

BLIGH TANNER

Redlands Coast Sports and Recreation Precinct Rehabilitation Management Plan

Redlands City Council

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PROJECT ENGINEER	Alan Hoban		
CLIENT	Redlands City Council		
CLIENT CONTACT	v. Steljic		
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P01	Aurecon		01/06/2021
P02	A Hoban, L Pallay, R De Jong, A Flower	A Hoban	21/09/2022

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This Regeneration and Rehabilitation Management Plan (RRMP) supersedes the Aurecon RRMP (2021). Excerpts from the Aurecon's superseded RRMP are contained within this RRMP.

Bligh Tanner Pty Ltd
ABN 32 061 537 666
blightanner@blightanner.com.au
blightanner.com.au

Brisbane
Level 9, 269 Wickham Street
PO Box 612
Fortitude Valley
Qld 4006 Australia
T +61 7 3251 8555
F +61 7 3251 8599

Sydney
Level 32, 101 Miller Street
North Sydney
NSW 2060 Australia
T +61 2 8019 7221



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1. INTRODUCTION

This Rehabilitation and Revegetation Management plan has been prepared to provide guidance and procedures that will allow the Redlands City Council (RCC), to achieve enhanced environmental outcomes as part of the development of the Redlands Coast Sports and Recreation Precinct (Project).

Council will ensure that controls are properly implemented, regularly monitored and audited to assess their effectiveness. Changes to the vegetation management controls will be investigated if they are not achieving their objectives.

1.1 Project description

The Project site (the site) is located at 277-293 Heinemann Road, Mount Cotton, formally described as Lot 420 on S312160. The site is located approximately 9.5 km south of the Cleveland central business district and is within the Redlands City Council local government area. The site consists of one rectangular freehold allotment, with a total area of 101.2 ha.

The Project, as illustrated in Figure 1, proposes to establish a sport and recreation precinct predominantly located in the northern portion of the Project site. The key components of the Project and associated staging are listed in Table 1.

Table 1 Proposed staging of construction works – Redland Sport and Recreation Precinct

Stage	Proposed works
Stage 1	Vegetation clearing and site establishment Enabling infrastructure (including northern roundabout access from Heinemann Road, water/sewer/stormwater and interim sewer pump out) Internal roads and play precinct carpark Play precinct and play pavilion Pump track, learn to ride facilities Maintenance access track and low-impact bush trails Central waterway corridor works Cycling precinct (incl. BMX, criterium tracks, parking and clubhouse)
Stage 2	Heinemann Road upgrades and trunk sewer works New southern roundabout access and internal road connection NRL and touch football precincts (incl. final landscaping/sports fields, clubhouses and carparking and lighting/electrical) Recycled water trunk main (subject to on-going planning and design)

1.2 Purpose and Scope

RCC is committed to conserving and enhancing the environment in order to restore ecosystem function and services. This includes restoring degraded areas and enhancing fauna movement corridors wherever possible.

The purpose of the Rehabilitation and Revegetation Management Plan is to describe the rehabilitation objectivise, elements and strategies necessary to address restoration of ecosystem function of the site. The site is defined as all areas within Lot 420 on S312160, that are located outside of the Project disturbance footprint.

This Rehabilitation and Revegetation Management Plan aims to ensure that commitments made by the Council in relation to rehabilitation are met.

The key components associated with restoration activities as detailed within this management plan, are provided as follows:

+ Defining regeneration zones and activities associated within each zone (refer Section 3)
+ Describing weed control techniques (refer Section 4)
+ Describing revegetation activities (refer Section 5)
+ Defining inspection, monitoring and reporting requirements (refer Section 6)
+ Providing performance indicators to measure success (refer Section 7)

1.3 Objective and Targets

1.3.1 Objectives

The Rehabilitation and Revegetation Management Plan has the following objectives:

+ Minimise the area of overall disturbance.
+ Undertake a comprehensive revegetation and rehabilitation program of all disturbed areas that are outside of the Project disturbance footprint.
+ Ensure revegetation and rehabilitation are undertaken in a timely manner.

1.3.2 Targets

The Rehabilitation and Revegetation Management Plan has the following targets:

+ No unnecessary clearing outside of the project disturbance footprint.
+ Successful rehabilitation and enhancement of disturbed areas within the site.
+ The above performance criteria have been developed to assist in the delivery of desirable outcomes. Key performance indicators for the Project are provided within Section 7.



Figure 1 Detailed Design of the Redlands Coast Sport and Recreation Precinct

2. EXISTING ENVIRONMENT

2.1 Site description

In accordance with the *Redland City Plan 2018*, the site is currently located within the Rural zone and is adjoined by agricultural and residential uses. The northern extent of the site contains open woodland and is used for cattle grazing and has been historically cleared and is degraded as a result of ongoing agricultural use. The southern portion of the site, though subject to historic logging, is heavily vegetated, supporting Least Concern, Of Concern and Endangered Regional Ecosystems. Mapped watercourses traverse the Site from the north and extend along the western boundary. An additional watercourse is mapped in the southeast of the site.

2.2 Extant Vegetation

The site supports Category X (Non-remnant) vegetation, Category B (Remnant) vegetation and Category C (High-value regrowth) vegetation as regulated under the *Vegetation Management Act 1999* (VM Act).

Areas of non-remnant vegetation in the site are characterised as pastoral land that has been subject to historic clearing with the exception of scattered large eucalyptus trees. These large trees include *Eucalyptus tereticornis, Eucalyptus racemosa* and *Eucalyptus pilularis* specimens that often support hollows. The ground layer is dominated by exotic *Sporobolus pyramidalis* (Giant rat's tail grass) and the native species *Imperata cylindrica* (Blady grass). The ground layer is also characterised by an abundance of exotic herbs and forbs, including *Senecio madagascariensis* (Fire weed).

Melaleuca quinquenervia (Paperbark) dominated swamp areas are associated with watercourses and associated alluvial plains. *Melaleuca quinquenervia* and *Eucalyptus tereticornis* dominate the canopy in these areas, which also supported a sub-canopy largely containing *Melaleuca quinquenervia*. The shrub layer, where present, was observed to support a number of Solanum species including *Solanum stelligerum* (Devils needles) and the non-native *Solanum torvum* (Devils fig). The ground layer generally included *Juncus spp* (Rushes) and *Axonopus compressus* (Broad-leaved carpet grass).

Six vegetation communities (ie. regional ecosystems) as described by the Regional Ecosystem Description Database (REDD) have been described for the site, consisting of the following:

+ RE12.3.11 - Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast
+ RE 12.9-10.4 - Eucalyptus racemosa subsp. racemosa woodland on sedimentary rocks
+ RE 12.11.23 - Eucalyptus pilularis open forest on coastal metamorphics and interbedded volcanics
+ RE 12.11.24 - Eucalyptus carnea or E. tindaliae, Corymbia intermedia +/- E. siderophloia or E. crebra woodland on metamorphics +/- interbedded volcanics
+ RE 12.11.25 - Corymbia henryi and/or Eucalyptus fibrosa subsp. fibrosa +/- E. crebra, E. carnea, E. tindaliae woodland on metamorphics +/- interbedded volcanics
+ RE 12.11.27 - Eucalyptus racemosa subsp. racemosa and/or E. seeana and Corymbia intermedia woodland on metamorphics +/- interbedded volcanics

Refer to **Error! Reference source not found.** for the Regional Ecosystem (RE) mapping on the site.

These communities are described in greater detail in Table 2, with BioCondition benchmarks provided within Appendix A.

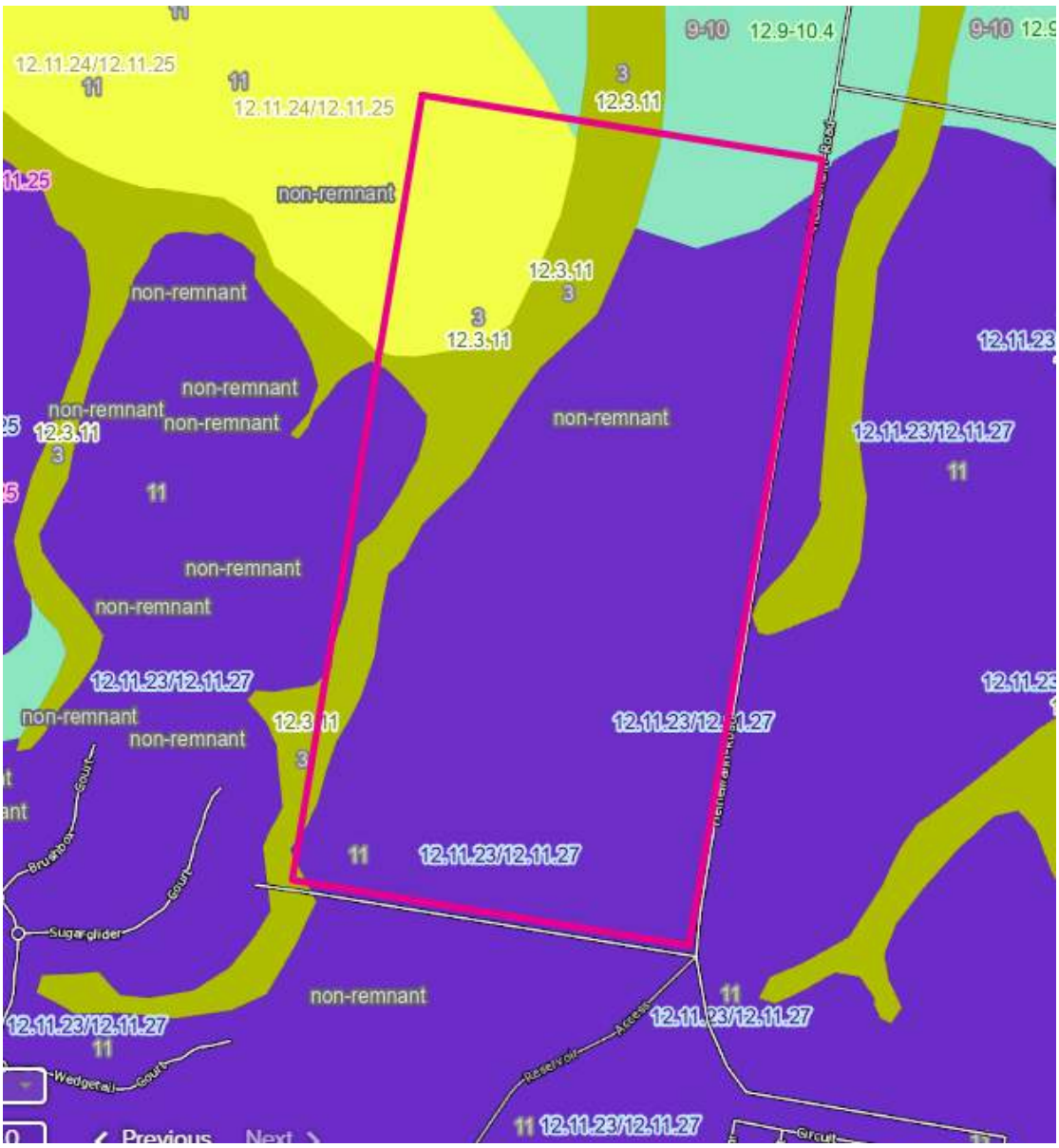


Figure 2 Regional Ecosystem mapping

Table 2 Description of vegetation communities occurring within the Project Site.

Regional Ecosystem (RE)	Management status (VM Act)	Description (adapted from Regional Ecosystem Description Database, Version 11.1)	Dominant canopy species for use in restoration
12.3.11	Of concern	*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia* and *Corymbia intermedia* open forest to woodland. *Corymbia tessellaris, Lophostemon suaveolens* and *Melaleuca quinquenervia* frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include *Angophora leiocarpa, Eucalyptus exserta, Eucalyptus grandis, Corymbia trachyphloia, Corymbia citriodora* subsp. *variegata, Eucalyptus latisinensis*, *Eucalyptus tindaliae, Eucalyptus racemosa* and *Melaleuca sieberi*. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands.	*Eucalyptus tereticornis, Eucalyptus siderophloia, Corymbia intermedia, Lophostemon suaveolens* and *Melaleuca quinquenervia*

Regional Ecosystem (RE)	Management status (VM Act)	Description (adapted from Regional Ecosystem Description Database, Version 11.1)	Dominant canopy species for use in restoration
12.9-10.4	Least concern	*Eucalyptus racemosa* subsp. *racemosa* woodland to open forest. Other species can include *Angophora leiocarpa, Eucalyptus seeana, Eucalyptus siderophloia, Corymbia intermedia, Eucalyptus tindaliae*, with *Lophostemon suaveolens*, *Melaleuca quinquenervia, Eucalyptus tereticornis* common on lower slopes. Occurs on Cainozoic and Mesozoic sediments +/- remnant Tertiary surfaces.	*Eucalyptus racemosa, Eucalyptus siderophloia, Corymbia intermedia, Eucalyptus tindaliae,* and *Lophostemon suaveolens*
12.11.23	Endangered	*Eucalyptus pilularis* open forest. Other canopy species include *Eucalyptus microcorys, Corymbia intermedia, Angophora woodsiana, Eucalyptus tindaliae* and *Eucalyptus carnea*. *Eucalyptus racemosa* subsp. *racemosa* and *Corymbia trachyphloia* are prominent in the Venman area. Occurs on low coastal Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	*Eucalyptus pilularis, Eucalyptus microcorys, Corymbia intermedia, Angophora woodsiana,* and *Eucalyptus tindaliae*
12.11.24	Least concern	*Eucalyptus carnea, Eucalyptus tindaliae, Corymbia intermedia* woodland +/- *Eucalyptus crebra* or *Eucalyptus siderophloia*, *Eucalyptus resinifera, Eucalyptus major, Eucalyptus helidonica, Angophora woodsiana, Corymbia trachyphloia, Eucalyptus microcorys, Corymbia citriodora* subsp. *variegata*, *Corymbia henryi*. Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics usually at altitudes	*Eucalyptus carnea, Eucalyptus tindaliae,* and *Corymbia intermedia*
12.11.25	Of concern	*Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* woodland. Other frequently occurring canopy species may include *Eucalyptus crebra, Eucalyptus carnea, Eucalyptus tindaliae, Eucalyptus siderophloia, Corymbia citriodora* subsp. *variegata, Angophora leiocarpa, Eucalyptus acmenoides, Eucalyptus helidonica, Eucalyptus propinqua, Corymbia intermedia* and *Eucalyptus seeana*. Rarely includes patches of Eucalyptus dura. Usually occurs on low hills, hills and footslopes of mountains in near coastal areas on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	*Corymbia henryi* and *Eucalyptus fibrosa*
12.11.27	Endangered	*Eucalyptus racemosa* subsp. *racemosa* and/or *Eucalyptus seeana* and *Corymbia intermedia* woodland. Other characteristic species include *Eucalyptus siderophloia, Angophora leiocarpa, Corymbia trachyphloia* subsp. *trachyphloia* and rarely *Eucalyptus pilularis. Melaleuca quinquenervia* may be present and at times becomes locally co-dominant. Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics, typically at low altitude	*Eucalyptus racemosa*, *Eucalyptus seeana* and *Corymbia intermedia*

2.3 Restricted Matters (Weeds)

The site supports a number of weed species, although none are at a density that is significantly impacting on the ecology of the site. The following list includes all of the Restricted Invasive Plants, declared under the provisions of the *Biosecurity Act 2014*, which were observed within the site.

+ Asparagus aethiopicus (Asparagus fern);
+ Cinnamomum camphora (Camphor laurel);
+ Eichhornia crassipes (Water hyacinth);
+ Lantana camara (Lantana);
+ Lantana montevidensis (Creeping lantana);
+ Senecio madagascariensis (Fireweed);
+ Anredera cordifolia (Madeira vine);
+ Bryophyllum delagoense (Mother-of-millions);
+ Sporobolus pyramidalis (Giant rat's tail grass);
+ Sphagneticola trilobata (Singapore daisy); and
+ Tecoma stans (Yellow bells).

It should be noted that *Sporobolus pyramidalis* (Giant rat's tail grass) dominated the north-eastern portion of the Site and indicated scattered infestation of *Senecio madagascariensis* (Fireweed) throughout this area of the Site. The restricted matters presented above are to be the primary focus of weed control activities. Suggested methodologies to control these species are presented in Section 4.

3. REGENERATION STRATEGY

Restoration activities within the Subject area will comprise of two types. These are:

+ Assisted Natural Regeneration (weed control);
+ Revegetation (weed control and supplementary planting)

The Regeneration strategy is discussed in further detail in the sections below.

3.1 Regeneration zones

As part of the site revegetation strategy, two (2) regeneration zones have been established (refer to Appendix 2 for regeneration areas) based on their current level of native vegetation, the level of anthropogenic impacts and their end-use (i.e. use as public open space or recreational areas). The specific regeneration strategy for each of these regeneration zones is presented in Table 3.

Table 3 Regeneration strategies to be applied to each of the regeneration zones

Regeneration Area (Zones)	Regeneration Strategy	Proposed regeneration Activities	Notes
A	Assisted Natural Regeneration	Weed control throughout entire area	No supplementary planting is proposed
B	Active Revegetation	Weed control throughout entire area	Supplementary planting is to reflect species characteristic to the following Regional Ecosystem types: RE 12.3.11, 12.11.23, 12.11.24, 12.11.25, 12.11.27 and 12.9-10.4 Refer to Table 2 and Appendix A for further information related to the Regional Ecosystems identified above. Supplementary planting is to have the ultimate goal of achieving the BioCondition Benchmarks presented within Appendix A in the long term (ie within a 50-100-year timeframe)

4. WEED CONTROL TECHNIQUES

This section provides information related to weed control techniques that are likely to be required as part of the rehabilitation works associated with the Project.

The steps below in relation to weed removal apply to all portions of the site, which are located outside of the development footprint, as specified by this Plan.

Although weeds will be removed during clearing for construction and landscaping, regular effort will be required to control weeds following the completion of Project works. The effort required during the later stages of rehabilitation will diminish as natural ecosystems are established and provided that weeds are controlled/removed prior to the onset of seeding (ie following flowering) or the development of propagules.

Weed hygiene protocols are to be observed at all times (ie washdown of equipment to remove debris, seeds and propagules), in consideration that highly invasive species (eg Giant Ratstail Grass) are known to occur within this area. Vehicles are to avoid driving off formed roads wherever possible and any equipment moved from site is to be brushed, or washed down prior to leaving site to ensure that invasive species are not transported from this area.

Application of herbicides shall only be carried out under the authority of a licensed contractor in accordance with the *Agricultural Chemicals Distribution Control Act* (1966) and in accordance with the manufacturer's directions (i.e. as per the product's label). Any contractors engaged to control weeds are to be proficient in weed control methods for each of the target species.

Herbaceous weeds shall be foliar sprayed or hand pulled a minimum of one week prior to mulching and planting. Shrub weeds and tree weed saplings shall be treated using either the cut stump method or stem injection. Extreme care should be taken to prevent herbicide being sprayed into creeks or waterways.

Application of herbicides shall only be carried out under the authority of a licensed contractor in accordance with the *Agricultural Chemicals Distribution Control Act (1966)* and in accordance with the manufacturer's directions.

The methods and herbicide use rates provided below are considered current best practice. However, it is the responsibility of the operator to ensure that the methods used are suitable for the site and any environmental constraints experienced at the specific location are considered.

4.1 Cut-scrape-paint

This weed control method applies to all woody shrubs, trees and some vines.

+ Cut plant low to the ground at an angle.
+ Apply Glyphosate immediately at the rate of 1-part Glyphosate to 1.5 parts water, with a paintbrush approximately 1.5 centimetres wide.
+ Scrape sides lightly to reveal green tissue and apply the herbicide to the scraped area.
+ Take care that the brush is not contaminated with soil.

All seed that has high viability and longevity, e.g. Senna spp. and other members of the Fabaceae family, or plants with a high invasive potential, such as Umbrella Tree Schefflera actinophylla, must be removed from the parent and either composted on site or removed from the site.

4.2 Gouge-paint

This weed control method applies to those plant species that have a fleshy root system, such as rhizomes or large bulbs. It is particularly appropriate for the treatment of *Asparagus* spp.

+ Gouge out sections of the fleshy base with a knife (if using on Asparagus, first cut the stems at shoulder height and also at the base).
+ Apply 1-part Glyphosate to 1.5 parts water immediately, with a paint brush approximately 1.5 centimetres wide.

4.3 Stem Injection

This weed control method applies to all woody trees and shrubs with a diameter of about six to ten centimetres or greater.

+ With a tomahawk, make a cut the width of the blade, at a slight angle, into the trunk. It is important not to make cuts too deep.
+ Apply herbicide immediately into the cut using a tree-injecting device (if using Glyphosate, apply at the rate of 1-part Glyphosate to 1.5 parts water).
+ Repeat this procedure in a brickwork pattern around the circumference of the tree, as close to the ground as possible. Where the presence of a crotch angle makes this difficult, make a cut above it. Two rows of cuts will be sufficient for trees with trunks of six to ten centimetres; larger trunk diameters will need correspondingly more.
+ Treat all visible lateral roots as per dot point 1.

4.4 Scrape-ditch-paint

This weed control method is applicable to many species of vines where it is desirable to treat the vines intact, particularly those with aerial tubers such as *Anredera cordifolia* (Madeira Vine) or those which will propagate from segments, e.g. *Delairia odorata* (Cape Ivy).

+ Scrape the stem tissue on one side of the stem only for at least 20-30 centimetres if possible. Note - on Madeira Vine, it is necessary to scrape heavily. Scrape as many sections of the stem as possible.
+ Apply undiluted Glyphosate with a paintbrush.
+ On stems that are thicker or horizontal, make a ditch into the stem with a knife and apply herbicide. Tubers and side roots should be treated the same way. Note – care must be taken not to sever the stem.

4.5 Spraying

This weed control method is carried out using a 15-litre backpack spray unit with a modified spray nozzle that gives a solid spray pattern. Glyphosate is the main herbicide used with the addition of a marker dye. For plants that show some resistance (e.g. Madeira Vine) or where growing conditions are not optimal, an acidifying agent, LI700®, is added. Metsulfuron methyl can also be used for resistant species and grasses. It should be used with a surfactant, such as Agral®.

Where both Glyphosate and Metsulfuron methyl are recommended for a species, it may be possible to use a commercially available compound of these two herbicides. This approach is currently under trial and is not suitable for operators unskilled in precision spraying.

Dilution rates for Glyphosate and Metsulfuron methyl are in accordance with the manufacturer's recommendations and any variation requires a permit from the National Registration Authority.

Dilution rates for Glyphosate to water for treatment of some weed species are provided below:

+ Plants with more or less succulent leaves, e.g. *Tradescantia* spp (Wandering Jew), *Anredera cordifolia* (Madeira Vine) (autumn to winter is the suggested time for spraying these plants), Chlorophytum spp. (Spider/Ribbon Plants) etc - 1-part Glyphosate to 50 parts water + LI700® 0.5%
+ *Lantana camara* (Lantana) - 1-part Glyphosate to 100 parts water

+ Other soft-leaved plants, annuals and grasses - 1-part Glyphosate to 100 parts water
+ *Baccharis halimifolia* (Groundsel bush) and similar woody weeds - 1-part Glyphosate to 150 parts water to 1-part Glyphosate to 400 parts water Typical dilution rates for Metsulfuron methyl to water are - 1.5g Metsulfuron methyl to 10 litres water + 20 millilitres Agral® to 10 litres water.

4.6 Overspray

This weed control method is applicable to large, dense infestations of plants such as *Lantana camara*, where it is desirable to leave the dead plants intact to prevent erosion and over-exposure of large areas, protect native seedlings from predators such as wallabies, and avoid trampling by humans.

+ Spray over the top of the infestation, using a weak solution of Glyphosate.
+ Any native plants that may be under the weed will be protected by the foliage cover of the weed.
+ Leave the sprayed plants intact so that native seedlings can establish under the shelter provided.
+ The rate for over spraying of Lantana is 1-part Glyphosate to 100 parts water.

Alternatively, weeds can be cut and flattened with bush-hooks or loppers and the subsequent regrowth sprayed with Glyphosate. In many cases it is preferable to overspray wherever practicable as this will cause less erosion and trampling of suppressed native plants, such as ferns and seedlings. However, handwork will be necessary to cut-scrape paint any unsprayed Groundsel Bush or Lantana that surrounds native plants.

4.7 Crowning

This weed control method is applicable to weeds which have their growing points below the surface of the ground (corms, bulbs, rhizomes, clumped or fibrous root systems).

+ Grasp the leaves or stems and hold them tightly so that the base of the plant is visible. Plants with sharp leaves or stems should be cut back first.
+ Insert the knife close to the base of the plant at a slight angle, with the tip well under the root system.
+ Cut through the roots close to the base. Depending on the size of the plant, two or more cuts may be needed to sever all the roots.
+ Remove the plant. Make sure that the base of the plant where the roots begin is completely removed.

4.8 Mechanical removal

Weed trees (eg. Camphor laurel) may occur within the site and where possible should be mechanically removed using chainsaws to ground level. The roots should be left in situ to maintain stability, to minimise disturbance and to prevent erosion and scouring in situations where they occur close to drainage lines. The trees shall not be pushed with bulldozers or similar.

Mature tree that are weeds (eg Camphor laurel) should be felled so they fall away from adjacent native trees. Where this is not possible, such weeds should be dismantled and lowered to the ground. Any resprouts or suckers should be treated using the cut stump method or foliar spraying until the tree is completely dead.

4.9 Aquatic Weeds

Eichhornia crassipes (Water hyacinth) has been recorded in the Project Site. In addition, serious aquatic weed species that proliferate in the region include *Cabomba caroliniana* (Cabomba), a Weed of National Significance, and *Salvinia molesta* (Salvinia), an environmental aquatic weed. Both species thrive in situations of sunlight, slow flows and increased nutrient load.

If any aquatic weeds are identified during rehabilitation works, they shall be mechanically removed from the water and disposed of legally offsite.

Under no circumstances are aquatic plants to be sprayed *insitu* in dams, creeks or other watercourses.

5. REVEGETATION

As identified previously, active revegetation is to occur within Area B. All revegetation activities are to be geared to restoring natural systems.

This section provides information related to the overarching process associated with revegetation to be used in order to achieve successful revegetation outcomes.

This section provides information related to site preparation and direct planting. Information related to site maintenance and monitoring is provided within Section 6.

5.1 Site preparation

Site preparation consists of getting the area ready for planting. This will include removal of competing species (ie non-native weeds, grasses and forbs) using the methodologies outlined in Section 4. Ensure all weeds are controlled so that planting into bare moist ground is possible. Good weed control creates a reservoir of moisture in the planting area which is available for use by the seedlings and well-prepared weed-free soil is essential for most revegetation programs. Prior to planting fence sites to protect them from grazing by livestock and undertake pest management to eradicate vermin such as rabbits and hares if required.

5.2 Species selection and densities

Species selections and comments related to planting densities for each of these areas has been provided in Table 2. Recommended planting densities for canopy and understory species is provided in Table 4.

Table 4 Recommended densities of canopy and understorey species per Regional Ecosystem type

Reginal Ecosystem	Density of canopy species to be used (%)	Density of shrubs and ground covers to be used (%)	Density of canopy plantings
12.11.23	5-10%	90-95%	1 - 10 per 20m^2
12.11.24	5%	95%	1 per 20m^2
12.11.25	5%	95%	1 per 20m^2
12.3.11	5-10%	90-95%	1 - 10 per 20m^2
12.9-10.4	5-10%	90-95%	1 – 10 per 20m^2
12.11.27	5%	95%	1 per 20m^2

5.3 Planting

Seedlings, whether bare rooted, cells or tubes can be established by hand operated tools in a wide variety of conditions and this methodology is considered to be most suited for the revegetation actives associated with the Project Site. Hand planting is a technique most suited to revegetation projects that:

+ require selected plants at regular spacings, for example, farm forestry;
+ require species that are difficult to direct seed;
+ are establishing species for which there is a limited seed supply; hand planting can be valuable in setting up seed production areas to rectify this problem for the future;
+ aim to provide a high level of community education at the planting stage;

- are inaccessible by machinery;
- are of a small scale;
- use a wide range of species;
- are planting specimen trees.

Seedlings are to be obtained by a reputable source and are to be of local provenance. Material to be planted is to be older than the 6th leaf stage (to ensure that root development of the seedling has occurred). Choose plants that have been grown in conditions that help to prevent root circling or that reduce the damage to the root (e.g. air pruning and ribbed pots). Revegetation works are to utilise as many different indigenous species as possible.

During revegetation activities, seedlings are to be planted into moist soil. To assist establishment and reduce losses to browsing animals, plant guards can be installed around seedlings. It is recommended that planting coincide with periods of rainfall, to increase the chances of seedling establishment. Watering at planting is required to remove air pockets from the roots, to help overcome any transplant shock and to establish good root to soil contact. However, not that in wet sites, watering may not be required.

Following planting, regular inspection (weekly/monthly) to assess for signs of pests and diseases and take action as required. (e.g. water if plants display drought stress, remove plant guards, apply fertilisers, etc.).

6. MAINTENANCE, INSPECTION AND REPORTING

6.1 Maintenance

The regeneration areas are to be maintained for a period of five years following the completion of planting (unless performance indicators are not met, in which case maintenance will be extended). Responsibility for maintenance will rest with the proponent or their delegate.

In relation to ongoing weed management, frequent control events are required with initially 10-12 control events recommended per year, for the first five years. This is to be reduced to two control events per annum between years six and ten.

For the first year following completion of planting, maintenance is to occur on a monthly basis, and will focus on plant watering, weed control, and monitoring to ensure that survival rates are such that the overall rehabilitation objective can be achieved; namely to return the revegetated areas to a near-natural state, taking into account the time needed to allow new vegetation to reach maturity. Allowance should be made for re-planting if survival rates are poor. Monitoring should also ensure that rehabilitation areas remain stable, particularly after rain events, and allow for any necessary repairs to be implemented if and when required.

In the second year following completion of planting, the frequency of maintenance visits can be reduced to bi-monthly (in relation to revegetation, noting that additional weed control is required as identified above), with the focus on weed control, and watering if required (e.g. during extended dry periods).

During years three to five following planting, maintenance would take place on a quarterly basis, focusing again on weed control (noting additional weed control required as identified above). During this period, some thinning of vegetation may be required to ensure that the right balance between canopy and understorey species is achieved.

6.2 Monitoring

Monitoring for restoration projects is typically undertaken using quantitative methods (i.e. transect or quadrat-based monitoring) and qualitative methods (i.e. observations on daily record sheets and photo-point monitoring).

Prior to the commencement of restoration activities, a minimum of five (5) photo-monitoring points are to be established in each regeneration zone. Baseline data is to be collected at each of these locations using transect and quadrat-based sampling techniques, to which progress can be measured. For all areas pertaining to areas individually or collectively greater than 0.5 hectares, data collection to measure restoration outcomes is required. Data should be collected within stratified random quadrats of a minimum size of 20m x 20m. The number and location of quadrats are to be determined in consultation with council, prior to the implementation of this management plan.

Monitoring is to be conducted at three-monthly intervals for the first two (2) year and then at six-monthly intervals thereafter until the performance targets have been achieved.

6.3 Reporting

Reporting on the progress of the regeneration and revegetation activities is required to demonstrate that the restoration project is achieving its aims and objectives. The following is required as part of this management plan:

+ Brief reporting is to be provided to the proponent by contractors within three (3) weeks of a monitoring event, with a detailed report (summarising the progress of the restoration activities) submitted on an annual basis
+ Reports are to be retained by the proponent and provided to the relevant regulatory authority as conditioned or upon request.
+ Progress reports should include:
  - Progress on implementation of the rehabilitation strategy.
  - Monitoring results and compliance with performance indicators.
  - Any changes in the Implementation Schedule as a result of adaptive management.
  - Progress of ongoing site management issues.
  - Any records of threatened flora and fauna species.
  - Recommendations regarding the ongoing management of the site.

7. PERFORMANCE INDICATORS AND CORRECTIVE ACTIONS

7.1 Performance indicators

The following performance indicators are to be used to assess success where assisted natural regeneration (i.e. weed control) is to occur (i.e. Areas A, refer Section 3.1)

+ Primary treatment of all weeds to occur by the end of year three.
+ Nil fruiting of weed species after primary treatment.
+ Increased number and abundance of native species.
+ Increased recruitment of native species.
+ Increased percentage canopy of native species.
+ Increased colonisation and use of the site by native fauna.
+ Effective restriction of access by pedestrians, vehicles and domestic and feral animals to the rehabilitation zones (unless otherwise designated).

The following performance indicators are to be used to assess success where reconstruction (i.e. revegetation and weed control) is to occur (i.e. Area B refer Section 3.1)

+ Primary treatment of all weeds to occur by the end of year three.
+ Nil fruiting of weed species after primary treatment.
+ Increased number and abundance of native species.
+ Increased recruitment of native species.
+ Increased percentage canopy of native species.
+ No inappropriate genetic material used in plantings.
+ Species used in replants are to be characteristic of the Regional Ecosystem BioCondition Benchmark (refer Appendix A) and are to be of local provenance.
+ High survival rate of planted stock (>70%) and naturally recruited native species.
+ Growth of >1 metre by year three plantings and cover (cumulative cover from ground level to canopy) of 60% after 3 years and 80% after five years (or as otherwise specified by the BioCondition Benchmarks – Refer Appendix A).
+ Increased colonisation and use of the site by native fauna.
+ Effective restriction of access by pedestrians, vehicles and domestic and feral animals to the revegetation zones (unless otherwise designated).

7.2 Corrective actions

If performance indicators identified within Section 7 are not met, an adaptive management strategy is to be adopted to ensure compliance (i.e. in instances of drought, fire, disease, or planting failure). In instances where weeds persist on site, or excessive mortality within revegetation zones, management strategies are to be revaluated and updated to ensure that performance indicators are met.

Any alterations to any component of this management plan must be approved by the relevant regulatory authority and to be accompanied by an Adaptive Management Statement (AMS) which clearly outlines the plan component to be altered and the reasoning for the alteration.

8. REFERENCES

Greening Australia (2003). Revegetation Techniques – A guide for establishing native vegetation in Victoria. National Heritage Trust, Victoria.

Queensland Herbarium (2019). BioCondition Benchmarks for Regional Ecosystem Condition Assessment (Bioregion 12). (DES: Brisbane)

Queensland Herbarium (2021). *Regional Ecosystem Description Database (REDD).* Version 12 (March 2021) (DES: Brisbane)

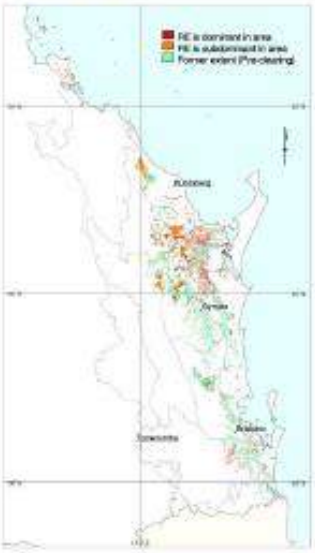
Tweed Shire Council (2012): *Draft habitat restoration plan preparation guidelines – Site-specific guidelines for the ecological restoration and ongoing management of habitat utilised by native flora and fauna*. Version February 2012.

A1. BIOCONDITION BENCHMARKS

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland **Regional ecosystem: 12.3.11**

Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open-forest on alluvial plains usually near coast





BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	7
		Grass:	12
		Forbs and other:	25
Trees:	Tree canopy	Tree canopy median height (m):	23
		Tree canopy cover (%):	56
	Tree sub-canopy	Tree sub-canopy median height (m):	8
		Tree sub-canopy cover (%):	33
	Large trees	Large eucalypt tree dbh threshold (cm):	49
		Number of large eucalypt trees per hectare:	22
		Large non-eucalypt tree dbh threshold (cm):	36
		Number of large non-eucalypt trees per hectare:	8
	Typical tree species: Eucalyptus tereticornis (blue gum), Eucalyptus siderophloia (red ironbark), Melaleuca quinquenervia (swamp paperbark)		
Shrubs:		Native shrub cover (%):	20
	Typical shrub species: Acacia leiocalyx (early flowering black wattle), Allocasuarina littoralis (woolly oak), Alphitonia excelsa (soap tree)		
Ground cover (%):		Native perennial grass cover (%):	44
		Organic litter cover (%):	37
	Typical ground cover species: Themeda triandra (kangaroo grass), Imperata cylindrica (blady grass), Eremochloa bimaculata (poverty grass), Lomandra longifolia (spiny mat rush), Eustrephus latifolius (wombat berry)		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			555
Non-native plant cover			0
None listed			

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Users should refer to the regional ecosystem description database (REDD) and/or the technical description for more complete lists of characteristic species. Only the most frequently used common name is given. Other common names may be used in other regions. Declared pest species in Queensland are designated (*).

30/11/2012

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.9-10.4a

Eucalyptus racemosa subsp. racemosa woodland with a wet sedge ground layer on sedimentary rocks





BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	11
		Grass:	8
		Forbs and other:	16
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	21
		Tree canopy cover (%):	72
	Tree sub-canopy	Tree sub-canopy median height (m):	9
		Tree sub-canopy cover (%):	35
	Large trees	Large eucalypt tree dbh threshold (cm):	49
		Number of large eucalypt trees per hectare:	27
		Large non-eucalypt tree dbh threshold (cm):	25
		Number of large non-eucalypt trees per hectare:	9
Typical tree species: Eucalyptus racemosa subsp. racemosa (scribbly gum), Eucalyptus resinifera (red mahogany), Corymbia intermedia (pink bloodwood), Lophostemon suaveolens (swamp box), Melaleuca quinquenervia (swamp paperbark)			
Shrubs:		Native shrub cover (%):	5
Typical shrub species: Acacia leiocalyx subsp. leiocalyx (black wattle), Alphitonia excelsa (red ash), Banksia integrifolia (coast banksia), Leptospermum trinervium (woolly tea-tree), Lomatia silaifolia (crinkle bush)			
Ground cover (%):		Native perennial grass cover (%):	15
		Organic litter cover (%):	51
Typical grass, forbs and other species: Cymbopogon refractus (barbed-wire grass), Digitaria parviflora (small-flower fingergrass), Entolasia stricta (wiry panic), Ptilothrix deusta (ptilothrix sedge), Cyperus gracilis (slender sedge)			
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			458
Non-native plant cover			0
Typical non-native species: Lantana camara^ (lantana), Passiflora suberosa (corky passionfruit)			
Benchmark based on: 3 reference sites and expert opinion.		**Benchmark reliability ranking:**	high

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

18/01/2019

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland **Regional ecosystem: 12.11.23**

Eucalyptus pilularis open-forest on coastal metamorphics and interbedded volcanics





BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	16
		Shrub:	11
		Grass:	4
		Forbs and other:	18
Trees:	Tree canopy	Tree canopy median height (m):	31
		Tree canopy cover (%):	50
	Tree sub-canopy	Tree sub-canopy median height (m):	10
		Tree sub-canopy cover (%):	11
	Large trees	Large eucalypt tree dbh threshold (cm):	47
		Number of large eucalypt trees per hectare:	28
		Large non-eucalypt tree dbh threshold (cm):	27
		Number of large non-eucalypt trees per hectare:	2
	Typical tree species: Eucalyptus pilularis (blackbutt), Eucalyptus tindaliae (Queensland white stringybark), Corymbia intermedia (pink bloodwood)		
Shrubs:		Native shrub cover (%):	18
	Typical shrub species: Allocasuarina littoralis (woolly oak), Lophostemon confertus (brush box)		
Ground cover (%):		Native perennial grass cover (%):	6
		Organic litter cover (%):	56
	Typical ground cover species: Themeda triandra (kangaroo grass), Entolasia stricta (wiry panic), Imperata cylindrica (blady grass)		
Coarse woody debris	Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:		480
Non-native plant cover			0
	Typical non-native species: Lantana camara^, Senna pendula var. glabrata^ (Easter cassia)		

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Users should refer to the regional ecosystem description database (REDD) and/or the technical description for more complete lists of characteristic species. Only the most frequently used common name is given. Other common names may be used in other regions. Declared pest species in Queensland are designated (^).

30/11/2012

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland **Regional ecosystem: 12.11.24**

Eucalyptus carnea, E. tindaliae, Corymbia intermedia +/- E. siderophloia or E. crebra woodland on metamorphics +/- interbedded volcanics





Adrian Borsboom

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	10
		Shrub:	8
		Grass:	9
		Forbs and other:	17
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	26
		Tree canopy cover (%):	72
	Tree sub-canopy	Tree sub-canopy median height (m):	10
		Tree sub-canopy cover (%):	43
	Large trees	Large eucalypt tree dbh threshold (cm):	46
		Number of large eucalypt trees per hectare:	33
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na
	Typical tree species: Eucalyptus tindaliae (Tindale's stringybark), Eucalyptus carnea (broad-leaved white mahogany), Eucalyptus siderophloia (grey ironbark), Corymbia intermedia (pink bloodwood), Eucalyptus crebra (narrow-leaved red ironbark)		
Shrubs:		Native shrub cover (%):	7
	Typical shrub species: Acacia concurrens (curracabah), Acacia disparrima subsp. disparrima (brush ironbark wattle), Lophostemon confertus (brush box), Alphitonia excelsa (red ash)		
Ground cover (%):		Native perennial grass cover (%):	39
		Organic litter cover (%):	45
	Typical grass, forbs and other species: Themeda triandra (kangaroo grass), Imperata cylindrica (blady grass), Cymbopogon refractus (barbed-wire grass), Eremochloa bimaculata (poverty grass)		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			546
Non-native plant cover			0
	Typical non-native species: Lantana camara^ (lantana), Melinis minutiflora (molasses grass)		
Benchmark based on: 24 Corveg sites, 3 reference sites and expert opinion		**Benchmark reliability ranking:**	high

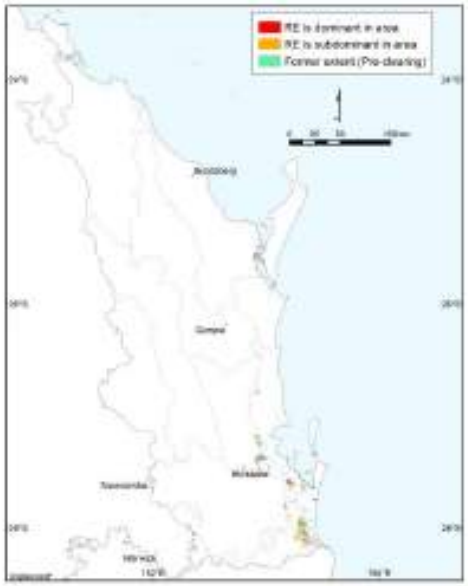
Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

18/01/2019

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland **Regional ecosystem: 12.11.25**

Corymbia henryi and/or Eucalyptus fibrosa subsp. fibrosa +/- E. crebra, E. carnea, E. tindaliae woodland on metamorphics +/- interbedded volcanics





Teresa Eyre

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	7
		Shrub:	8
		Grass:	9
		Forbs and other:	13
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	22
		Tree canopy cover (%):	40
	Tree sub-canopy	Tree sub-canopy median height (m):	9
		Tree sub-canopy cover (%):	5
	Large trees	Large eucalypt tree dbh threshold (cm):	40
		Number of large eucalypt trees per hectare:	23
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na
	Typical tree species: Corymbia henryi (large-leaved spotted gum), Eucalyptus fibrosa subsp. fibrosa (broad-leaved ironbark), Eucalyptus crebra (narrow-leaved red ironbark), Eucalyptus carnea (broad-leaved white mahogany), Eycalyptus tindaliae		
Shrubs:		Native shrub cover (%):	4
	Typical shrub species: Acacia concurrens (curracabah), Acacia disparrima var disparrima, Acacia leiocalyx subsp. leiocalyx (black wattle), Allocasuarina torulosa (mountain oak), Alphitonia excelsa (red ash)		
Ground cover (%):		Native perennial grass cover (%):	20
		Organic litter cover (%):	65
	Typical grass, forbs and other species: Entolasia stricta (wiry panic), Themeda triandra (kangaroo grass), Cymbopogon refractus (barbed-wire grass), Cyanthillium cinereum (vernonia), Desmodium rhytidophyllum (a perennial legume)		
Coarse woody debris: Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:			100
Non-native plant cover			0
	Typical non-native species: Lantana camara^ (lantana), Passiflora suberosa (corky passionfruit), Bidens pilosa (cobblers pegs), Oxalis corniculata, Asparagus aethiopicus 'Sprengeri' (ground asparagus fern)		
Benchmark based on: 6 Corveg sites, 1 reference site, 9 QBERD sites and expert opinion		**Benchmark reliability ranking:**	high

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

16/01/2019

BioCondition benchmark for regional ecosystem condition assessment

Southeast Queensland — Regional ecosystem: 12.11.27

Eucalyptus racemosa subsp. racemosa and/or E. seeana and Corymbia intermedia woodland on metamorphics +/- interbedded volcanics





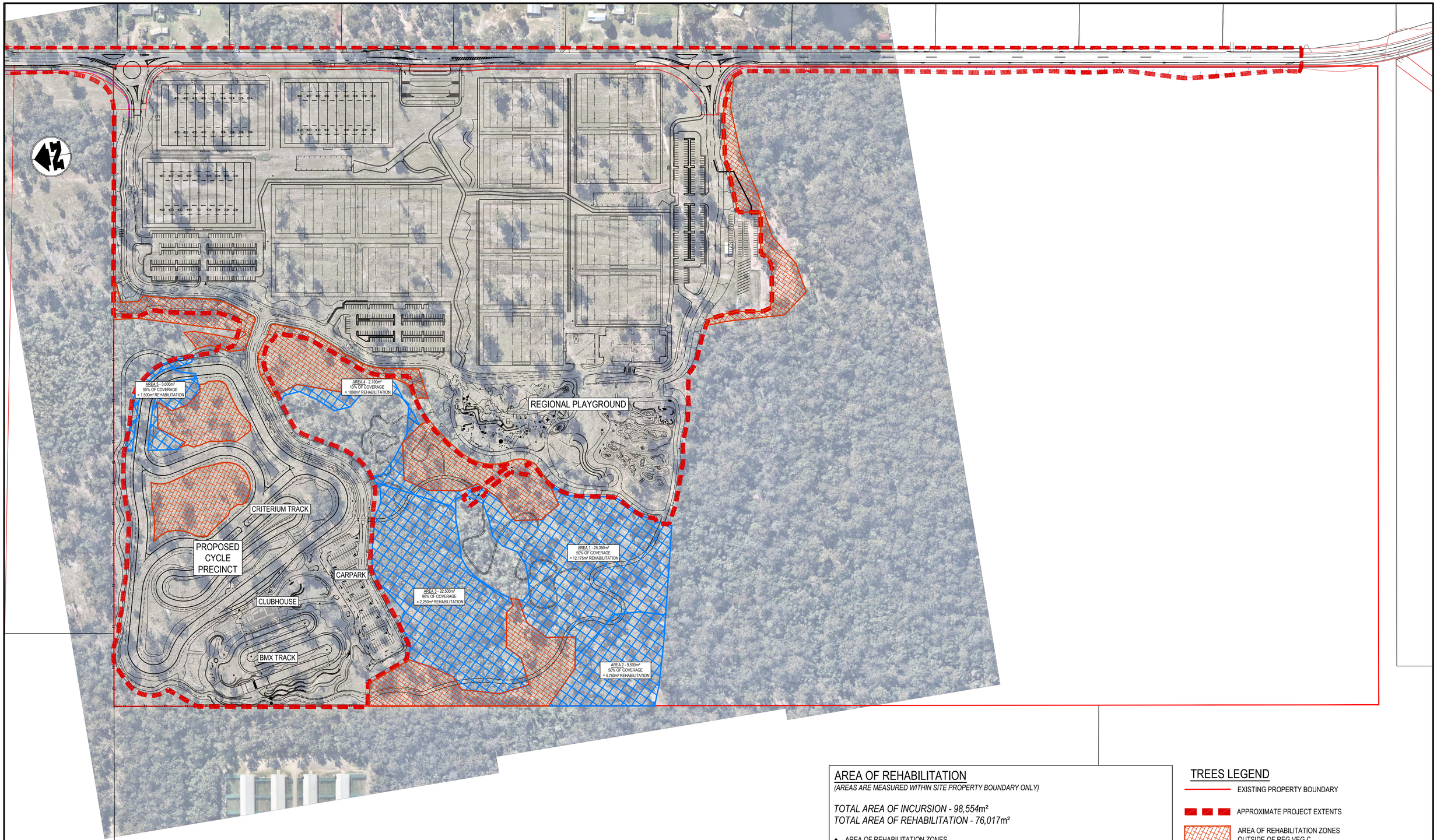
Shannon Hudson

BioCondition attribute			Benchmark
Recruitment of dominant canopy species (%):			100
Native plant species richness:		Tree:	8
		Shrub:	7
		Grass:	7
		Forbs and other:	14
Trees:	Emergent canopy	Tree emergent canopy median height (m):	na
		Tree emergent canopy cover (%):	na
	Tree canopy	Tree canopy median height (m):	21
		Tree canopy cover (%):	44
	Tree sub-canopy	Tree sub-canopy median height (m):	10
		Tree sub-canopy cover (%):	18
	Large trees	Large eucalypt tree dbh threshold (cm):	50
		Number of large eucalypt trees per hectare:	27
		Large non-eucalypt tree dbh threshold (cm):	na
		Number of large non-eucalypt trees per hectare:	na
	Typical tree species: Eucalyptus racemosa subsp. racemosa (scribbly gum), Corymbia intermedia (pink bloodwood), Lophostemon suaveolens (swamp box), Allocasuarina littoralis (black sheoak), Eucalyptus microcorys (tallowwood)		
Shrubs:		Native shrub cover (%):	13
	Typical shrub species: Acacia disparrima var disparrima, Alphitonia excelsa (red ash), Banksia spinulosa (golden candlesticks), Hakea florenta, Xanthorrhoea johnsonii (forest grasstree)		
Ground cover (%):		Native perennial grass cover (%):	26
		Organic litter cover (%):	51
	Typical grass, forbs and other species: Imperata cylindrica (blady grass), Entolasia stricta (wiry panic), Themeda triandra (kangaroo grass), Desmodium rhytidophyllum (a perennial legume), Lobelia purpurascens (white root)		
Coarse woody debris:	Total length (m) of debris ≥ 10cm diameter and ≥0.5m in length per hectare:		639
Non-native plant cover			0
	Typical non-native species: Passiflora suberosa (corky passionfruit), Emilia sonchifolia (emilia), Lantana camara^ (lantana), Ochna serrulata (ochna), Gomphocarpus physocarpus (balloon cottonbush)		
Benchmark based on:	7 Corveg site, 3 reference sites and expert opinion	**Benchmark reliability ranking:**	high

Selected typical species are those that characterize the ecosystem, community or stratum at reference sites. Up to five frequently occurring species for each stratum are selected. Shrub and ground strata may contain recruiting canopy species. 'Eucalypt' refers to species belonging to the genera Eucalyptus, Corymbia, Angophora, Lophostemon and Syncarpia. Users should refer to regional ecosystem technical descriptions for more complete lists of characteristic species. Common names can differ between regions. Declared pest species in Queensland are designated (^).

18/01/2019

A2. REHABILITATION PLAN



AREA OF REHABILITATION

(AREAS ARE MEASURED WITHIN SITE PROPERTY BOUNDARY ONLY)

*TOTAL AREA OF INCURSION - 98,554*m²
*TOTAL AREA OF REHABILITATION - 76,017*m²

- AREA OF REHABILITATION ZONES
  - AREA OF REHABILITATION OUTSIDE OF REG VEG C - 48,702m²
  - AREAS OF CATEGORY REG VEG C THAT HAVE BEEN PARTIALLY CLEARED AND TO BE REHABILITATED
    - + AREA 1 - 50% CANOPY - 12,175m²
    - + AREA 2 - 50% CANOPY - 9,500m²
    - + AREA 3 - 90% CANOPY - 2,250m²
    - + AREA 4 - 10% CANOPY - 1,890m²
    - + AREA 5 - 50% CANOPY - 1,500m²
  - **TOTAL AREA OF REHABILITATION 76,017**m²

TREES LEGEND

- EXISTING PROPERTY BOUNDARY
- APPROXIMATE PROJECT EXTENTS
- AREA OF REHABILITATION ZONES OUTSIDE OF REG VEG C
- AREAS OF CATEGORY C THAT HAVE BEEN PARTIALLY CLEARED AND TO BE REHABILITATED

SCALE:

REV	DATE	DESCRIPTION	DRN	DSN	CHK	APR

CLIENT: DESIGN AND TECHNICAL SERVICES
Redland CITY COUNCIL
Redlands coast

CONSULTANT: BLIGH TANNER
BRISBANE | SYDNEY
blightanner@blightanner.com.au
blightanner.com.au

INTERNAL PROJECT NUMBER: 2021.0554

PROJECT: 43697 - REDLANDS COAST REGIONAL SPORT AND RECREATION PRECINCT
LOCATION: 277-293 HEINEMAN ROAD, MOUNT COTTON
TITLE: REHABILITIONA PLAN

DESIGN SERVICES DRG: 2021.0554_CIV_CSK-162
REV: ----
SHEET:
RCC DRG. No:
SIZE:

REGIONAL PLAYGROUND

CRITERIUM TRACK

PROPOSED CYCLE PRECINCT

CARPARK

CLUBHOUSE

BMX TRACK

TREES LEGEND

- EXISTING PROPERTY BOUNDARY
- APPROXIMATE PROJECT EXTENTS
- AREAS OF REHABILITATION
- REGIONAL ECOSYSTEM RE 12.3.6
- REGIONAL ECOSYSTEM RE 12.3.11
- REGIONAL ECOSYSTEM RE 12.9 / 10.4
- REGIONAL ECOSYSTEM RE 12.11.23 / 12.11.25
- REGIONAL ECOSYSTEM RE 12.11.23 / 12.11.27

SCALE:

REV	DATE	DESCRIPTION	DRN	DSN	CHK	APR

CLIENT: DESIGN AND TECHNICAL SERVICES

Redland CITY COUNCIL

Redlands coast

CONSULTANT: BLIGH TANNER

BRISBANE | SYDNEY
blightanner@blightanner.com.au
blightanner.com.au

INTERNAL PROJECT NUMBER: 2021.0554

PROJECT: 43697 - REDLANDS COAST REGIONAL SPORT AND RECREATION PRECINCT

LOCATION: 277-293 HEINEMAN ROAD, MOUNT COTTON

TITLE: REGIONAL ECOSYSTEM OVERLAY PLAN

DESIGN SERVICES DRG: 2021.0554_CIV_CSK-163

REV: ----

SHEET:

RCC DRG. No:

SIZE:

Bligh Tanner Pty Ltd
ABN 32 061 537 666
blightanner@blightanner.com.au
blightanner.com.au

Brisbane
Level 9, 269 Wickham Street
PO Box 612
Fortitude Valley Qld 4006
Australia
T +61 7 3251 8555
F +61 7 3251 8599

Sydney
Level 32, 101 Miller Street
North Sydney
NSW 2060 Australia
T +61 2 8019 7221