

VEGETATION MANAGEMENT PLAN

for

Four Rural Tourist Cabins

at

Lot 18 Alidenes Road, Wilsons Creek

Lot 14 DP 755722 and Lot 3 DP 115913

Date: November 2022

B A L A N C E D
S Y S T E M S

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CONTENTS

1. INTRODUCTION	3
1.1 Report Overview.....	3
1.2 Aims and objectives	3
1.3 Scope of Work.....	3
1.4 Relevant Legislation.....	3
1.4.1 Biodiversity Conservation Act 2016	3
1.4.2 NSW Biosecurity Act 2015.....	4
2. THE SITE	5
2.1 Site Description	5
2.2 The Proposed Development.....	6
2.3 Topography, Watercourses and Soils.....	7
2.3.1 Topography.....	7
2.3.2 Watercourses.....	7
2.3.3 Soils	8
2.4 Vegetation Mapping	8
2.5 Flora and Fauna Values.....	10
3. VEGETATION MANAGEMENT PLAN	11
3.1 Overview and Justification	11
3.2 Description of Works.....	11
3.3 Timeline	11
3.4 Key Performance Indicators.....	11
3.5 Ecological Works Schedule.....	12
3.6 Environmental Weed Management	13
3.7 Assisted Natural Regeneration (ANR)	14
3.8 Revegetation Strategy	15
3.9 Adaptive Management	15
3.10 Bushfire Management	16
3.11 Projected Outcomes	16
3.12 Monitoring and Reporting	17
USAGE NOTE	18
REFERENCES	19
APPENDIX A – Byron Shire Council Planning Controls	20
APPENDIX B – Climate Information	21
APPENDIX C – Vegetation Management Plan	22

1. INTRODUCTION

This report is a Vegetation Management Plan to accompany a proposed rural tourist cabins development application located at 18 Alidenes Road, Wilsons Creek. The VMP is a requirement under the Byron DCP 2014 and includes a 5-year management plan within a designated vegetation management zone, to be located in the northern portion of the site along the Mullumbimby Creek. The ecological works will commence in Stage 2 of the development application, at construction certificate stage of the visitor cabins.

1.1 Report Overview

This report contains three main sections with attached appendices:

Section 1: INTRODUCTION

Section 2: SITE DESCRIPTION

Section 3: VEGETATION MANAGEMENT PLAN

Appendices

1.2 Aims and objectives

The aim of this report is to:

- ❖ Implement an integral component of the project, being a vegetation management plan for ecological works within the Mullumbimby Creek riparian corridor on the site as part of the rural tourist cabins facility.

The objectives of this VMP are:

- Protect and enhance the habitat of native species, both flora and fauna;
- Implement ecological works within suitable areas on the site containing important environmental values;
- Improve water catchment values within the Mullumbimby Creek catchment;
- Minimise bushfire hazard risk to the proposed rural tourist cabins whilst protecting ecological values;
- Manage environmental weeds on the site to improve native habitat; and
- Improve the amenity and conservation value of the property by protecting and restoring biodiversity and ecological processes.

1.3 Scope of Work

The Byron Shire Development Control Plan 2014 requires ecological works to be conducted on the property of which financial income from the tourist facility can help fund under a 5-year management plan and beyond. Byron Shire Council provides requirements for a Vegetation Management Plan under the Byron DCP 2014 with extract provided within Appendix A.

1.4 Relevant Legislation

1.4.1 Biodiversity Conservation Act 2016

The *NSW Biodiversity Conservation Act 2016* commenced on 25 August 2017.

The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development (described in section 6 (2) of the Protection of the Environment Administration Act 1991), and in particular:

- (a) to conserve biodiversity at bioregional and State scales, and
- (b) to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations, and
- (c) to improve, share and use knowledge, including local and traditional Aboriginal ecological knowledge, about biodiversity conservation, and
- (d) to support biodiversity conservation in the context of a changing climate, and

- (e) to support collating and sharing data, and monitoring and reporting on the status of biodiversity and the effectiveness of conservation actions, and
- (f) to assess the extinction risk of species and ecological communities, and identify key threatening processes, through an independent and rigorous scientific process, and
- (g) to regulate human interactions with wildlife by applying a risk-based approach, and
- (h) to support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature, and
- (i) to support and guide prioritised and strategic investment in biodiversity conservation, and
- (j) to encourage and enable landholders to enter into voluntary agreements over land for the conservation of biodiversity, and
- (k) to establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity, and
- (l) to establish a scientific method for assessing the likely impacts on biodiversity values of proposed development and land use change, for calculating measures to offset those impacts and for assessing improvements in biodiversity values, and
- (m) to establish market-based conservation mechanisms through which the biodiversity impacts of development and land use change can be offset at landscape and site scales, and
- (n) to support public consultation and participation in biodiversity conservation and decision-making about biodiversity conservation, and
- (o) to make expert advice and knowledge available to assist the Minister in the administration of this Act.

The VMP attempts to align the project with all relevant objectives of the NSW BC Act 2016 and targets the area mapped under the NSW Biodiversity Values Map.

1.4.2 NSW Biosecurity Act 2015

The *North Coast Strategic Weed Management Plan 2017-2022* provides a framework for weed management in the North Coast region (NSW). One of the key aspects is that it identifies regional priority weeds that pose a significant risk and outlines responses to achieve weed management outcomes, which also supports the *NSW Biosecurity Act 2015*. The priority weeds for the region are set out in the plan, with additional information provided on the NSW DPI website and the NSW WeedWise application.

Weed species have been prioritised by the NSW Weed Risk Management system, guided by the principle '*managing weeds earlier rather than later is more cost effective*', in accordance with weed management hierarchy: Prevention, Eradication, Containment and Asset Protection (see Table 1 below). Weed risk is calculated by analysis of a Species' invasiveness, environmental impacts, potential distribution and also for control costs, persistence in the environment and current distribution. Further information on specific weeds on the site are provided in following sections of this report.

Table 1: Regional weed management categories

Category	Objective	Characteristics of weeds in this category
Prevention	To prevent the weed species arriving and establishing in the Region.	These species are not known to be present in the region. They have a high to very high weed risk (highly invasive and high threat) and have a high likelihood of arriving in the region due to potential distribution and/ or an existing high-risk pathway.
Eradication	To permanently remove the species and its propagules from the Region. OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.	These species are present in the region to a limited extent only and the risk of re-invasion is either minimal or can be easily managed. They have a high to very high weed risk and high feasibility of coordinated control.
Containment	To prevent the ongoing spread of the species in all or part of the Region.	These species have a limited distribution in the region. Regional containment strategies aim to prevent spread of the weed from an invaded part of the region (core infestation), and/or exclude the weed from an uninvaded part of the region (exclusion zone).
Asset Protection	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread has already occurred.	These weed species are widespread and unlikely to be eradicated or contained within the wider regional context. Effort is focussed on reducing weed threats to protect priority high value assets.

2. THE SITE

2.1 Site Description

The property subject to this Vegetation Management Plan is 18 Alidenes Road, Wilsons Creek also referred to as Lot 14 DP 755722 and Lot 3 DP 115913. The site is currently mostly covered in grazing grasslands while there is some existing native vegetation in some areas, the most significant being the northern riparian corridor along Mullumbimby Creek. Environmental plantings and weed management have been undertaken on neighbouring properties along Mullumbimby Creek. The site is mostly rural zoned however contains a conservation zoning in along the Mullumbimby Creek.



Figure 1: Subject Site (Nearmap)

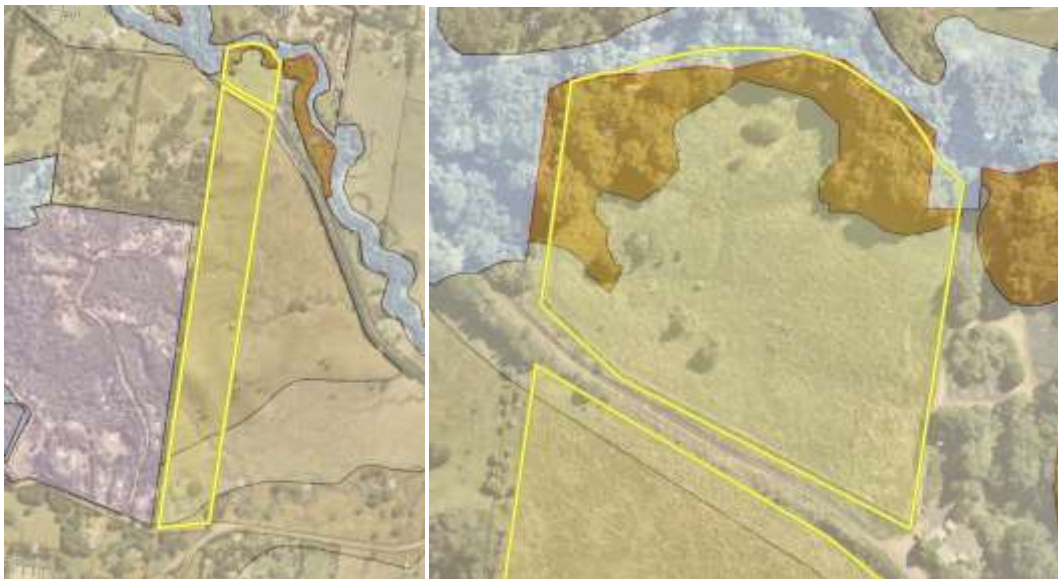


Figure 2: Council Zoning (Source: NSW Planning Portal)

2.3 Topography, Watercourses and Soils

2.3.1 Topography

The property contains undulating land with minor slopes, with two prominent east-west ridges in the north and south portions of the site. The part of the property on the northern side of Yankee Creek Road reserve is low-lying land.

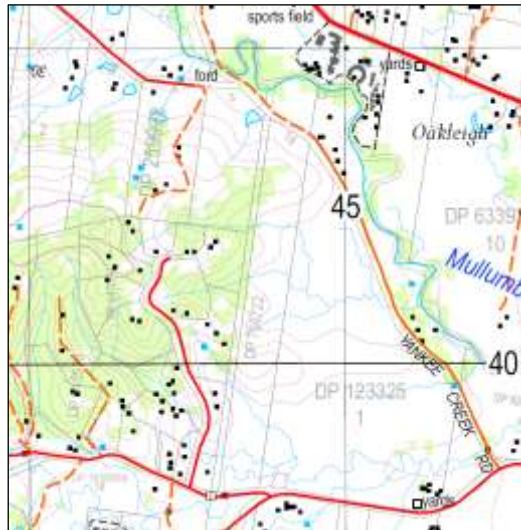


Figure 4: NSW topographic map (NSW Topo Map 2019)

2.3.2 Watercourses

The site contains numerous mapped drainage lines (Class 1), with Yankee Creek (Class 3) flowing easterly through the site in the far south of the property and Mullumbimby Creek (Class 4) flowing easterly along the northern boundary.



Figure 5: NSW mapped watercourses (NSW DPIE)

2.3.3 Soils

The site assessment showed a dominance of dark brown/black clay soils which is consistent with published works by D. Morand titled 'Soil Landscapes of the Lismore – Ballina 1:100 000 Sheet' (Table 2).

Table 2: Soil Profile Morand

Grouping	Mu – Mullumbimby	Bi - Billinudgel
Landscape	level to gently undulating alluvial plains and terraces of the Brunswick River and its tributaries. Predominantly metamorphic and rhyolitic derived sediments. Extensively cleared closed-forest.	low rolling hills on metamorphics of the Neranleigh-Fernvale Group. Relief is 50–100 m, slopes 10–20% and locally >33%. Slopes are generally moderately long (100–300 m). Ridges and crests are narrow (100–150 m). Partly cleared open eucalypt forest. Littoral closed-forest at Brunswick and Broken Heads.
Soil Description	deep (>300 cm), moderately well-drained brown Structured Alluvial Clays (Uf6, Uf6.31, Uf6.12) on floodplain. Very deep (>500 cm), moderately well-drained bright brown Structured Alluvial Clays (Uf6.31, Uf6.12) on terraces.	shallow to moderately deep (100 cm), moderately well-drained Yellow Podzolic Soils and Yellow Podzolic Soil/Soloth intergrades (Dy5.21, Dy3.11, Dy4.11) on crests and slopes. Deep (>100 cm), moderately well-drained Yellow Podzolic Soils (Dy5.21, Dy4.11) and Red Podzolic Soil/Red Earths (Dr5.21) on siltstone.
Limitations	flood hazard, localised seasonal waterlogging and moderately erodible soil materials with high shrink-swell.	hardsetting, shallow, stony and erodible soils of low fertility. Steep slopes and localised mass movement.

2.4 Vegetation Mapping

The property contains >95% open managed grazing grasslands, with some scattered regrowth vegetation including both Camphor Laurel and native rainforest species. The northern part of the site along the Mullumbimby Creek contains some important native rainforest vegetation that is considered to be lowland subtropical rainforest, that includes some large established mature trees including Red Cedar, Black Booyong, White Beech, Blackbean and Ficus species.



Figure 6: Council Vegetation Mapping

The property contains areas mapped as HEV Vegetation, including an area to the west of the cabins that will be protected from cattle grazing with the most significant area being the riparian rainforest along Mullumbimby Creek.



Figure 7: Council Vegetation Mapping

The Yankee Creek and Mullumbimby Creek corridors are mapped on the NSW Biodiversity Values Map (BC Act 2016).



Figure 8: NSW BV Map

2.5 Flora and Fauna Values

There are no mapped threatened species on the subject site, however there are some threatened species identified within the Mullumbimby Creek vegetated corridor on adjacent properties, that includes Rough-shelled Bushnut, Sweet Myrtle, Arrowhead Vine and Ball-nut. The Mullumbimby Creek are is also mapped as key fish habitat for a range of species.



Figure 9: NSW Species Sightings (NSW SEED Portal)



Figure 10: Key Fish Habitat (NSW SEED Portal)

3. VEGETATION MANAGEMENT PLAN

3.1 Overview and Justification

The property has a history of agricultural land use, with the clearing of native vegetation following European settlement to establish dairy farming, which then progressing to beef cattle farming. The proposal seeks to introduce a mixed-land use viability to the rural farm landholding, that results in positive environmental outcomes for the site.

The Mullumbimby Creek riparian corridor will be targeted, with the portion of land on the northern side of Yankee Creek Road reserve included as the vegetation management zone. The proposal requires 3,600 tree plantings or equivalent works to be conducted within this designated works area, to be commenced in Stage 2 of the project.

3.2 Description of Works

The proposed ecological works will target the Mullumbimby Creek Riparian Zone, which will protect existing vegetation and provide maximum benefit by supplementing existing works on neighbouring properties. Works within the zone includes both the management of weeds however majority will be conducted as native rainforest plantings, as outlined in the below table:

Management Area	Area (ha)	Weed Management	Rainforest Plantings
Mullumbimby Creek Riparian Zone	1.8	600 equivalent tree plantings	3,000 tree plantings

3.3 Timeline

The ecological works project will be undertaken formally over a period of 5-years, with the majority of works occurring within the first two years and maintenance in the remaining three years. Works will be required to commence at Construction Certificate stage of the proposed rural tourist cabins, in Stage 2 of the development application.

3.4 Key Performance Indicators

The following KPIs are to be used as criteria for progress, monitoring and reporting:

1. Native vegetation is protected from key threatening processes, including weed management and grazing.
2. Environmental weeds are eradicated, controlled and prevented from re-emerging within the management zone:
 - o Primary works result in canopy, mid stratum and ground reduced to 75% cover of baseline (at end of year 1);
 - o Secondary works results in canopy, mid stratum and ground reduced to 90% cover of baseline (at end of year 2); and
 - o Annual weeds and exotic grasses no greater than 10% of total cover at the end of year 5.
3. Rainforest plantings within the vegetation management zone:
 - o Grassed areas to be slashed / brush-cut / sprayed prior to plantings with plant circles established;
 - o Plantings to include water crystals, mulch, fertiliser and watering;
 - o Plantings to include plant protector and structural post support where required; and
 - o 90% survival rate of plantings (after 24 months following the completion of planting activities) with replacement plantings where required.
4. Rainforest plantings must achieve a minimum height of 50cm and have visual evidence of healthy growth after 24 months following the completion of planting activities.
5. Management area contains minimum 75% native canopy cover at 5th year to suppress weed growth and generate early stages of a rainforest micro-climate.
6. The VMP does not generate adverse conditions for bushfire management for the proposed tourist cabins.
7. On-going monitoring data is collected and evaluation reports submitted to Council.

3.5 Ecological Works Schedule

Vegetation management zone	Summary of ecological works	Year					KPI
		1	2	3	4	5	
Mullumbimby Creek Riparian Zone	1. Protect existing native vegetation						
	<ul style="list-style-type: none"> Identify, mark and GPS any significant native trees or threatened flora or fauna species found on-site by utilising fluoro flagging tape as well as indicating on the VMP map. 						1
	<ul style="list-style-type: none"> Restrict cattle access to the vegetation management zone area. 						
	<ul style="list-style-type: none"> Protect native vegetation, including large mature trees and native seedlings, whilst undertaking control of environmental weeds. 						1
	2. Manage environmental weeds						
	Year 1 – Primary Works						
	<ul style="list-style-type: none"> Camphor Laurel large trees drill & inject with herbicide. Camphor Laurel small trees cut & paint with herbicide. Small-leaf Privet cut & paint or drill & inject with herbicide. Large-leaf Privet cut & paint or drill & inject with herbicide. Lantana cut & paint with herbicide and/or manual removal. Solanum sp. cut and paint with herbicide and/or manual removal. Manual removal / cut & paint native vines where required, including Water Vine, Cockspur. Spot spray and/or manual removal of annual weeds including annuals and exotic grass species. 	Primary	Secondary	Maintenance	Maintenance	Maintenance	2, 6
	Year 2 – Secondary Works						
	<ul style="list-style-type: none"> Follow-up and repeat year 1 work where required. 						
	Year 3 to 5 – Maintenance						
	<ul style="list-style-type: none"> Maintain management area by suppressing regrowth of environmental weeds with appropriate methods. 						
	3. Rainforest Plantings						
	<ul style="list-style-type: none"> Stage 1 - Undertake 3,000 rainforest plantings in the management zone in accordance with the revegetation strategy. Year 1 primary rainforest riparian plantings. Year 2 infill rainforest riparian plantings. Year 3, 4 and 5 maintenance and infill plantings where required. Maintain, mulch, water and fertilise rainforest plantings 	Primary	Secondary	Maintenance	Maintenance	Maintenance	3, 4, 5, 6
	4. Monitor environmental works						
	Undertake monitoring and reporting:						
	<ul style="list-style-type: none"> Establish baseline conditions in a report. Implement GPS Photopoints for monitoring at four nominated locations. Annual monitoring report Final 5-year report 	1	2	3	4	Final	7

3.6 Environmental Weed Management

The primary environmental weeds of concern are listed and described in the below table:

Species	Approach	Removal and Control	Revegetation
Camphor Laurel <i>Cinnamomum camphora</i>	A number of techniques are available to control camphor laurel. The technique used will depend on the situation, landscape, number of trees to control and resources available. It is important to plan your control program and take a long-term approach including follow-up treatments, control of other weed species, and planting of replacement species. Management should aim to increase competition, which will prevent invasion by camphor laurel.	Manual removal: seedlings can be hand-pulled, making sure the entire root system is removed. Felling larger trees without herbicide results in re-shooting and suckering. Mechanical removal is not recommended on steep slopes or nearby creeks and drainage lines. Chemical control: an effective way of controlling existing infestations. Herbicides can control trees without the need to disturb soil or other vegetation. The method used depends on the site situation, tree size, access, and vegetation: - cut stump; - stem injection; - basal bark; or - foliar spray application.	Replacement with native species is vital for long-term weed control. Native rainforest and other species will often germinate underneath camphor laurels but the intense competition by mature camphor laurels dramatically reduces the ability of those seedlings to grow to maturity. When camphor laurels are controlled in stages these native species are able to grow and replace the camphor laurels.
Small-leaf Privet <i>Ligustrum sinense</i>	Wide dispersal of seed by birds cannot be controlled; therefore, controlling the spread of privet requires the removal of seed trees and young seedlings before they produce seed.	Manual removal: Manual removal techniques such as the original 'Bradley method' allow for good control of privet with minimal disturbance to the surrounding vegetation. Narrow-leaf privet can be pulled up but the stems are more likely to break from the root system, leaving viable root segments capable of regeneration. They should be dug out and the plants placed upside-down to dry out the roots. Chemical removal: Foliar treatments can be made to flushes of seedlings and groups of plants up to 3 m high. Cut-stump application of herbicides is very effective for controlling young plants, suckers or regrowth. Stem injection is also appropriate for treating larger individual plants in amongst other vegetation.	Many attempts to control or remove privet have failed because of its ability to regenerate vigorously from root and stem suckers. Follow-up control measures are critical for successful removal. The removal of large numbers of privet bushes from other vegetation can cause enough disturbance that reinfestation occurs. Revegetation along with ongoing weed control, can assist with preventing reinfestation.
Large-leaf Privet <i>Ligustrum indicum</i>	Wide dispersal of seed by birds cannot be controlled; therefore, controlling the spread of privet requires the removal of seed trees and young seedlings before they produce seed.	Manual removal: Manual removal techniques such as the original 'Bradley method' allow for good control of privet with minimal disturbance to the surrounding vegetation. These techniques involve hand-weeding of small and medium-sized privet plants, where the gaps left by weeding must be similar to those that occur naturally after the death of a native plant. Soil disturbance should also be minimised. Chemical control: Foliar treatments can be made to flushes of seedlings and groups of plants up to 3 m high. Cut-stump application of herbicides is very effective for controlling young plants, suckers or regrowth. Stem injection is also appropriate for treating larger individual plants in amongst other vegetation.	Many attempts to control or remove privet have failed because of its ability to regenerate vigorously from root and stem suckers. Follow-up control measures are critical for successful removal. The removal of large numbers of privet bushes from other vegetation can cause enough disturbance that reinfestation occurs.

Species	Approach	Removal and Control	Revegetation
Giant devil's fig <i>Solanum chrysotrichum</i>	Established plants are easy to treat, but the legacy they leave with the seed is a major problem. If you can see any on the property, act immediately to remove them before they mature and set seed. Has become established in most valleys on the NSW North Coast.	Manual Removal: Hand pull individual plants and small infestations. Care should be taken when handling this plant due to the large, sharp thorns along the stems and branches. Chemical control: Control can be achieved by either grubbing out the seedlings or spraying with glyphosate and water 1:100 (10ml/L) plus surfactant up to half a metre high. Shrubs can be cut and swabbed with a rate of 1 litre of glyphosate to 1.5 litres of water. Stem injecting is also possible on mature plants.	Flowering from autumn to spring, it reproduces from seed usually spread by birds and bats. It rapidly invades disturbed sites; for instance, where the ground was recently disturbed.
Lantana <i>Lantana camara</i>	An integrated approach that uses a variety of control methods gives best results when dealing with Lantana (<i>Lantana camara</i>). A range of methods including, herbicides, mechanical removal, fire, biological control and re-vegetation should be used. Best results are obtained by working from areas of light infestation towards heavier infestation, and long-term follow-up control is required after initial attempts.	Chemical control: A variety of chemical controls are used to control Lantana and are described in detail in Stock (2009). The addition of penetrants and surfactants (adjuvants) to some herbicides may increase the herbicide absorption into the Lantana's sap system . <ul style="list-style-type: none"> - Foliar sprays - Root application - Cut and paint method - Cut and scrape method - Basal bark application 	Germination most frequently occurs following the first summer storms, but may occur at any time of the year when sufficient moisture is present and as soil temperature increases. Lantana can re-sprout from the base if the shoot dies, extending the life of individual plants. Lantana is allelopathic and can release chemicals into the surrounding soil which prevent germination and competition from some other plant species
Broad-leaf Paspalum	Broad-leaved paspalum (<i>Paspalum mandiocanum</i>) is regarded as an environmental weed in Queensland and New South Wales. This species grows in a wide range of conditions, from full sun to shaded sites, and suppresses or kills grasses and other species in the ground layer of vegetation. Because it grows well in heavy shade under a dense tree canopy, and is particularly invasive in wetter forest and rainforest communities.	Small numbers of seedlings and small plants can be removed by hand. However, chemical control is required for large infestations. Tree planting circles with herbicide are most effective for rainforest planting establishment whilst brushcutting around growing plantings is also effective.	<i>Paspalum mandiocanum</i> reproduces from seeds that are produced in considerable numbers in late summer. Seed viability is high in the first year and germination occurs readily. Although not the most damaging weed in terms of the management area, it may suppress native regeneration on the site and should be monitored.

3.7 Assisted Natural Regeneration (ANR)

Assisted Natural Regeneration (ANR) or bush regeneration of native forest ecosystems will utilise proven techniques to convert existing areas dominated by environmental weeds into native rainforest by providing suitable conditions for the germination of native plants from the existing seed bank and deposition.

Natural regeneration utilises the ecological processes of rainforest dynamics and the succession process. Following disturbance of a rainforest, the regeneration process progresses as part of the continuous redevelopment of species establishment and structural characteristics. This includes the basic premise of the following stages of vegetative growth;

Pioneer species -> Secondary species -> Late secondary species -> Tertiary species.

The seed bank is a critical factor for undertaking the assisted natural regeneration method. Seed dispersal provides another viable opportunity to introduce local seed into the site. Camphor Laurel left dead in situ provides excellent structural support for birds, bats and other animals to distribute seed. Other seeds are also transported by wind or water from nearby sources including the existing vegetated corridor of Mullumbimby Creek.

3.8 Revegetation Strategy

The revegetation strategy consists of rainforest plantings within the Mullumbimby Creek Riparian Zone. It is required that a qualified and experienced bush regenerator undertakes and / or oversees the ecological works, including native tree plantings, to ensure maximum survival rates.

For further detailed guidelines on species selection and planting techniques for subtropical rainforest, refer to *Big Scrub Landcare - Subtropical Rainforest Restoration – A practical manual and data source for Landcare groups, land managers and rainforest regenerators (2019)*.

Planting Model

A suitable planting model based upon rainforest ecology and the concept of succession should be employed in specific locations to ensure successful establishment depending upon soil type, topography, flooding potential, frost potential and other environmental factors. This is going to vary between the local environmental factors in the management zone.

Planting Layout and Density

Plantings will have varied spacing throughout the management zone. For example, the planting of lower bank species along a watercourse would require a higher density, whereas planting upper bank areas will require a lower density.

The table below contains tree density and total area conversions to help with planning at specific locations on the property.

Table: Tree Density and Total Area Conversions

Tree Spacing (m)	1.5	1.8	2.0	2.5	3.0	3.5	4.0
Tree Density (per ha)	5,100	3,500	2,800	1,800	1,250	900	700
Tree Area (sqm)	2.0	2.9	3.5	5.6	8.0	11.0	14.4

Flora Species List

The primary goal in developing a suitable native species list is selecting species that are endemic to the Mullumbimby locality. A useful source of this information can be obtained from the subject site and from nearby regrowth and remnant vegetation. Consultation with an experienced local nursery is required.

Plant Supply

Native plants should be sourced from local nurseries that produce high quality plants and have a good reputation. It is important that the plants are of local provenance. Ordered trees should be in good health, free of disease and show signs of good root development and vigorous growth. Utilisation of seed from the site may be a viable technique.

Planting Techniques

Planting should take place during a time of year with good conditions for plant survival and growth. Plantings should be accompanied with quality mulching, fertilising and watering to ensure maximum chance of survival until the plants become established. It is recommended to do plantings from later summer through to autumn which has the most chance of rainfall and lower temperatures.

Maintenance

Maintaining the native plantings over a time period until a significant canopy is established will be required to reduce weed infestation and promote vigorous growth.

3.9 Adaptive Management

This VMP permits adaptive management provisions for the works schedule to be implemented over the 5-year period where environmental changes are occurring on-site during the working period. Adaptive management can respond to monitoring data that may suggest an alternative method is required to achieve the KPIs. If additional threatened species are identified during the ecological works, in particular during or following weed management works, which will require an adaptive management response to ensure they are protected. Adaptive management allows for suitable changes to be made to the works schedule, if the changes result in higher efficiency or success of achieving the key performance indicators and outcomes of the plan.

3.10 Bushfire Management

The property is identified as being bushfire prone, therefore Asset Protection Zones (APZs) are required for the proposed four (4) rural tourist cabins. The designated APZs require the management of vegetation surrounding the dwelling site. The proposal recognises the importance of conserving native flora and preventing soil erosion and will employ measures to ensure fuel reduction practices and the ongoing maintenance of APZs is conducted appropriately. Any additional landscaped gardens within APZs should comply with Planning for Bushfire Protection requirements.

The proposed ecological works should be conducted in a manner that complies with Bushfire Management and 'NSW Planning for Bushfire Protection 2019'.

Asset Protection Zones

An Asset Protection Zone (APZ) is an area surrounding a building, such as a dwelling or associated building, where fuel is managed and reduced for bushfire risk purposes. The area requires a reduction in available vegetation that may be flammable during a bushfire situation, therefore the APZ contains reduced fuel that may reduce the severity or impact of a bushfire onto the building. The APZ does not require removal of all vegetation, it does permit some trees to remain in most situations however, there should be limited connectivity between trees and the understorey should be managed.

A properly managed APZ (Figure 12) will contain:

- 'Buffer zone' surrounding the main dwelling and associated buildings (vegetation);
- Provide an area for occupants to move to safe location away from a bushfire; and
- Access for Rural Fire Service personnel to defend property and assets.

Inner and outer protection areas – example designs

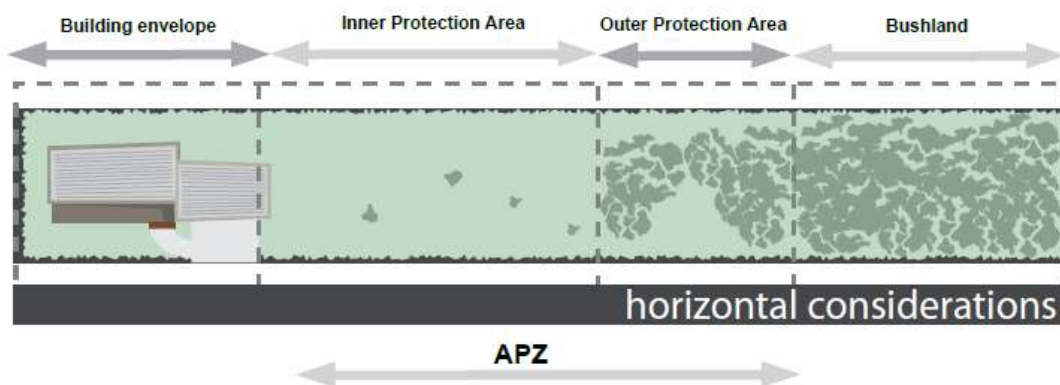


Figure 12: APZ Diagram

3.11 Projected Outcomes

- Existing native flora including HEV Vegetation along the Mullumbimby Creek is protected for the long-term;
- Camphor Laurel is removed from the vegetation management zone;
- Environmental weeds such as Large-leaved Privet, Small-leaved Privet, Solanum sp. and Lantana are removed from vegetation management zone;
- Native species are established and replicate the species diversity of original subtropical rainforest ecosystem before European settlement to compliment neighbouring properties' works;
- Natural forest regeneration is encouraged and facilitated along the Mullumbimby Creek riparian corridor;
- Establish a native canopy that promotes suitable microclimate and understorey habitat;
- Restored riparian zone and reduced erosion leading to enhanced water catchment and key fish habitat values;
- Asset Protection Zones implemented and managed according to recommendations whilst still protecting native vegetation on the site.

3.12 Monitoring and Reporting

Monitoring data will be collected throughout the implementation of the plan so that progress can be measured against the stated key performance indicators (KPIs).

Monitoring

Monitoring will be ongoing and comprehensive inspections will be conducted every 12 months to assess and evaluate the ongoing condition of the management zone compared to the baseline condition. This task requires recording data on native vegetation health, weed management and additional tree plantings. Geo-tagged photographs will provide a visual means to assess changes over time.

Monitoring points will be designated within the management zone where base data collection for ecological condition should be collected prior to any ecological works being started. Data can then be compared to annual monitoring data which provides for an ongoing, cyclic review system that can feed back into the adaptive management strategy.

Daily recording sheets should be used to monitor environmental repair and enhancement works:

- Weed management and herbicide usage;
- Plant species list; and
- Planting and environmental works activity sheets.

The following professional toolkit provides a comprehensive set of tools and recording sheets that contains scientific rigorous methodology:

Monitoring Revegetation Projects in Rainforest Landscapes. Toolkit Version 3 (*Kanowski et al. 2010, Griffith University*).

Reporting

Certified progress reports and an independent certified final audit report are to be provided to Byron Shire Council:

Table 10: Reporting Requirements

Certified Report	Submission	Content
Baseline Report	Year 1	Provides baseline geo-tagged photos of each monitoring station. Includes a description of the existing vegetation, site characteristics and environmental conditions.
Annual Monitoring Report	Year 1, 2, 3, 4	Provide details on progress of the VMP and achieved performance criteria. Includes details on contract agreements organised, detailed species planting list, specific locations, planting density, weed control activities and protection measures. Multiple photo points set up on the property within the management area to monitor works over time.
Final Evaluation Report	Year 5	Following the completion of the implemented VMP, to contain a final audit of ecological works.

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APPENDIX A – Byron Shire Council Planning Controls

D3.3.4 Rural Tourist Accommodation and Farm Stay Accommodation

3. A vegetation management plan (VMP) is to be submitted with each Rural Tourist Accommodation Development Application detailing where 900 local native trees per cabin or rural tourist residence are to be planted as environmental repair and enhancement for development. VMP's must be prepared by a qualified and experienced bush regenerator (Certificate 4 in Natural Area Restoration / Conservation and Land Management) or ecologist with specific knowledge and experience in Restoration Ecology and in accordance with the Guidelines for VMP/Biodiversity Conservation Management Plan (BCMP)/ Environmental Enhancement Management Plan (EEMPs), available on Council's website.

Baseline monitoring and permanent monitoring points must be included with the VMP and restored or planted areas will have conditions imposed that the VMP area must be retained in perpetuity.

Equivalent ecological restoration may be provided where existing native vegetation occurs on site. It is preferred that remnant vegetation on site is restored to a local native plant community type before additional planting is undertaken. Weed control should prioritise invasive species and weeds of national significance (WONS). The area of restoration to be completed in place of planting is to be calculated as follows:

a. Calculate the area required to plant 900 trees per cabin or rural tourist residence using the appropriate plant spacings for the vegetation community to be established. For example, rainforest species are generally planted 2 to 3m apart, thus 900 trees would occupy an area of some 0.56ha at spacings of 2.5m (using the table below); while koala habitat restoration or eucalypt/sclerophyll plant communities naturally have spacings between 4m and 6m apart so that 900 trees would occupy an area of 1.44 ha.

Table D3.2 - Tree Spacing Numbers / Hectare (Ha)

No of Trees per Ha	Spacing
10,000	@ 1.0metre spacing
4,444	@ 1.5metre spacing
2,500	@ 2.0metre spacing
1,600	@ 2.5metre spacing
1,111	@ 3.0metre spacing
816	@ 3.5metre spacing
625	@ 4.0metre spacing
400	5 metre spacings
25	20 metre spacings
16	25 metre spacings
11	30 metre spacings
4	50 metre spacings

b. For areas that are clearly dominated by weed species (greater than 50% cover over all stratum), the total restoration area is double that calculated in point a) above. For areas that are weedy, but not weed-dominated (less than 50% cover over all stratum), the restoration area worked is four times that calculated above. These calculations ensure that equivalent effort is expended whether planting or restoring existing plant communities.

APPENDIX B – Climate Information

Climate data from Byron Bay (Cape Byron AWS) (Source: Australian BOM 2021)

Month	Mean Maximum Temperature (°C)	Mean Minimum Temperature (°C)	Mean Rainfall (mm)	Mean No. of Wet Days
January	28.0	21.3	156	10.5
February	27.5	21.2	193	12.9
March	26.6	20.1	168	12.7
April	24.0	17.7	162	11.5
May	21.4	15.1	94	10
June	19.3	13.2	163	11
July	18.9	12.4	84	8.2
August	20.2	13.2	68	5.4
September	22.1	15.3	49	5.7
October	23.7	17	89	8.7
November	25.3	18.7	89	8.0
December	26.7	20	128	10.3
YEAR AVERAGE	23.6	17.1	1473.2	108.6

Site name: BYRON BAY (CAPE BYRON AWS)

Site number: 058216

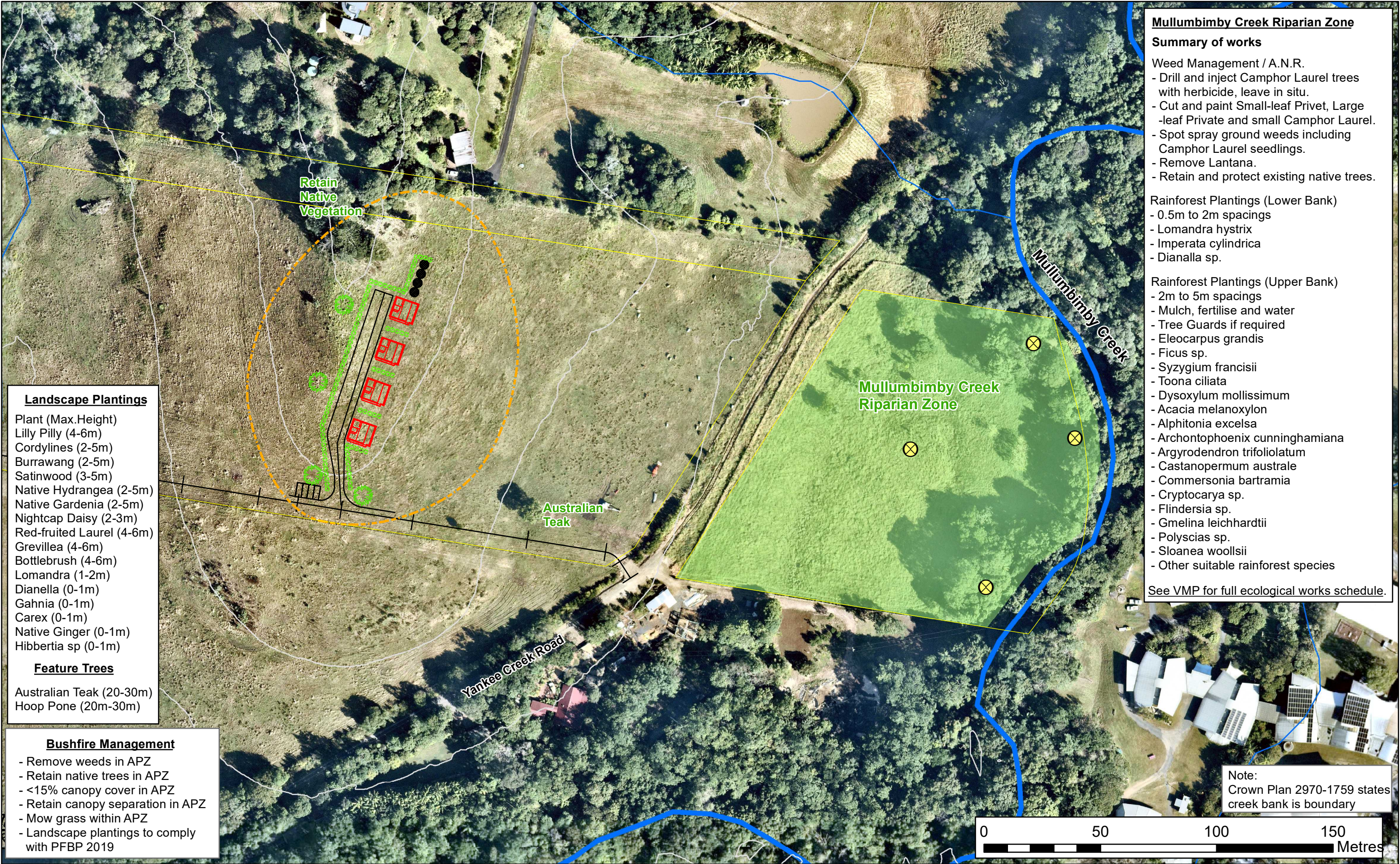
Latitude: 28.64 °S Longitude: 153.64 °E

Elevation: 95 m

Commenced: 1994 Status: Open



APPENDIX C – Vegetation Management Plan



Mullumbimby Creek Riparian Zone

Summary of works

Weed Management / A.N.R.

- Drill and inject Camphor Laurel trees with herbicide, leave in situ.
- Cut and paint Small-leaf Privet, Large-leaf Privet and small Camphor Laurel.
- Spot spray ground weeds including Camphor Laurel seedlings.
- Remove Lantana.
- Retain and protect existing native trees.

Rainforest Plantings (Lower Bank)

- 0.5m to 2m spacings
- Lomandra hystrix
- Imperata cylindrica
- Dianalla sp.

Rainforest Plantings (Upper Bank)

- 2m to 5m spacings
- Mulch, fertilise and water
- Tree Guards if required
- Eleocharis grandis
- Ficus sp.
- Syzygium francisii
- Toona ciliata
- Dysoxylum mollissimum
- Acacia melanoxylon
- Alphitonia excelsa
- Archontophoenix cunninghamiana
- Argyleodendron trifoliolatum
- Castanopermum australe
- Commersonia bartramia
- Cryptocarya sp.
- Flindersia sp.
- Gmelina leichhardtii
- Polyscias sp.
- Sloanea woollsii
- Other suitable rainforest species

See VMP for full ecological works schedule.

- Landscape Plantings**
- Plant (Max.Height)
- Lilly Pilly (4-6m)
 - Cordylines (2-5m)
 - Burrawang (2-5m)
 - Satinwood (3-5m)
 - Native Hydrangea (2-5m)
 - Native Gardenia (2-5m)
 - Nightcap Daisy (2-3m)
 - Red-fruited Laurel (4-6m)
 - Grevillea (4-6m)
 - Bottlebrush (4-6m)
 - Lomandra (1-2m)
 - Dianella (0-1m)
 - Gahnia (0-1m)
 - Carex (0-1m)
 - Native Ginger (0-1m)
 - Hibbertia sp (0-1m)
- Feature Trees**
- Australian Teak (20-30m)
 - Hoop Pone (20m-30m)

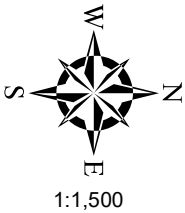
- Bushfire Management**
- Remove weeds in APZ
 - Retain native trees in APZ
 - <15% canopy cover in APZ
 - Retain canopy separation in APZ
 - Mow grass within APZ
 - Landscape plantings to comply with PFBP 2019

Note:
Crown Plan 2970-1759 states creek bank is boundary

18 Alidenes Road
Wilson's Creek
Lot 14 DP 755722, Lot 3 DP 115913
Proposed Four Rural Tourist Cabins
Illustration 1: Landscaping Concept, Bushfire Management and Vegetation Management Plan

- Legend**
- Subject Site
 - Contour (10m)
 - Watercourse**
 - 1st Order - Drainage Gully
 - 4th Order - Large Creek
 - Cabin Building
 - Access Road & Car Parking
 - Bushfire APZ
 - Landscape Planting
 - Feature Tree
 - Vegetation Management Zone (1.8 ha)
 - VMZ Monitoring

VERSION	DA
DATE	November 2022
LGA	Byron Shire Council
PARISH	Mullumbimby
DATA SOURCE	NSW LPI 2022 Byron Shire Council
IMAGERY	Nearmap July 2022



Scale: A3
Datum: GDA2020
Projection: MGA Zone 56

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