisation and revegetation of 1,110m^2 of RFEF surrounding the drainage line identified as Proposed Revegetation Area B in **Figure 1.3**;
- Bushfire management activities to be implemented in accordance with the Bushfire Protection Assessment Report prepared by Australian Bushfire Protection Planners Pty Ltd (ABPP);
- Retention of all ecologically significant trees within the DSL;
- Provision of fencing to control access to rehabilitation areas;
- Establishment of quantifiable goals for weed removal and regeneration;
- Implementation of pre, post and during construction ecological monitoring and certification;
- Long-term bushland management plans for implementation in the Conservation Area; and
- Installation of permanent signage to educate future land owners and the public of the ecological significance of the reserve.

1.3 Application of the BMP

The BMP applies to all native vegetation on the Subject Site during the construction phase, and exclusively to the Conservation Area and DSL in the longer term, with the exception of the Revegetation Plan which applies only to the Proposed Revegetation Area A and Area B as seen in **Figure 1.3**. Revegetation of CPW and RFEF within the Proposed Revegetation areas will occur to offset the loss of vegetation due to the DSL and improve the connectivity of the existing vegetation. The application of the BMP on the Subject Site will increase the ecological values of the site and provide habitat for local fauna species, including the *TSC Act* listed Cumberland Plain Land Snail (*Meridolum corneovirens*). The management period of the BMP will apply for a time period of five years.

All site works are to be conducted by qualified personnel. An experienced Bush Regeneration Contractor, who has completed a recognised course in bushregeneration and with at least 500hrs over 2 years experience in native vegetation community restoration, should oversee the on-ground works, as outlined in the WMP (Chapter 4) and Revegetation Plan (Chapter 5).

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Subject Site
- Waterway

Grid North

Image Source:
Image © SIX Maps
(dated 4-1-2014)

CUMBERLAND ECOLOGY

I:\...\14129\Figures\RP1\20141028\Figure 1.1

Figure 1.1. Subject Site

50 0 50 100 150 200 m

Coordinate System: MGA Zone 56 (GDA 94)

Conservation Area

Residential Area

Legend

- Subject Site
- DSL/ APZ
- Conservation and Residential Boundary
- Subdivision Concept Plan
- Cumberland Plain Land Snail

Trees

- Retained
- Removed

Grid North

Image Source:
Image © SIX Maps
(dated 4-1-2014)

Data Source:
© Fairfield City Council (2012).
Fairfield Local Environmental
Plan 2013 - Land Zoning Map

GIS Environmental Consultants (2013).
Flora and Fauna Impact Assessment.

CUMBERLAND ECOLOGY

I:\...\14129\Figures\RP1\20150123\Figure 1.2

Figure 1.2. Proposed Subdivision

20 0 20 40 60 80 m

Coordinate System: MGA Zone 56 (GDA 94)

Grid North

Legend

- Subject Site
- DSL/ APZ
- Channel Works Area
- Subdivision Concept Plan

Proposed Revegetation

- Area A
- Area B

EECs

- River flat Eucalypt Forest
- Cumberland Plain Woodland
- Freshwater Wetland

Image Source:
Image © SIX Maps
(dated 4-1-2014)

Data Source:
©ABPP (2013). Bushfire Protection Assessment.

GIS Environmental Consultants (2013). Flora and Fauna Impact Assessment.

CUMBERLAND ECOLOGY

20 0 20 40 60 80 m

I:\...\14129\Figures\RP1\20150602\Figure 1.3. Lot Labels, Reveg Areas, EECs

Figure 1.3. Lot Labels, DSL/ APZ, Revegetation Areas and EECs

Chapter 2

Methodology

2.1 Literature Review

The preparation of the BMP involved a literature review to assist with site characteristics and determine the most up to date methods of weed control for exotic species that are present on the Subject Site, and identify bushfire management guidelines. This literature review utilised a variety of sources including government fact sheets and websites including:

- PlantNET (Botanic Gardens Trust 2014);
- Atlas of NSW Wildlife (OEH 2014);
- Flora & Fauna Impact Assessment Henty Place and Diamond Crescent, Bonnyrigg (GIS Environmental Consultants 2013);
- Assessment of Impacts Henty Place and Diamond Crescent, Bonnyrigg (Cumberland Ecology 2014a);
- Bushfire Management Plan (ABPP 2014); and
- Noxious Weed Declarations (NSW Department of Primary Industries 2014).

2.2 Site Survey

A site inspection was undertaken by botanist Bryan Furchet and ecologist Mikael Peck from Cumberland Ecology on 22 October 2014. The survey consisted of a random meander transect across the site.

The purpose of the site inspection was to:

- Establish photo reference points (see ***Section 2.3***);
- Identify areas of high weed density; and
- Map Weeds of National Significance (WONS) and noxious weeds identified under the NSW *Noxious Weeds Act 1993* (NW Act).

2.3 Photo Reference Points

Photo reference points have been established within the varying vegetation types in the Conservation Area, and their locations are identified in **Figure 2.1**. These photo reference points are to be used as a visual and quantitative assessment of the progress of the works outlined in the BMP. From each of the photo reference points a photo has been taken pointing directly north (**Appendix A**). Visual markers for photo reference points on the ground are generally composed of star pickets that have been flagged with tape or spray painted to be clearly visible. No star pickets were installed during the initial site visit, but they should be installed at the approximate points of the GPS locations in **Table 2.1** by the Bushland Regeneration Contractor (BRC) upon initiation of the BMP.

Table 2.1 Location and description of photo reference points

Reference Point Number	Description	Direction	Easting	Northing
1	In RFEF facing into CPW	north	303796	6247348
2	In Regeneration area facing into RFEF area along Clear Paddock Creek	north	303827	6247327
3	In Regeneration area facing into CPW	north	303872	6247319
4	In RFEF facing into CPW along Clear Paddock Creek	north	303849	6247392
5	Edge of CPW facing into FW	north	303882	6247452

Coordinate System: MGA Zone 56 (GDA 94)

Legend

- Subject Site
- Proposed Revegetation
- Proposed Fence
- Photo Reference Point

Vegetation Community

- River flat Eucalypt Forest
- Cumberland Plain Woodland
- Freshwater Wetland

Grid North

Image Source:
Image © SIX Maps
(dated 4-1-2014)

Data Source:
© ABPP (2013). Bushfire Protection Assessment

CUMBERLAND ECOLOGY

I:\...\14129\Figures\RP1\20150123\Figure 2.1

Figure 2.1. Photo Reference Point Locations

20 0 20 40 60 80 m

Chapter 3

Site Description

The Subject Site is located within Lot 16 in DP 849870, which is located at 45-59 Diamond Crescent, Bonnyrigg as seen in **Figure 1.1**. The Subject Site is 5.36ha in size and is bounded by Diamond Crescent, Cartier St., Hently Pl., and the Liverpool to Parramatta Transit Way, in Bonnyrigg. Its surroundings are comprised primarily of residential dwellings, and within the Subject Site exists a dam and Clear Paddock Creek.

Vegetation mapping was undertaken by GIS Environmental Consultants in March 2013 as part of a Flora and Fauna Impact Assessment (GIS Environmental Consultants 2013). Cumberland Ecology verified the vegetation mapping as part of an Assessment of Impacts to Vegetation in March 2014 (Cumberland Ecology 2014a). The vegetation was further verified during a site inspection by Cumberland Ecology in October 2014. The following vegetation descriptions are summarised from the Flora and Fauna Impact Assessment prepared by GIS Environmental Consultants (2013), with the exception of the weed coverage section (**Section 3.6**).

The remnant vegetation within the Subject Site occurs as patches of CPW, RFEF and FW, in varied condition, and is separated by areas of exotic dominated grassland. Only very small areas of RFEF and CPW will be directly impacted by the subdivision works, for the establishment of a DSL, however, the patch of FW will not be directly impacted.

3.1 Subject Site Vegetation

The vegetation on the Subject Site has been heavily disturbed in parts by weed invasion, removal of trees and removal of native shrub and ground cover vegetation, altered fire regimes, earthworks, and historic grazing. Areas within the Conservation Area contain high weed densities that consist of: *Tradescantia zebrine* (Wandering Jew), *Rubus fruticosus* aggregate (Blackberry), *Asparagus sp*. *Ligustrum sinense* (Small-leaved Privet), *Olea europaea subspecies cuspidata* (African Olive), and *Alternanthera philoxeroides* (Alligator Weed). The highest weed densities occur along the riparian corridors which are dominated by Wandering Jew and Alligator Weed (see **Figure 3.1**).

3.1.1 Threatened Ecological Communities

i. RFEF

Patches of RFEF occur as two separate areas of vegetation within the Subject Site (see **Figure 1.3**). Both patches contain RFEF characteristic species with the canopy mostly comprised of mature and immature *Eucalyptus moluccana* (Grey Box) trees. The patch of

RFEF located at the north east of the Subject Site has experienced past disturbance leading to a degraded groundcover layer, while the patch to the west contains areas of high weed infestation of Wandering Jew along the creek line. Three photo reference points were taken in the patch of RFEF located in the north west section of the Subject Site (**Appendix A and Figure 2.1).**

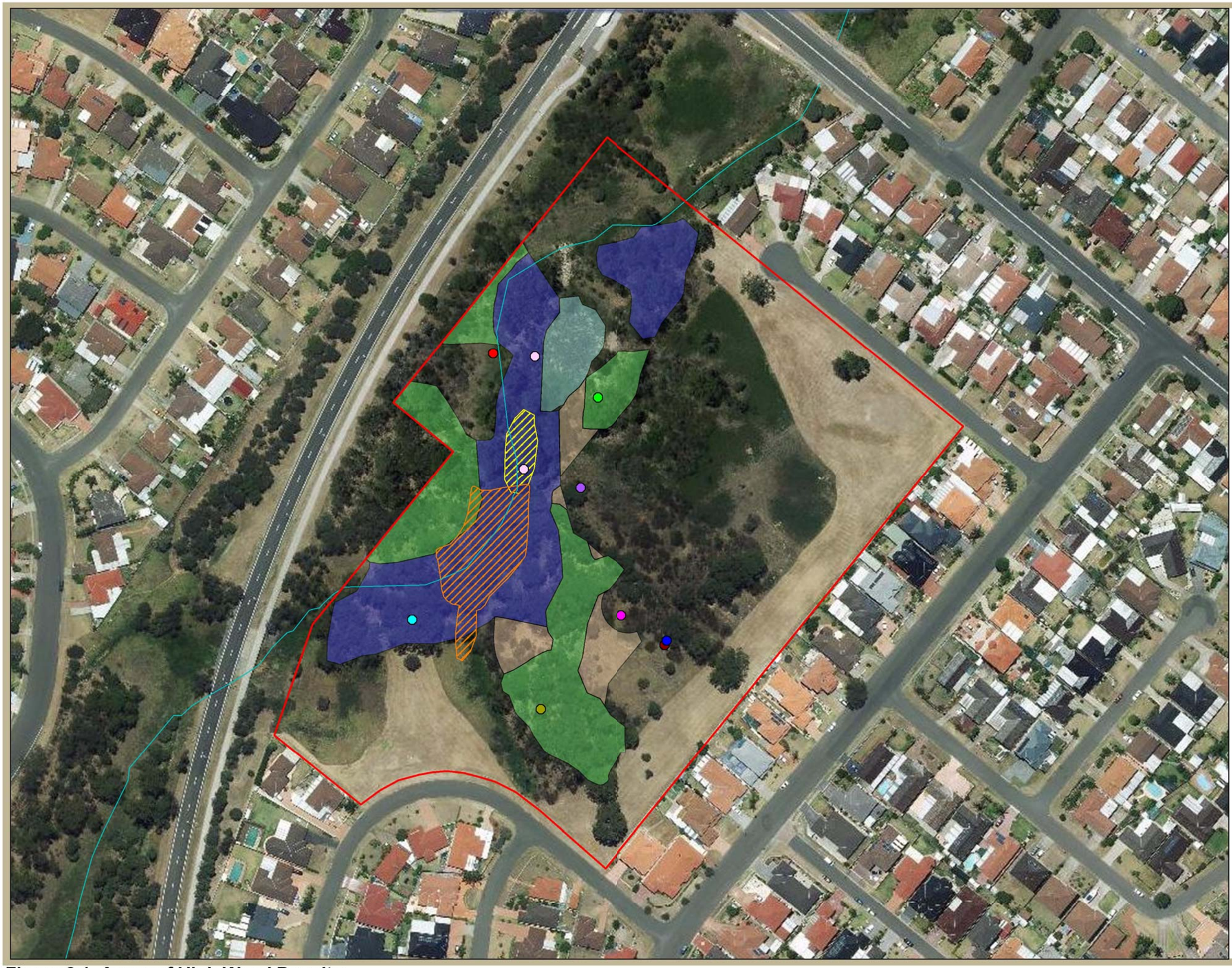
ii. CPW

Patches of CPW occur in four different areas within the Subject Site, but only two will be directly impacted by the proposed subdivision. Both areas of CPW to be impacted contain characteristic CPW species in all structural layers. The CPW located immediately adjacent to the proposed road and driveway infrastructure has undergone past disturbance, primarily to the topsoil, leading to weed invasion, while the CPW to the west is less disturbed and in better condition. Shells of the threatened Cumberland Plain Land Snail were also found in the area of CPW in the west. A photo reference point was taken on the boundary of CPW and proposed revegetation area located in the west of the Subject Site (**Appendix A and Figure 2.1).**

iii. FW

A patch of FW is located entirely within the Conservation Area and is comprised of a man-made dam within the floodplain of Clear Paddock Creek. It consists of moderately diverse characteristic FW species, weed species, and the presence of the pest fish species Plague Minnow (*Gambusia holbrooki*). This patch has low recovery potential due to the presence of Plague Minnow, which is difficult to eradicate especially in a floodplain. The wetland currently has no open water and is dominated by *Typha orientalis* and connects to Clear Paddock Creek in the southern and northern parts of the site. A photo reference point was taken on the boundary of FW (**Appendix A and Figure 2.1**).

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Subject Site
- Proposed Revegetation
- Waterway

Vegetation Community (ABPP 2013)

- River flat Eucalypt Forest
- Cumberland Plain Woodland
- Freshwater Wetland

Weed Locations

- Alligator Weed
- Wandering Jew
- African Olive/Moth Vine
- Asparagus
- Asparagus, Couch, Prairie Grass
- Blackberry
- Cactus sp.
- Crofton Weed
- Fireweed
- Rhodes grass
- Small Leaved Privet

Grid North

Image Source:
Image © SIX Maps
(dated 4-1-2014)

Data Source:
© ABPP (2013). Bushfire Protection Assessment

CUMBERLAND ECOLOGY

I:\...\14129\Figures\RP1\20141028\Figure 3.1

20 0 20 40 60 80 m

Figure 3.1. Areas of High Weed Density

Chapter 4

Weed Management Plan

4.1 Introduction

The entire Subject Site has been heavily disturbed by weeds due to natural and artificial disturbances. Areas located within Residential Area to be subdivided are primarily heavily disturbed grasslands with high weed densities of Blackberry and *Chloris gayana*. These areas have experienced extensive disturbances as they are directly adjacent to residential dwellings and roads. Conservation Area within the land to be conserved exhibits the highest weed densities in riparian areas along Clear Paddock Creek. These areas are dominated by Wandering Jew and Alligator Weed. The Weed Management Plan (WMP) outlines the steps and actions needed to manage these weeds, along with additional weeds present within the site.

4.2 Weed Control Measures

All works that can be safely managed should be undertaken by a suitably qualified bushland regeneration company. A list of weeds that occur on the site and relevant weed control methods can be found in **Appendix B**. 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 numbers are PER9907, PER11916, and PER11428. These permits need to be obtained from the Federal Government body, the Australian Pesticides and Veterinary Management Authority.

4.3 Initial Weed Management

4.3.1 Pre-construction Phase

Prior to construction, initial weed management will be carried out over the entire site. The weeds of primary concern occurring on the site are WONS and noxious weeds listed by Council and identified in **Tables 4.1 and 4.2**. As the construction process entails earthworks, the eradication of these weeds prior to earthworks will limit the exotic seed bank within the topsoil, thus limiting the dispersal of weed species throughout the site. All equipment entering the site, including hand tools and work boots will follow standard *Phytophthora cinnamomi* protocol. This will ensure that no vegetation material and/or loose soil will enter the site. Any

equipment onsite found to contain vegetation material or soil should be cleaned and treated with anti-fungal herbicides before leaving the site.

4.3.2 Construction Phase

During the construction phase, the primary form of weed control will be mechanical. Any emerging weeds identified following bulk earthworks should be controlled following the treatment methods outlined in **Appendix B**.

4.4 Ongoing Weed Management

Ongoing maintenance of the site should occur for the remainder of the maintenance period of the WMP, following the completion of the development. Maintenance is to be undertaken by a contracted bushland regeneration company, to diminish the soil seed bank of exotic weed species present on the site.

During the first year of maintenance site visits should occur at least twice each month with the visits spread out approximately every two weeks. This is required especially during the warmer, wetter months in spring and summer as some annual weed species can grow and develop seed within a three week period, and set large amounts of seed. 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.

After a year of maintenance when weed abundances have diminished on the site, site visits should occur once a month, until the end of 5 years of maintenance. If it is determined during the monitoring and reporting process (see **Chapter 7**) by the Bushland Management or Ecological Consultant at any point that annual and perennial weed populations have been reduced to minor occurrences, with no major weed outbreaks present, site visits can be scaled back to once every two months.

After 5 years of maintenance, site visits should be undertaken only when required to control any new or existing occurrences of weeds.

The most cost and time effective method of controlling weeds in bushland areas is by spraying a non-selective glyphosphate herbicide with a surfactant that is formulated for use in environmentally sensitive areas, such as Roundup Biactive or Clearup 360. Glyphosphate 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.

If spraying is undertaken in areas with dense native understorey, a cone shield needs to be used to direct herbicide spray directly onto weed species and avoid affecting native non-target species. Spraying should also be undertaken only on days with low wind speeds to prevent drift of herbicide onto non-target species.

Tree guards should remain around native plants that have been planted for 6 months (see **Chapter 5**). Tree guards protect plants from grazing by exotic herbivores, such as rabbits,

which can devastate revegetation areas soon after planting. Tree guards will also allow herbicide to be used for control of weeds in areas with native plantings, without damage to them occurring by herbicide drift.

The following sequential steps are recommended to manage the site effectively for each site visit:

- Work during each site visit should focus first on controlling weeds in the areas of the site with the most intact native vegetation.
- During each site visit the bushland regeneration team visiting the site should aim to sweep through the entire site. During this sweep weeds occurring within tree guards alongside planted native plants should be removed by hand, along with weeds occurring within dense patches of dominant native plants.
- A member or members of the team should then sweep the entire site spraying all weeds in open areas with herbicide using a knapsack sprayer.

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* are prolific seeders, and many exotic plants can have seed that remains viable in the soil for long periods of time. In order to effectively diminish the soil seed bank occurrences of exotic species it is important that individuals are not allowed to set seed. Mature weed individuals with seed present need to be bagged and removed.

During site visits for weed control, noxious weeds and WONS should be prioritised for control. Individual plants should not be allowed to achieve a reproductive stage in their life cycles.

4.5 Weeds of National Significance (WONS)

A total of six Weeds of National Significance were found to occur on site and are identified in the table below. WONS are categorised as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts. No legal requirements are required for WONS.

Table 4.1 WONS identified on Subject Site

Scientific Name	Common Name
Alternanthera philoxeroides	Alligator Weed
Asparagus aethiopicus	Asparagus 'Fern'
Asparagus asparagoides	Bridal Creeper
Lantana camara	Lantana
Rubus fruticosus	Blackberry Complex
Senecio madagascariensis	Fireweed

4.6 Noxious Weeds

A total of five noxious weeds identified by Council were found to occur on site and are outlined in the table below along with their legal requirements.

Table 4.2 Council listed noxious weeds on the Subject Site

Scientific Name	Common Name	Class	Legal Requirements
Alternanthera philoxeroides	Alligator Weed	3	The plant must be fully and continuously suppressed and destroyed.
Asparagus asparagoides	Bridal creeper	4	The plant must not be sold, propagated or knowingly distributed.
Lantana camara	Lantana	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.
Ligustrum sinense	Privet	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.
Rubus fruticosus (agg spp)	Blackberry	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

Chapter 5

Revegetation Plan

5.1 Introduction

The aim of the Revegetation Plan is to revegetate all areas identified as Proposed Revegetation Area A and Area B (**Figure 1.3**). The revegetation plan will supplement the WMP (Chapter 4) through planting native CPW and RFEF species in revegetation areas. Although FW exists within the Conservation Area, none will be removed during the project and will not be revegetated.

Areas to be revegetated as CPW and RFEF are identified in **Figure 1.3** as Proposed Revegetation Area A and Area B. In Area A, a total area of 470m^2 of RFEF and 1100m^2 of CPW will be revegetated. In Area B a total area of 1,110m^2 of a simplified form of RFEF will be revegetated to stabilise the drainage line at the southern end of the Subject Site.

Replanting of native species, especially groundcover species, is necessary as all regeneration areas are located near low lying areas with high weed densities, however in Proposed Revegetation Area B the planting ratio of shrub and groundcover species will need to be reduced to maintain an open channel for drainage flow.

In both Proposed Revegetation Areas there is not likely to be enough native remnant vegetation left to recolonise without supplemental planting. All tubestock to be planted will be of local provenance, and sourced from nurseries that specialise in growing seedlings of native plants with seed sourced from local bushland, to avoid planting of horticultural cultivars, and not members of a species as they naturally occur. Species will be chosen that are appropriate for CPW and RFEF.

5.2 Schedule of Works

Initial revegetation should commence immediately following initial weed suppression outlined in the WMP and include planting CPW and RFEF species identified in **Appendix C**, including a groundcover of native grasses. This will ensure competition with high weed density areas of Alligator Weed and Wandering Jew in low lying areas. As the goal of the Revegetation Plan is to revegetate fully structured CPW and RFEF communities, the contracted regenerators need to plant a high diversity of canopy, shrub and groundcover species in all regeneration areas.

5.3 Revegetation Species

Information provided within the GIS Environmental Consultants (2013), Cumberland Ecology (2014), and Cumberland Ecology's site inspection was used to identify a planting list of species present within the existing CPW and RFEF on the site. As some CPW and RFEF species may not have been identified, additional species suitable for these vegetation communities were identified in the OEH CPW and RFEF final determinations. A complete planting list of suitable CPW and RFEF species for revegetation are identified in **Appendix C**.

All tubestock/hiko cells to be planted should be of local provenance, and sourced from nurseries that specialise in growing seedlings of native plants with seed sourced from local bushland, to avoid planting of horticultural cultivars.

It is likely that not all species will be available from nurseries, as the provided lists are based on appropriate plantings for the area, and are not reflective of what local nurseries will have in stock or be able to provide at any given time. For this reason it is not expected that all species will be planted, but as many species as are available from the list should be planted to maximise the floral diversity of the revegetation area.

5.4 Planting Density

5.4.1 Proposed Revegetation Area A

i. CPW

CPW is typified by a sparse canopy, a relatively sparse shrub layer, and a dense groundcover of herbs and grasses. The majority of plants to be planted should be grasses, at least six grass individuals per m^2, and two herb individuals.

Table 5.1 contains an approximate guide on appropriate planting densities and the estimated total number of plants per stratum needed to revegetate the Proposed Revegetation Area A of CPW identified in **Figure 1.3**.

Table 5.1 Area A: CPW planting density and total number of plants per stratum needed

Stratum (form)	Planting Density	Total Number of Plants Per Stratum
Tree Canopy	1 unit/20m^2	55
Shrubs/Small Tree	1 unit/10m^2	110
Ground Covers	8 units/1m^2	8800

***Note: Total numbers of plants per stratum are based on a total CPW revegetation area of 1100m^2**

ii. RFEF

RFEF is typified by a tall open canopy, a midstorey layer comprised of small trees, scattered shrubs, and a groundcover composed of forbs, climbers and grasses. The majority of plants to be planted should be grasses, and the shrub layer should contain small trees, such as the Melaleuca and Casuarina species identified in the planting list.

Table 5.2 contains an approximate guide on appropriate planting densities and the estimated total number of plants per stratum needed to revegetate the Proposed Revegetation Area A of RFEF identified in **Figure 1.3**.

Table 5.2 Area A: RFEF planting density and total number of plants per stratum needed

Stratum (form)	Planting Density	Total Number of Plants Per Stratum
Tree Canopy	1 unit/16 m^2	29
Shrubs/Small Tree	1 unit/2 m^2	235
Ground Covers	8 units/1 m^2	3760

***Note: Total numbers of plants per stratum are based on a total RFEF revegetation area of 470m^2**

5.4.2 Proposed Revegetation Area B

i. RFEF

Proposed Revegetation Area B is located in a drainage line that runs from a stormwater culvert at Diamond Cresent, near the junction of Stott Close, in to Clear Paddock Creek. This area is partly located within the future APZ for lots 1-6. During consturction works in January 2015, works were undertaken to allow runoff to flow to Clear Paddock Creek, which involved the removal of dense noxious weeds. The replanting in this zone should aim to maintain an open form of RFEF, as described above. The majority of plants to be planted should be grasses and sedges at least six grass/sedge individuals per m^2, and two herb individuals. Sparse trees will be planted for soil stability only, and the canopy should not join.

Table 5.3 contains an approximate guide on appropriate planting densities and the estimated total number of plants per stratum needed to revegetate the Proposed Revegetation Area B of RFEF identified in **Figure 1.3**.

Table 5.3 Area B: RFEF planting density and total number of plants per stratum needed

Stratum (form)	Planting Density	Total Number of Plants Per Stratum
Tree Canopy	1 unit/40m^2	27
Ground Covers	8 units/1m^2	8,880

***Note: Total numbers of plants per stratum are based on a total Area B RFEF revegetation area of 1,110m^2**

5.5 Planting Guide

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

- Holes for tube stock should be dug deep enough that at least a few centimetres of the plant are below the soil surface;
- Treatment of soils within each planted tubestock plant hole with a plant establishment aid that contains a mix of materials such as slow and quick release fertilisers, water holding crystals, and wetting agents. These agents assist in establishing newly installed plants and can reduce establishment watering resources by up to 50%;
- Soil should be filled back in surrounding the tube stock;
- Plants need to be watered once immediately following planting; and
- A plastic tree guard should be installed around plants following planting and watering to protect them from herbivory, and herbicide drift during site visits for weed control. The density of 8 ground cover plants per m^2 for this project may make hand weeding unsafe with every individual plant surrounded by a tree guard as tree guards are secured in place with bamboo stakes and can be dangerous (an eye hazard when bending and removing weeds). For this reason the BRC should determine a safe proportion of groundcover plants to be selectively protected with trees guards, and caution should be used when spraying herbicide around plants without tree guards. All shrub and tree individuals planted should have tree guards.

5.6 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 which should be replaced with another individual of the same vegetation form during subsequent site visits to ensure at the end of the management 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, particularly during El Nino years. The contracted bushland regeneration team should water plantings during site visits in these periods to prevent the loss of plantings from dehydration. As recommended in the WMP, site visits should occur twice monthly in the first year of maintenance, monthly until the end of 5 years of maintenance works, and as required following that until the BMP expires.

5.7 Isolation of Revegetation areas

In Proposed Regeneration areas, fencing will be installed to control access of the public and decrease disturbances to these areas, increasing the likelihood of native regeneration. The installation of such fences are identified in **Figure 2.1** and their placement allows access for bushfire asset protections.

Chapter 6

Bushfire Management Plan

6.1 Introduction

An assessment of the potential bushfire risk to the proposed subdivision was undertaken by Australian Bushfire Protection Planners Pty Ltd in 2014 (ABPP 2014). The assessment identified that the Conservation Area contained, except for the connection to the northeast, an isolated pocket of vegetation which may be involved in a small scale localised bushfire event if the vegetation were to be ignited. Due to the isolation of the vegetation and the limited fire runs (spread of fire across the landscape) the predicted level of risk is low/moderate.

The Subject Site is not recorded on the Fairfield Certified Bushfire Prone Land Map (NSW Rural Fire Service 2003) as containing Bushfire Prone Vegetation and the approved subdivision did not require the issue of a Bushfire Safety Authority by the Commissioner of the NSW Rural Fire Service pursuant to Section 100B (1) (b) of the Rural Fires Act 1997. However, the Rural Fire Service raised concerns regarding the management of vegetation on the proposed Conservation Area and the provision of Asset Protection Zones for the proposed Residential Area that adjoin the future reserve [Conservation Area].

Following the receipt of this advice, Council undertook a review of the subdivision layout with the aim of providing bushfire protection measures which reduce the risk from a small scale bushfire event in the proposed Conservation Area. An amended layout was submitted to the NSW Rural Fire Service with the Service providing advice that it supported the proposal subject to the following requirement:

“Prior to the issue of a subdivision certificate, a Plan of Management shall be prepared for the proposed residue lot with regard to the provision of Asset Protection Zones along the boundaries of lots which adjoin the proposed [residue lot] to meet the performance criteria for Asset Protection Zones under Section 4.1.3 of Planning for Bushfire Protection 2006”.

This Bushfire Management Plan applies to the vegetation to be retained and managed in the DSL.

6.1.1 Provision of Defendable Space to future Dwellings:

The DSL provides a 15 metre width between the unmanaged vegetation within the Conservation Area and the future adjoining dwellings on proposed Lots 2, 3, 6, 7, 8, 10 – 12; Lots 23, 32 – 35 and Lots 40 & 41, as shown in **Figure 1.3**.

The Defendable Space is to be maintained as an Inner Protection Area (IPA) in accordance with Appendix A5.4 & Appendix A5.5 of *Planning for Bushfire Protection (2006a)* and the Rural Fire Service *"Standards for Asset Protection Zones" (2006b)*.

As identified in the *Planning for Bushfire Protection (2006a),* the IPA should provide a tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (2002).

6.1.2 Management of the vegetation within the private lots:

It is accepted practice that after construction of a dwelling, gardens will be established and landscaping of the grounds will be undertaken. It is essential that efforts to reduce fuels on adjoining properties are therefore not negated by actions within the immediate curtilage of the building.

It is expected that the curtilage to the dwellings will be maintained by the owner of the land.

In terms of priorities of addressing bush fire attack, priority should be given to preventing flame impingement by not allowing fine debris to accumulate close to a building.

Garden maintenance to reduce the spread of bush fire should include the following:

- Maintaining a clear area of low cut lawn or pavement adjacent to the dwelling;
- Keeping areas under fences, fence posts and gates and trees raked and cleared of fuel;
- Utilising non-combustible fencing and retaining walls;
- Breaking up the canopy of trees and shrubs with defined garden beds;
- Organic mulch should not be used in bush fire prone areas and non flammable material should be used as ground cover, eg Scoria, pebbles, recycled crushed bricks; and
- Planting trees and shrubs such that:
    - the branches will not overhang the roof;
    - the tree canopy is not continuous.

Appendix A5.5 of Planning for Bushfire Protection 2006 outlines the following property maintenance items to be undertaken in advance of the bush fire season:

- Removal of material such as litter from the roof and gutters;
- Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;
- Check water supplies are available and in working order;
- Check tiles and roof lines for broken tiles or dislodged roofing materials;
- Screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;
- Hoses and hose reels are not perished and fittings are tight and in good order;
- Doors are fitted with draught seals and well maintained;
- External mats are of non combustible material; and
- Combustible materials are located well away from the dwelling.

6.1.3 Management of the Defendable Space on Council Land:

The whole of the section of the nominated DSL located on Council land is to be maintained by Fairfield City Council to the standard of an Inner Protection Area in accordance with Appendix A5.4 & Appendix A5.5 of Planning for Bushfire Protection 2006 and the Rural Fire Service "Standards for Asset Protection Zones". Council will also maintain the fire access link/Cycle-way/Pedestrian Path (located within the Defendable Space) to ensure serviceable access for fire-fighting appliances.

Chapter 7

Monitoring and Reporting

7.1 Monitoring

A qualified bushland management or ecological consultant will carry out a program of regular monitoring of the implementation of the BMP in relation to the works schedule (see **Appendix D**). The consultant will be responsible for ensuring the measures outlined in this BMP are implemented and that plant stock is replaced, as needed.

The monitoring program will be carried out for the duration of the BMP and monitoring will be completed every six months for the life of the BMP.

General observations of the nature and condition of the revegetation areas along with the collection of quantitative data will be taken during monitoring including:

- A photograph shall be taken at each photo reference point facing north for a visual assessment of site progress;
- Estimates of the success rate of plantings and natural regeneration, and assessment of plant replacement requirements;
- Weed abundance and locations of noxious weeds and WONS in each area;
- Exotic to native understorey ratio; and
- Recommendations for corrective measures and/or vegetation management.

7.2 Reporting

A brief and concise report should be prepared based on the findings of the two monitoring visits per year. The report will be prepared by the ecological consultant and forwarded to Fairfield Council for approval at the end of each six month period for the duration of the BMP maintenance period. This report should be based around the points outlined in ***Section 7.1*** and the performance criteria outlined in the schedule of works in **Appendix D**. The final report must be submitted to Council for approval, and will certify completion of the works.

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Appendix A

Photograph Reference Points

Photograph A.1 Photo reference point No. 1

Photograph A.2 Photo reference point No. 2

Photograph A.3 Photo reference point No. 3

Photograph A.4 Photo reference point No. 4

Photograph A.5 Photo reference point No. 5

Appendix B

Weeds Occurring on Subject Site and their Control Method

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
Ageratina adenophora	Crofton Weed		- Hand Weed - Spot Spray with Glyphosphate 5mL/1L - Slash large individuals with brushcutter and spray regrowth foliage with glyphosphate 5mL/1L -For infestations up to 5m^2, use hand tools to manually dig and remove all roots associated with each individual stem and surrounding soil.
Alternanthera philoxeroides	Alligator Weed	WONS, Noxious	For infestations larger than 5m^2, shallow mechanical digging can be done at a depth of 20 cm. - Hand spray Glyphosate 10 mL/1L -Removal of species from location possesses serious risk of infestation of other areas. Any plant material or contaminated soil must be disposed of in a way outlined by NSW DPI (http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0012/210450/alligator-weed-control-manual-part4.pdf)
Araujia sericifera	Moth Vine		- Hand Weed Juveniles - Spray juveniles with glyphosphate 10mL/1L - Skirt mature vines (cut through plant close to root) and then pull root manually or apply undiluted glyphosphate to cut surface - Scrape and paint vine with undiluted glyphosphate
Asparagus aethiopicus	Asparagus 'Fern'	WONS, Noxious	- Any branches profuse with fruit should be cut with secateurs and bagged to prevent further spread of species by birds - Juvenile plants can be eased out of soil with a trowel or knife - care should be taken to remove below ground plant material - For large, mature plants the woody crown at the base can be cut around with a sharp knife, or hacked out with a mattock or peter lever and removed - it is easiest to

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
Asparagus asparagoides	Bridal Creeper	WONS, Noxious	cut all branches off near the base with secateurs prior to removing crown - plant will not resprout from water storing tubers or roots below ground so these can be left to rot to reduce soil disturbance. - Spray mature and juvenile plants with metsulfuron methyl 6g/100mL + surfactant - 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. - July-September - Spray foliage with glyphosphate 10mL/1L + surfactant - May to June - Spray foliage with metsulfuron methyl (e.g. Brush Off) 5g/100L + non-ionic surfactant
Asparagus officinalis	Asparagus	Noxious	- Hand weed juveniles - Remove carefully with secateurs and bag seed plumes of mature plants '- Remove with secateurs and bag and reprodctive material - Plant can be dug out of ground with hand tools, however care needs to be taken to completely remove crown from base of plant as it will resprout - Foliar spray with 10mL/1L glyphosphate can be effective for large infestations however regrowth will need to be resprayed over a number of months upon resprouting from crown
Bidens pilosa	Cobblers Pegs		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Brassica fruticulosa	Twiggy Turnip		

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
Briza subaristata			- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Bromus catharticus	Prairie Grass		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Chloris gayana	Rhodes Grass		- Hand weed juveniles - Remove carefully with secateurs and bag seed plumes of mature plants - Dig mature plants out of the ground with a mattock; or - Brushcut mature plants to near ground level and spray with glyphosphate 10mL/1L - During subsequent site visits spray regrowth foliage with glyphosphate 10mL/1L
Cirsium vulgare	Spear Thistle		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Conyza bonariensis	Flaxleaf Fleabane		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Cynodon dactylon	Couch		- Hand Weed - Spot Spray with glyphosphate 10mL/1L - May require monthly treatment of regrowth individuals for up to six months
Cyperus eragrostis	Umbrella Sedge		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Echinochloa crus-galli	Barnyard Grass		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
Ehrharta erecta	Panic Veldtgrass		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Galium aparine	Goosegrass		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Gomphocarpus fruticosus	Narrow-leaved Cotton Bush		- Hand Weed Juveniles - Spot Spray Glyphosphate 15mL/1L - Cut and Paint Glyphosphate 50mL/100mL
Hypochaeris radicata	Catsear		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Lantana camara	Lantana	WONS	- Hand weed juveniles and regrowth from small pieces - Spot spray with glyphosphate 10mL/1L - Slash using brushcutter, or hand cut with loppers, and spray regrowth foliage with glyphosphate 10mL/1L - 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
Ligustrum sinense	Small-leaved Privet	Noxious	- Hand weed juveniles - 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. - Cut shrub and mature individuals as close to ground as possible with loppers or hand saw (or chainsaw) and treat stump with undiluted glyphosphate

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
Olea europaea subsp. cuspidata	African Olive		- Spray juveniles and regrowth foliage of cut and painted individuals with glyphosphate 10mL/1L - Spray juveniles with glyphosphate 10mL/1L - Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosphate or Triclopyr (600g/L formulation)/diesel at 4L/60L concentration (as per Garlon 600 label) - Use a power drill (9mm drill bit with dowelling tip) to drill holes less than 20 mm apart throughout lignotuber of mature trees and fill holes with glyphosphate a 1:5 mixture with water. After all holes have been filled with herbicide mixture refill holes with herbicide mixture a second time (plant will have absorbed herbicide by this time). Check trees monthly for regrowth and repeat treatment if resprouting foliage is observed
Paspalum dilatatum	Paspalum		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Pennisetum clandestinum	Kikuyu Grass		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Plantago lanceolata	Lamb's Tongues		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Rubus fruticosus	Blackberry Complex	WONS	- It is possible to spray with 10mL/1L glyphosphate however it will leave dangerous thorned stems - Wearing thick clothing and leather glove uses loppers to cut close to base and apply

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
			undiluted glyphosphate to cut stems (remove cut foliage and stems cautiously) - Spray regrowth foliage with glyphosphate 10mL/1L
Rumex crispus	Curled Dock		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Senecio madagascariensis	Fireweed	WONS	- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Sida rhombifolia	Paddy's Lucerne		- Hand weed - Spray with glyphosphate 10mL/1L - Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted glyphosphate
Solanum pseudocapsicum	Madeira Winter		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Solanum seaforthianum	Climbing Nightshade		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Taraxacum officinale	Dandelion		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Tradescantia fluminensis	Wandering Jew		- Small infestations can be removed by hand weeding - Care needs to be taken not to leave behind any plant material which will resprout. - Large infestations can be controlled by spraying with glyphosphate 10mL/1L, and the use of a surfactant will increase the efficacy of herbicide. Spraying needs to be repeated during every site visit. It can take several months before the mature plants appear to be affected but a sudden die off will occur after several months of treatment. Any regrowth material following die off of mature plants needs to be

Table B.1 Weeds occurring on Subject Site, their status and control methods

Scientific Name	Common Name	Status	Control Method
			sprayed or removed by hand. - Large infestations can be raked up and bagged and removed from site. This is time consuming and labour intensive due to the large mass and weight of heavy infestations of healthy plants. - Large infestations can be covered with black plastic sheets for several months. The plants will die eventually due to lack of required sunlight. This method is not recommended for bushland regeneration as it also inhibits regrowth form seed of native plant species.
Verbena bonariensis	Purpletop		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Verbena litoralis			- Hand Weed - Spot Spray - Glyphosphate 10mL/1L
Verbena officinalis	Common Verbena		- Hand Weed - Spot Spray - Glyphosphate 10mL/1L

Appendix C

Planting List

Table C.1 Cumberland Plain Woodland Planting List

Stratum	Family	Scientific Name
Trees	Mimosaceae	*Acacia decurrens*
Trees	Mimosaceae	*Acacia parramattensis*
Trees	Myrtaceae	*Angophora floribunda*
Trees	Myrtaceae	*Corymbia maculata*
Trees	Myrtaceae	*Eucalyptus crebra*
Trees	Myrtaceae	*Eucalyptus eugenioides*
Trees	Myrtaceae	*Eucalyptus moluccana*
Trees	Myrtaceae	*Eucalyptus tereticornis*
Shrubs	Fabaceae	*Dillwynia parvifolia*
Shrubs	Sapindaceae	*Dodonaea viscosa*
Shrubs	Pittosporaceae	*Bursaria spinosa var. spinosa*
Groundcovers	Acanthaceae	*Brunoniella australis*
Groundcovers	Acanthaceae	*Brunoniella pumilio*
Groundcovers	Amaranthaceae	*Alternanthera denticulata*
Groundcovers	Apiaceae	*Centella asiatica*
Groundcovers	Asteraceae	*Bidens pilosa*
Groundcovers	Asteraceae	*Euchiton sphaericus*
Groundcovers	Asteraceae	*Lagenifera stipitata*
Groundcovers	Asteraceae	*Pseudognaphalium luteo-album*
Groundcovers	Asteraceae	*Vernonia cinerea var. cinerea*
Groundcovers	Campanulaceae	*Wahlenbergia gracilis*
Groundcovers	Campanulaceae	*Wahlenbergia stricta subsp. stricta*
Groundcovers	Chenopodiaceae	*Einadia hastata*
Groundcovers	Chenopodiaceae	*Einadia nutans*
Groundcovers	Chenopodiaceae	*Einadia polygonoides*
Groundcovers	Chenopodiaceae	*Einadia trigonos*
Groundcovers	Convolvulaceae	*Dichondra repens*
Groundcovers	Convolvulaceae	*Dichondra Sp. A*
Groundcovers	Cyperaceae	*Eleocharis sphacelata*
Groundcovers	Cyperaceae	*Eleocharis sphacelata*
Groundcovers	Dilleniaceae	*Hibbertia diffusa*
Groundcovers	Fabaceae	*Zornia dyctiocarpa*
Groundcovers	Gentianaceae	*Centaurium spicatum*

Table C.1 Cumberland Plain Woodland Planting List

Stratum	Family	Scientific Name
Groundcovers	Goodeniaceae	*Goodenia hederacea*
Groundcovers	Juncaceae	*Juncus usitatus*
Groundcovers	Lobeliaceae	*Pratia purpurascens*
Groundcovers	Lomandraceae	*Lomandra multiflora*
Groundcovers	Lomandraceae	*Lomandra filiformis subsp. filiformis*
Groundcovers	Onagraceae	*Ludwigia peploides subsp. montevidensis*
Groundcovers	Phormiaceae	*Dianella longifolia*
Groundcovers	Plantaginaceae	*Plantago debilis*
Groundcovers	Poaceae	*Aristida ramosa*
Groundcovers	Poaceae	*Aristida vagans*
Groundcovers	Poaceae	*Aristida warburgii*
Groundcovers	Poaceae	*Austrodanthonia tenuior*
Groundcovers	Poaceae	*Austrostipa pubescens*
Groundcovers	Poaceae	*Chloris truncata*
Groundcovers	Poaceae	*Chloris ventricosa*
Groundcovers	Poaceae	*Cymbopogon refractus*
Groundcovers	Poaceae	*Echinopogon caespitosus var. caespitosus*
Groundcovers	Poaceae	*Entolasia marginata*
Groundcovers	Poaceae	*Eragrostis brownii*
Groundcovers	Poaceae	*Eragrostis leptostachya*
Groundcovers	Poaceae	*Lachnagrostis filiformis*
Groundcovers	Poaceae	*Microlaena stipoides*
Groundcovers	Poaceae	*Panicum effusum*
Groundcovers	Poaceae	*Paspalum distichum*
Groundcovers	Poaceae	*Sporobolus creber*
Groundcovers	Poaceae	*Themeda australis*
Groundcovers	Polygonaceae	*Persicaria decipiens*
Groundcovers	Polygonaceae	*Persicaria decipiens*
Groundcovers	Rubiaceae	*Asperula conferta*
Groundcovers	Scrophulariaceae	*Eremophila debilis*
Groundcovers	Solanaceae	*Solanum prinophyllum*
Groundcovers	Typhaceae	*Typha orientalis*
Vines	Fabaceae	*Desmodium brachypodum*
Vines	Fabaceae	*Glycine clandestina*

Table C.1 Cumberland Plain Woodland Planting List

Stratum	Family	Scientific Name
Vines	Fabaceae	*Glycine tabacina*
Vines	Fabaceae	*Hardenbergia violacea*
Vines	Luzuriagaceae	*Geitonoplesium cymosum*
Vines	Ranunculaceae	*Clematis glycinoides*

Table C.2 River-flat Eucalypt Forest Planting List

Stratum	Family	Scientific Name
Tree	Arecaceae	*Livistona australis*
Tree	Casuarinaceae	*Casuarina cunninghamiana subsp. Cunninghamiana*
Tree	Casuarinaceae	*Casuarina glauca*
Tree	Mimosaceae	*Acacia decurrens*
Tree	Fabaceae (Mimosoideae)	*Acacia floribunda*
Tree	Fabaceae (Mimosoideae)	*Acacia parramattensis*
Tree	Meliaceae	*Melia azedarach*
Tree	Myrtaceae	*Acmena smithii*
Tree	Myrtaceae	*Angophora floribunda*
Tree	Myrtaceae	*Angophora subvelutina*
Tree	Myrtaceae	*Backhousia myrtifolia*
Tree	Myrtaceae	*Eucalyptus amplifolia*
Tree	Myrtaceae	*Eucalyptus baueriana*
Tree	Myrtaceae	*Eucalyptus benthamii*
Tree	Myrtaceae	*Eucalyptus botryoides*
Tree	Myrtaceae	*Eucalyptus elata*
Tree	Myrtaceae	*Eucalyptus grandis*
Tree	Myrtaceae	*Eucalyptus longifolia*
Tree	Myrtaceae	*Eucalyptus moluccana*
Tree	Myrtaceae	*Eucalyptus ovata*
Tree	Myrtaceae	*Eucalyptus saligna*
Tree	Myrtaceae	*Eucalyptus tereticornis*
Tree	Myrtaceae	*Eucalyptus viminalis*
Tree	Myrtaceae	*Melaleuca decora*
Tree	Myrtaceae	*Melaleuca linariifolia*

Table C.2 River-flat Eucalypt Forest Planting List

Stratum	Family	Scientific Name
Tree	Myrtaceae	*Melaleuca styphelioides*
Tree	Myrtaceae	*Tristaniopsis laurina*
Shrub	Asteraceae	*Ozothamnus diosmifolius*
Shrub	Lamiaceae	*Plectranthus parviflorus*
Shrub	Phyllanthaceae	*Breynia oblongifolia*
Shrub	Phyllanthaceae	*Phyllanthus gunnii*
Shrub	Pittosporaceae	*Bursaria spinosa*
Shrub	Pittosporaceae	*Pittosporum undulatum*
Shrub	Rosaceae	*Rubus parvifolius*
Shrub	Ulmaceae	*Trema aspera*
Shrub	Violaceae	*Hymenanthera dentata*
Groundcovers	Apiaceae	*Centella asiatica*
Groundcovers	Apiaceae	*Hydrocotyle peduncularis*
Groundcovers	Asteraceae	*Euchiton sphaericus*
Groundcovers	Asteraceae	*Sigesbeckia orientalis subsp. Orientalis*
Groundcovers	Asteraceae	*Vernonia cinerea*
Groundcovers	Blechnaceae	*Doodia aspera*
Groundcovers	Campanulaceae	*Wahlenbergia gracilis*
Groundcovers	Chenopodiaceae	*Einadia hastata*
Groundcovers	Chenopodiaceae	*Einadia nutans*
Groundcovers	Chenopodiaceae	*Einadia trigonos*
Groundcovers	Commelinaceae	*Commelina cyanea*
Groundcovers	Convolvulaceae	*Dichondra repens*
Groundcovers	Dennstaedtiaceae	*Hypolepis muelleri*
Groundcovers	Dennstaedtiaceae	*Pteridium esculentum*
Groundcovers	Geraniaceae	*Geranium solanderi*
Groundcovers	Lobeliaceae	*Pratia purpurascens*
Groundcovers	Lomandraceae	*Lomandra filiformis*
Groundcovers	Lomandraceae	*Lomandra longifolia*
Groundcovers	Lomandraceae	*Lomandra multiflora subsp. Multiflora*
Groundcovers	Oxalidaceae	*Oxalis perennans*
Groundcovers	Phormiaceae	*Dianella longifolia*
Groundcovers	Phyllanthaceae	*Poranthera microphylla*
Groundcovers	Plantaginaceae	*Veronica plebeia*

Table C.2 River-flat Eucalypt Forest Planting List

Stratum	Family	Scientific Name
Groundcovers	Poacae	*Oplismenus aemulus*
Groundcovers	Poaceae	*Austrostipa ramosissima*
Groundcovers	Poaceae	*Cymbopogon refractus*
Groundcovers	Poaceae	*Dichelachne micrantha*
Groundcovers	Poaceae	*Digitaria parviflora*
Groundcovers	Poaceae	*Echinopogon caespitosus var. caespitosus*
Groundcovers	Poaceae	*Echinopogon ovatus*
Groundcovers	Poaceae	*Entolasia marginata*
Groundcovers	Poaceae	*Entolasia stricta*
Groundcovers	Poaceae	*Eragrostis leptostachya*
Groundcovers	Poaceae	*Imperata cylindrica var. major*
Groundcovers	Poaceae	*Microlaena stipoides var. stipoides*
Groundcovers	Poaceae	*Paspalidium distans*
Groundcovers	Poaceae	*Themeda australis*
Groundcovers	Polygonaceae	*Persicaria decipiens*
Groundcovers	Pteridaceae	*Adiantum aethiopicum*
Groundcovers	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*
Groundcovers	Rubiaceae	*Galium propinquum*
Groundcovers	Rubiaceae	*Opercularia diphylla*
Groundcovers	Solanaceae	*Solanum prinophyllum*
Groundcovers	Violaceae	*Viola hederacea*
Vine	Bignoniaceae	*Pandorea pandorana*
Vine	Fabaceae	*Desmodium varians*
Vine	Fabaceae	*Glycine clandestina*
Vine	Fabaceae	*Glycine microphylla*
Vine	Fabaceae	*Glycine tabacina*
Vine	Fabaceae	*Hardenbergia violacea*
Vine	Luzuriagaceae	*Eustrephus latifolius*
Vine	Luzuriagaceae	*Geitonoplesium cymosum*
Vine	Menispermaceae	*Stephania japonica var. discolor*
Vine	Ranunculaceae	*Clematis aristata*
Vine	Ranunculaceae	*Clematis glycinoides*
Vine	Vitaceae	*Cayratia clematidea*

Appendix D

Schedule of Works

Table D.1 Schedule of Works

Action	Responsibility	Performance Criteria	Timing
Phase 1: Site Preparation			
Carry out weeding of all primary weeds.	BR Contractor	Main weed infestations and WONS removed - Reproductively mature plants absent from site.	1 month prior to clearing
Seed collection of all available natives within and around the site.	BR Contractor	Collection of seeds from existing natives.	Any time prior to clearing
Put sediment fencing around any batters and areas susceptible to runoff during rain.	BR Contractor	Sediment fences have been placed around all batters and susceptible runoff during rain.	Any time prior to clearing
Phase 2: Construction			
Carry out weeding of all primary weeds.	BR Contractor	No weed infestations and WONS removed - Reproductively mature plants absent from site.	Immediately after the completion of all earthworks.
Phase 3: Post Construction			
Star picket installation at photo reference points	BR Contractor	Star pickets installed at approximate locations of GPS coordinates provided.	Following completion of earthworks
Planting of native ground covers.	BR Contractor	Native ground covers have been planted in all revegetation areas	Following completion of earthworks
Planting of native ground covers.	BR Contractor	Native ground covers have been planted at the southern drainage line.	Following completion of earthworks

Table D.1 Schedule of Works

Action	Responsibility	Performance Criteria	Timing
Revegetate canopy and shrub/small tree layer with native species.	BR Contractor	Native plants have been planted from the list in Appendix C in all revegetation areas.	Following completion of earthworks
Carry out secondary weeding.	BR Contractor	Weed regrowth following primary weeding removed. Work has commenced on control of annual weed species.	3 to 6 months following primary weeding, depending on observed levels of weed regrowth; site visits twice monthly.
Phase 4: Maintenance			
Carry out maintenance weeding throughout the site	BR Contractor	Existing weed growth minimised or controlled; regrowth following secondary weeding controlled; and no new weed species of infestations	7 months to 4-5 years; site visits twice monthly.
Maintenance of plantings.	BR Contractor	Any dead plantings replaced; Plants watered when drought stressed; and Additional plantings where required due to observed gaps in any strata	7 months to 4-5 years; site visits twice monthly.
Monitoring inspection	Ecologist	Complete site inspection to record revegetation progress.	8 months to 4-5 years; site visits twice monthly.
Reporting	Ecologist	Complete report based on two annual monitoring inspections and submit to Penrith Council.	At the end of each year.