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IN ENVIRONMENTAL
MANAGEMENT

# VEGETATION MANAGEMENT PLAN – ARAKOON ROAD

157 ARAKOON ROAD, SOUTH WEST ROCKS

**February 2024**

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## Version Control

| Version | Purpose | Author | Reviewed / approved by | Date |
|---|---|---|---|---|
| Rev 0.1 | Draft Report | Callum McKercher | Lachlan Webster | 16/02/2024 |
| Rev 1.0 | Draft Final | | Lachlan Webster | 16/02/2024 |
| Rev 2.0 | Final | | Lachlan Webster | 11/03/2024 |

## Distribution Control

| Copy | Purpose | Method | Issued to: | Name | Date |
|---|---|---|---|---|---|
| 1 | File Copy | Electronic/Email | Biodiversity Australia | Chantal Linares | 11/03/2024 |
| 2 | Client Review | Electronic/Email | King & Campbell | Craig Campbell | 11/03/2024 |

Project Number: ENS4974

Our Document Reference: ENS4974-BEC-REP-ArakoonRd_VMP-rev2.0

# 1. Background Information

## 1.1 Introduction

Biodiversity Australia Pty Ltd was commissioned to prepare a Vegetation Management Plan (VMP) for the proposed subdivision and subsequent development to occur at 157 Arakoon Road (Lot 9 on DP1219664) along Arakoon Road, South West Rocks, New South Wales (NSW). This Vegetation Management Plan (VMP) supports the approval process to be submitted to Kempsey Shire Council (KSC).

This VMP is written with consideration to the recommendations made in the Biodiversity Development Assessment Report (BDAR) developed by Biodiversity Australia and, in lieu of no formal biodiversity of restoration plan published from the KSC, the *South East Queensland Ecological Restoration Framework: Manual* (Chenoweth EPLA and Bushland Restoration Services, 2012).

## 1.2 Location of the Subject Land

The Subject Land is located on Arakoon Road and is 23.97 ha in area. The Subject Land contains an existing residence in the southern section of the Development Footprint while the rest is cleared and regularly mown land with sparse remnant vegetation distributed throughout. The Subject Land is currently designated as a large residential lot (R5 land) the location is shown in **Figure 1** below.

## 1.3 Site Development Plans

The proposed development on the Subject Land will include:

- the demolition of dwelling currently on the lot.
- the subdivision of the lot.
- the construction of road transport infrastructure within the lot to connect Belle O'Connor Street, Athena Parade, Burrawong Drive, Arakoon Road and an unformed road reserve on the eastern border of the Subject Land as seen in Error! Reference source not found..
- The excavation of 2 detention basins to a depth of approximately 1.4m in basin 1 and approximately 1.6m in basin 2 within the Subject Land that will be converted into artificial wetlands (**Figure 2**) upon completion of the project.

## 1.4 Statement of Intent

The intent of this document is to guide vegetation management associated with the proposed development including any native vegetation that is to be retained within the development as well as the revegetation efforts to return basin areas to augmented forested wetland habitat as previously existed. These basins will operate as ephemeral wetlands and will have natural wet/dry phases as would occur natural within this environment. This plan should be implemented for a minimum of 5 years from completion of construction of basins to ensure the success of revegetation efforts. It is intended that this plan be written with an adaptive approach so that it can be utilised into perpetuity.

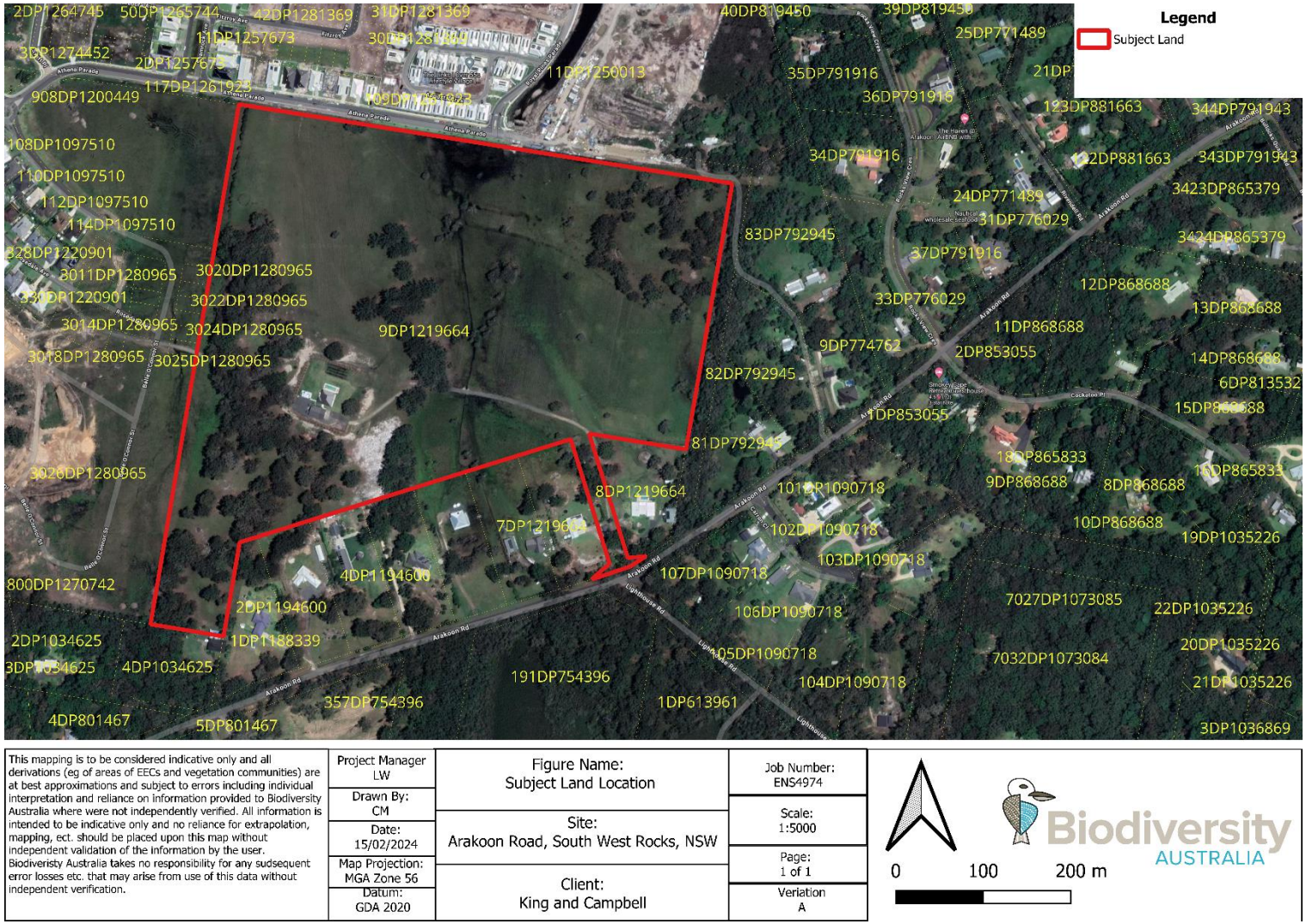



**Figure 1:** Subject Land location (QGIS, 2024).

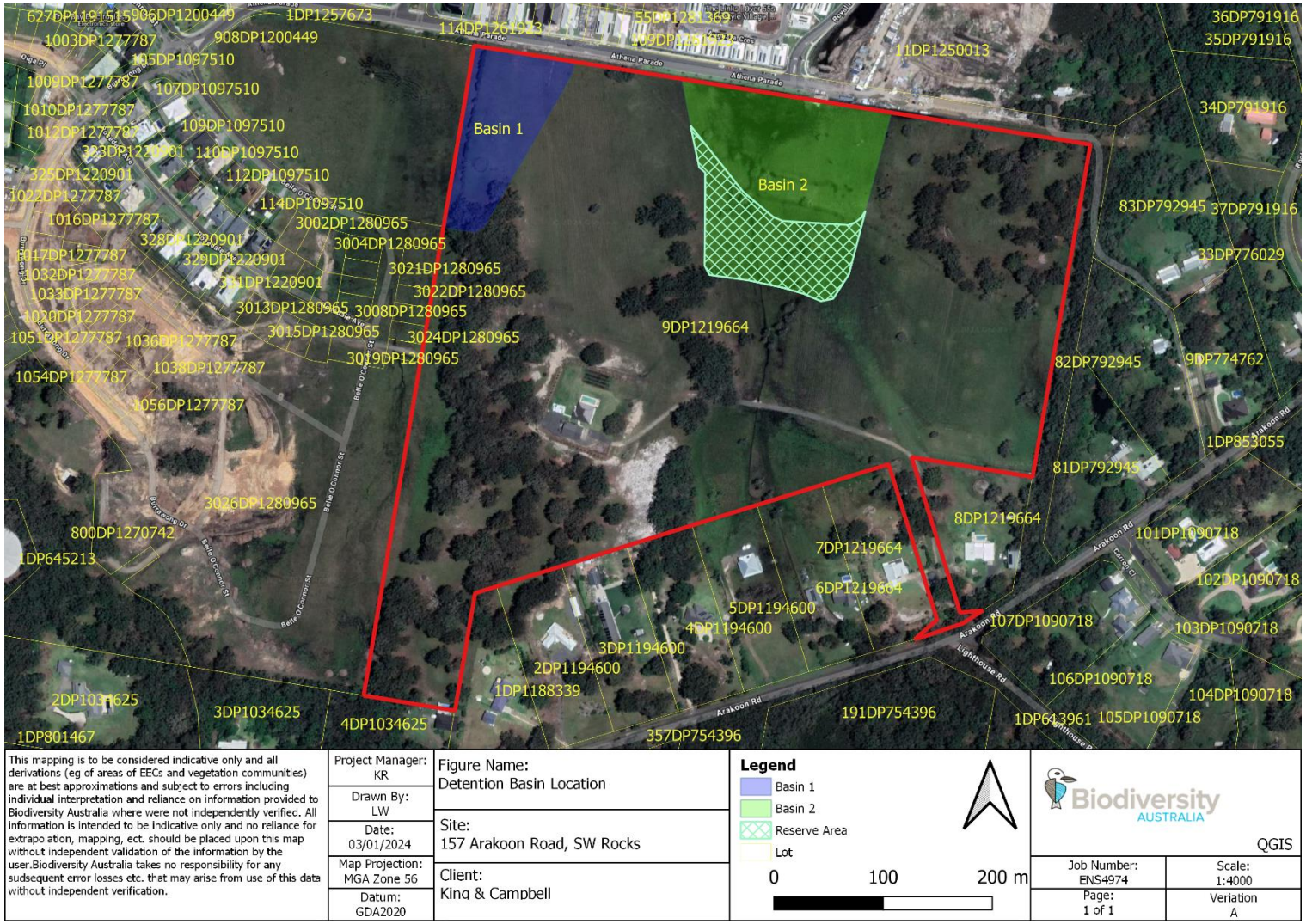



**Figure 2:** Location of planned detention basins within the Subject Land (QGIS, 2024)

## 1.5 Vegetation Communities

The vegetation community within the Subject Land was determined using data collected during fieldwork for the unpublished BDAR for this planning proposal (Biodiversity Australia, in press). It was determined that one distinct community; Northern *Melaleuca quinquenervia* (paperbark) Swamp Forest (Plant Community Type (PCT) 4004) in the NSW North Coast Interim Biogeographic Regionalisation for Australia (IBRA) Region, can be found within the Subject Land. This PCT is associated with the Threatened Ecological Community (TEC) Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community (EEC) under the *Biodiversity Conservation Act 2016* (BC Act). The community does not conform to the state listed EEC or the federally listed TEC as it falls outside of the 1 in 100 year flood level.

PCT 4004 is described, in remnant condition, as paperbark dominated woodland with canopy trees including paperbarks, *Casuarina glauca* (swamp sheoak), *Eucalyptus robusta* (Swamp mahogany) and rarely other Eucalypts, with a dense ground layer of ferns, sedges and grasses including *Telmatoblechnum indicum* (Swamp water fern), *Gahnia clarkei* (Tall saw-sedge) and *Machaerina articulata* (Jointed twig-rush).

The majority of the vegetation within the site is to be cleared however the sections around the basins are to be rehabilitated and converted into artificial wetlands with vegetation conforming to the species description associated with PCT 4004. It is also recommended that where possible large trees existing on site be retained to enhance the habitat value around the artificial wetlands.

## 1.6 Development Impacts

The area of impact is restricted to the development footprint, the areas where the existing road infrastructure is being connected to the new roads planned within the development footprint and any access roads required to enter or exit the site. Residual habitat on site exists within the detention basin footprints as seen in **Figure 2** above. The development footprint includes land that has been completely or partially cleared and a small section of the Subject Land plays host to an existing dwelling. Approximately 7.5 ha of native vegetation is proposed for removal from the Subject Land.

# 2. VMP Objectives and Performance Criteria

### 2.1.1 Objective

The primary objective of this Vegetation Management Plan is to ensure the required actions are effectively implemented to achieve positive environmental outcomes for the site and known threatened species; and to address statutory compliance.

More specifically, the objective of the VMP is to provide a framework for the revegetation of basin 1 and basin 2 and revegetate the reserve area to the south of basin 2 to meet the floristic composition conforming to the suite of species found in PCT 4004.

### 2.1.2 Performance Criteria

The performance criteria against which achievement of this primary objective is to be measured are:

- Weed infestations successfully treated and no further significant weed issues.
- Removal of all *Biosecurity Act* listed weeds after 5 years.
- No new invasive weeds introduced to the site.
- Assisted revegetation within relevant areas is established and become self-sufficient
- Vegetation in reconstruction zones restored to establish and become self-sufficient.

# 3. VMP Actions

## 3.1 Weed Control

The data collected on the Subject Land by Biodiversity Australia (recorded 11 invasive flora species within the Subject Land. These species are recorded below in **Table 1.**

**Table 1:** List of weed species recorded on site

| Common Name | Scientific Name | Weeds of National Significance | Obligation under the *Biosecurity Act 2015* |
|---|---|---|---|
| Camphor Laurel | *Cinnamomum camphora* | N | • General Biosecurity Duty |
| Groundsel Bush | *Baccharis halimifolia* | N | • General Biosecurity Duty |
| Queen Palm | *Syagrus romanzoffiana* | N | • Not Listed |
| Whisky Grass | *Andropogon virginicus* | N | • Not Listed |
| Broad-leaved Carpet Grass | *Axonopus compressus* | N | • Not Listed |
| Couch Grass | *Cynodon dactylon* | N | • Not Listed |
| - | *Ageratum houstonianum* | N | • Not Listed |
| Thickhead | *Crassocephalum crepidioies* | N | • Not Listed |
| - | *Cuphea cathagenensis* | N | • Not Listed |
| Mascarene | *Phyllanthus tenellus* | N | • Not Listed |

| Common Name | Scientific Name | Weeds of National Significance | Obligation under the *Biosecurity Act 2015* |
|---|---|---|---|
| Mullumbimby Couch | *Cyperus brevifolius* | N | • Not Listed |

None of the weeds above are listed as *Weeds of National Significance (2000)* under the National Weed Strategy however removal of weed infestations should be a undertaken across the Subject Land. Revegetation areas and the land immediately adjacent to them should be a high priority to reduce the impact these invasive species will have on plant growth and establishment. Treatment of the weed species from Table 1 is addressed in the following section.

### 3.1.1 Weed Treatment

Under part 3 section 22 of the *Biosecurity Act 2015* a person who deals with biosecurity matters or a carrier and who knows, or ought to reasonably know, the biosecurity risk posed or likely posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.

The treatment methods for weeds found on site, as recommended by NSW Weedwise, can be found in Table 2 below.

Table 2**:** Listed Weed Treatment

| Common Name | Species Name | Control method | Treatment |
|---|---|---|---|
| Camphor Laurel | *Cinnamomum camphora* | • Mechanical removal<br>• Foliar spray<br>• Scrape and paint<br>• Cut stump<br>• Stem injection | • Glyphosate 360g/l (1.0L/100L water)<br>• Glyphosate 360g/l (1.0L/1.5L water)<br>• Glyphosate 360g/l (1.0L/1.0L water) |
| Groundsel Bush | *Baccharis halimifolia* | • Physical removal (hand or machine)<br>• Foliar spray<br>• Cut stump<br>• Basal barking | • Glyphosate 360g/l (1.0L/100L water)<br>• Glyphosate 360g/l (1.0L/1.5L water)<br>• Glyphosate 360g/l (1.0L/1.0L water) |
| Queen Palm | *Syagrus romanzoffiana* | • Physical removal (rand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/1.5L water)<br>• Glyphosate 360g/l (1.0L/100 L water) |
| Whisky Grass | *Andropogon virginicus* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| Broad-leaved Carpet Grass | *Axonopus compressus* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| Couch Grass | *Cynodon dactylon* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| - | *Ageratum houstonianum* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| Thickhead | *Crassocephalum crepidioies* | • Physical removal (hand or machine) | • Glyphosate 360g/l (1.0L/100L water) |

| Common Name | Species Name | Control method | Treatment |
|---|---|---|---|
| | | • Chemical control | |
| - | *Cuphea cathagenensis* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| Mascarene | *Phyllanthus tenellus* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |
| Mullumbimby Couch | *Cyperus brevifolius* | • Physical removal (hand or machine)<br>• Chemical control | • Glyphosate 360g/l (1.0L/100L water) |

For weed species that are not listed above but recorded within the management area consultation of NSW Weedwise should be undertaken to determine appropriate treatment regimes.

### 3.1.2 Weed Control Methods

Recommended weed control works for the project are based on a coordinated approach. The use of a variety of control methods is advised, reducing reliance on herbicides alone and increasing the chances of successful control or eradication of invasive species.

All ecological restoration works are to be undertaken by Bush Regeneration Professionals accredited or suitably qualified and experienced to enable accreditation by the Australia Association of Bush Regenerators (AABR).

The methodology used may vary depending on which treatment is effective for a particular species, as well as which is most efficient, taking into account other site factors such as weather, surrounding vegetation and potential for off target damage to native species. Only herbicides registered for use on each particular weed species are to be used on that species and used at the recommended label rate, unless an applicable off-label permit is available.

The following weed control techniques may be used to treat weeds on the site:

- **Cut/scrape and paint** – this technique involves cutting the plant off as close to the base as possible and painting the stump with a 1:1 mixture of Glyphosate and water; or scraping with a knife the top layer of tissue (down to the vascular tissue) at least 50% of the way up each stem of the plant on both sides of the stem and painting the wound with 1:1 Glyphosate to water. This technique is generally used to treat woody weeds.
- **Foliar spraying** – A knapsack spray unit is used to apply a water diluted herbicide and dye mixture at the recommended label rate over all the foliage of a plant. This method kills the invasive species but leaves the majority of the plant standing. This is effective when treating stands of Lantana (*Lantana camara*) or other woody weeds, herbaceous, aquatic or grass weeds depending on the herbicide selected.
- **Skirting -** Vine stems are cut using loppers or secateurs approximately 30 centimetres from the ground. These stems are treated using the CSP method or foliar spraying. The remainder of the vine is left in place and will die in the tree or shrub canopy.
- **Stem injection –** Herbicide is placed immediately into holes or cuts made by drilling or cutting through the bark into the sapwood tissue in the trunks of woody weeds and trees. The aim is to reach the sapwood layer just under the bark (the cambium), where the

chemical will be transported throughout the plant. It is essential to apply the herbicide immediately (within 15 seconds of drilling the hole or cutting the trunk), as stem injection relies on the active uptake and growth of the plant to move the chemical through its tissues. Stem injection methods kill the tree or shrub where it stands, and only trees and shrubs that can be safely left to die and rot should be treated this way. If the tree or shrub is to be felled, allow it to die completely before felling.

- **Splatter gun** - A splatter gun is a modified spray unit which produces a solid stream of large droplets of concentrated herbicide mixture. This unit can be sprayed 6-10 metres from the area which requires treatment. Due to the concentrated nature of the herbicide (1:9) only a small fraction of the total foliage of each plant requires treatment to provide an effective result. This method is employed in dense woody weed thickets and other areas of limited access.
- **Seed Collection** - Using knife or secateurs the seed heads of grasses are collected and bagged. The seeds are then safety disposed of in accordance to *Biosecurity Act 2015.* The plant is then treated using a herbicide mixture.

## 3.2 Habitat Reconstruction

Once the development has been completed the two detention basins constructed on the northern portion of the Subject Land are intended to be revegetated. Planting densities have been informed by the *South East Queensland Ecological Restoration Framework: Manual* (Chenoweth EPLA and Bushland Restoration Services, 2012) which states that trees and shrubs are to be planted at a density of 1 per 2m$^2$ and all other category of plants are to be planted at a density of 3 per m$^2$.

The project will require the planting of approximately 38 373 m$^2$ (basin 1 being 11 187 m$^2$ and basin 2 being 27 186 m$^2$). These wetlands have the potential to play host to fauna including amphibians, reptiles and birds. To facilitate the creation of these wetlands plantings of native canopy trees, shrubs, groundcovers and grasses will be required. Additionally any large woody debris or hollows found within the works area should be retained to place within the reconstructed wetland to provide habitat to terrestrial fauna.

The vegetation within the works area has been categorised as PCT 4004 and the planting works will aim to reinstate the integrity of this PCT within the bounds of the Subject Land. The planting will aim to produce a habitat that is consistent with the community benchmarks outlined below in Table 3. Table 3 shows the five-year forecast from year one to five as well as predicted PCT benchmarks that the project will aim to meet.

Table 3: PCT 4004 Community Condition Benchmarks and five year planting progression

| PCT ID | Vegetation Class | Year | Species Richness | | | | | | % Cover | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tree | Shrub | Grass and Grass Like | Forb | Fern | Other | Tree | Shrub | Grass and Grass Like | Forb | Fern | Other |
| 4004 | Northern *Melaleuca quinquenervia* Swamp Forest | 1 | 5 | 3 | 5 | 2 | 1 | 1 | 10 | 5 | 10 | 3 | 2 | 1 |
| | | 2 | 5 | 3 | 5 | 2 | 1 | 1 | 15 | 6 | 20 | 3 | 2 | 1 |
| | | 3 | 5 | 3 | 5 | 2 | 1 | 1 | 20 | 7 | 30 | 3 | 2 | 1 |
| | | 4 | 5 | 3 | 5 | 2 | 1 | 1 | 25 | 8 | 40 | 3 | 2 | 1 |
| | | 5 | 5 | 3 | 5 | 2 | 1 | 1 | 30 | 9 | 50 | 3 | 2 | 1 |
| **Benchmarks** | | | 5 | 7 | 7 | 6 | 2 | 5 | 36.0 | 13.0 | 73.0 | 3.0 | 2.0 | 4.0 |

### 3.2.1 Proposed activities

Basin 1 will undergo habitat construction to revegetate the detention basin planned as part of the proposed subdivision design. The species to be planted will include those listed in the species pallet of PCT 4004 and the preferred species list and their numbers for this site can be found in **Appendix 2.**

Basin 2 will undergo habitat construction to revegetate the detention basin planned as part of the proposed subdivision design. The species to be planted will include those listed in the species pallet of PCT 4004 and the preferred species list and their numbers for this site can be found in **Appendix 3.**

The reserve area will focus on revegetating canopy layer vegetation through the planting of associated species of PCT 4004 as no impact to the ground layer will be necessary in this area. Appropriate species can be found in **Appendix 4.**

The densities recommended by the *South East Queensland Ecological Restoration Framework: Manual* (Chenoweth EPLA and Bushland Restoration Services, 2012) are too high to ensure the planting is in-keeping with the canopy cover benchmarks for the trees and shrubs therefore the densities of these species have been reduced in an attempt to meet this benchmark as seen in Table 4.

Table 4: Planting specifications for basins

| Basin 1 planting schedule | | | | |
|---|---|---|---|---|
| **Plant strata** | **Area ($m^2$)** | **Quantity** | **Pot size** | **Density** |
| **Canopy** | 11 187 | **872** | **2"** | **3 plants per 36 $m^2$** |
| **Shrub** | 11 187 | **1219** | **2"** | **4 plants per 36 $m^2$** |
| **All others** | 11 187 | **3495** | **2"** | **12 plants per 36 $m^2$** |
| **Total plant density** | | | | **1 plant per 2 $m^2$** |
| **Basin 2 planting schedule** | | | | |
| **Canopy** | 27 186 | **2120** | **2"** | **1 plants per 12 $m^2$** |
| **Shrub** | 27 186 | **2963** | **2"** | **1 plants per 9 $m^2$** |
| **All others** | 27 186 | **8495** | **2"** | **3 plants per 9 $m^2$** |
| **Total plant density** | | | | **1 plant per 2 $m^2$** |
| **Reserve area** | | | | |
| **Canopy** | 10 453 | **1045** | **2"** | **1 plants per 10 $m^2$** |
| **Total plant density** | | | | **1 plant per 10 $m^2$** |

It is recommended that any large native trees or shrubs within or adjacent to the proposed detention basins, where practical, be retained and protected. This vegetation will act as vital habitat for fauna on site and increase the genetic diversity of the vegetation within the Subject Land to promote the health of the climax communities present once works are completed. These protection measure will include but not be limited to:

- No driving or stockpiling within the Tree protection zone (TPZ) of trees to be retained.

- Installation of high visibility fencing around the trunks of trees to be retained.
- Any excavation within the TPZ or trimming of trees to be retained is to be supervised by a suitably qualified arborist.

If this existing vegetation cannot be retained and protected it is recommended that they be replaced to ensure the species richness within the area is not adversely affected.

#### 3.2.1.1 Weed Control

Weed control is to be undertaken throughout the Subject Land to target all weed species identified in **Table 1** above and any additional species on site using the listed weed treatment methods found in **Table 2** and **Section 3.1.2**.

Weed control will need to occur before the planting works commence to minimise the competition experience by the plants to be installed in the Subject Land. Additionally, every 6 months follow-up weed control will be required to control any new infestations.

#### 3.2.1.2 Planting timeline and specifications

Appropriate site preparation is key to ensure a successful planting. Site preparation and planting are to follow the steps below:

1. Primary removal of weeds from within the planting area including treatment of woody weeds, herbaceous annuals and grasses from within the planting area.
2. Installation of tree protection measures for any trees to be retained within the basin footprint.
3. Planting throughout the basin footprint using the species outlined in **Appendix 2, Appendix 3** and **Appendix 4.**
4. Restore and enhance fauna habitat through the detention of timber for logs and natural rock where practical.
5. Perform 6 monthly weed control within planted areas to regularly reduce competition between installed plants and invasive species.
6. Assess the need for an infill planting (survival rate < 90%) in year 2 of the planting

In addition to the above several other specifications should be adhered to:

- Tubestock should be sun hardened prior to revegetation and be derived from local seed stock.
- Organic fertilisers, with low phosphorous content should be applied where necessary as per manufacturer's instructions.
- Procedure for tube stock planting should follow a best practice horticultural guide, such as the *South East Queensland Ecological Restoration Framework: Manual* (Chenoweth EPLA and Bushland Restoration Services, 2012).

- All plants are to be tree guarded to reduce or prevent predation from herbivores including macropods.
- All plants are to have jute matting installed to reduce weed germination adjacent to the plant.
- Planting distance: trees and shrubs should be planted at a density of 1 per $m^2$ and forbes, grasses and ferns should be planted at a density of 3 per $m^2$.

A detailed outline of activities associated with the planting each year from the initial planting in year one to completion in year 5 can be found below in **Table 5.**

**Table 5:** Planting Implementation Plan for Basin 1 and Basin 2

| Location | Year | Timing | Activity | Responsibility | Corrective actions |
|---|---|---|---|---|---|
| Basin 1 and 2 | 1 | Pre-planting | Complete 2 rounds of weed treatment | Qualified bush regenerator | Ensure weed pre-treatment rounds are completed before the commencement of planting and is successful |
| | | | Acquire tubestock, fertiliser, jute matting and tree guards | Proponent | Delay the planting until all materials have been obtained |
| | | | Establish photo monitoring points (PMPs) within the planting area | Ecologist | Collect initial photos for monitoring and weed levels prior to planting |
| | | During planting | Initial planting and watering | Qualified bush regenerator/Planting contractor | Ensure all works are completed in line with the VMP |
| | | Months 1-3 | Newly installed seedlings are to be watered twice per week for the first month and once per week during months 2 and 3 | Qualified bush regenerator | Ensure all works are completed in line with the VMP |
| | | | Monitor and record rehabilitation progress and seedling survival | | |
| | | Month 6 | Monitor and record rehabilitation progress and seedling survival | Qualified bush regenerator | Additional watering if conditions are dry |
| | | | Monitor and record weed regrowth | | |
| | | | Complete a round of weed treatment | | Conduct weed treatment |
| | | | Collect photos from PMPs | | |
| | | Month 12 | Monitor and record rehabilitation progress and seedling survival | Qualified bush regenerator | Additional watering if conditions are dry |
| | | | Monitor and record weed regrowth | | |
| | | | Complete a round of weed treatment | | Conduct weed treatment |
| | | | Collect photos from PMPs | | |
| | | End of year 1 | Complete an end of planting report | Ecologist | Produce a report detailing the performance of the planting against the PCT 4004 benchmarks and predicted values. |
| | Year 2 | 6 monthly | Monitor and record rehabilitation progress and plant health | Ecologist | Monitor plant growth and community characteristics against PCT 4004 benchmarks |

| Location | Year | Timing | Activity | Responsibility | Corrective actions |
|---|---|---|---|---|---|
| | | | Collect photos from PMPs | | |
| | | | Complete a round of weed treatment | Qualified bush regenerator | Conduct weed treatment |
| | | End of year 2 | Complete a end of planting report | Ecologist | Produce a report detailing the performance of the planting against the PCT 4004 benchmarks and predicted values. |
| | Year 3 | 6 monthly | Monitor and record rehabilitation progress and plant health | Ecologist | Monitor plant growth and community characteristics against PCT 4004 benchmarks and determine the need for an infill planting (<90% survival) |
| | | | Collect photos from PMPs | | |
| | | | Complete a round of weed treatment | Qualified bush regenerator | Conduct weed treatment |
| | | End of year 3 | Complete a end of planting report | Ecologist | Produce a report detailing the performance of the planting against the PCT 4004 benchmarks and predicted values. |
| | Year 4-5 | 6 monthly | Monitor and record rehabilitation progress and plant health | Ecologist | Monitor plant growth and community characteristics against PCT 4004 benchmarks |
| | | | Collect photos from PMPs | | |
| | | | Complete a round of weed treatment | Qualified bush regenerator | Conduct weed treatment |
| | | End of years 4 and 5 | Complete a end of planting report | Ecologist | Produce a report detailing the performance of the planting against the PCT 4004 benchmarks and predicted values. |

### 3.2.2 Planting composition

As the aim of this VMP is to revegetate two detention basins into artificial wetlands the depth of the basins will influence the placement of species within the area of impact. To ensure that the deeper sections of the wetlands (approximately 1.6 m deep in both basins) will play host to species that can survive periodic and extreme inundation a subset of species from **Appendix 2** and **Appendix 3** will be used. In the deeper sections of the planting a greater proportion of the following species should be used:

- Paperbarks
- Swamp mahogany
- Swamp paperbark
- Willow bottlebrush
- Bungwall
- Frogsmouth

### 3.2.3 Signage

Signage is to be erected on pathways and around the perimeter of the basin. This is to inform guests and the public that no access to the conservation areas is permitted and of the need to protect the habitat values of these zones.

Signs are to be erected at three points along pathways and at two points on the edge of the basin. Suggested content for the signs is as follows:

**Conservation Area**
**No access permitted**
**Please keep to footpaths**

# 4. Monitoring, Costing Reporting and Compliance

## 4.1 Monitoring Requirements

Monitoring for the VMP is recommended to be undertaken to monitoring the progress of actions carried out under this VMP. This specifies the following monitoring requirements:

- Walking transects through the site to monitor condition of habitat and success of regeneration/weed control measures and any VMP compliance issues such as unauthorised access, evidence of damage or predation from feral species.
- Ensure no additional clearing or tree removal has been undertaken.
- Inspection of offset plantings to monitor health and survivorship.

The following additional monitoring requirements must be undertaken as part of this VMP:

- Check progress of natural regeneration.
- Complete PMHC Site Performance Auditing Form

## 4.2 Reporting Requirements

A monitoring report to address the requirements of the VMP will be required annually for five years. This will address/detail the following matters where relevant as follows:

- Details on success of planting and natural regeneration.
- Status of weeds and recommendations for further control where required.
- Details on any feral predator sightings, weed infestations, and any controls.
- Details of any management or maintenance issues that need to be addressed.
- Details on compliance/implementation of other measures detailed in the VMP including fencing, public access, and recommendations for compliance enforcement.
- Recommendations for improvements that will have to be implemented (with appropriate timelines to allow compliance). Implementation of these measures are to be detailed in the subsequent reports.

## 4.3 Compliance and Long-term Security

The requirements of the VMP will apply as conditions of development consent through both Council stamping of the plans and inclusion within the consent conditions (table of documents relied upon) and any specific conditions.

The implementation plan listed in this document sets out the specific actions required to be undertaken by responsible authorities to implement the recommendations of the VMP; responsible authorities; and thresholds for completions to monitor implementation of the VMP.

Annual monitoring over five years will also ensure plantings are effectively established and require little maintenance after this period. Compliance checks will be undertaken with each monitoring event and results, including the need for follow-up action or contingency measures, will be detailed in the annual reports.

The VMP will be deemed successful if monitoring determines that the objective stated in Section 2 is achieved as per the listed specified performance criteria.

# 5. Conclusion

This Vegetation Management Plan has been prepared to guide future management actions, restoration activities and monitoring across the on-site conservation zones. It has been prepared based on the requirements detailed in the BDAR prepared by in conjunction with this document.

Several management actions have been listed which aim to achieve positive environmental outcomes and meet the performance criteria for the project. These include where possible the detention and protection of existing mature vegetation, management of weeds, retention of course woody material and hollows from trees to be removed or in cleared areas and planting of native vegetation. An implementation plan has been prepared to guide the timing and completion of the required actions.

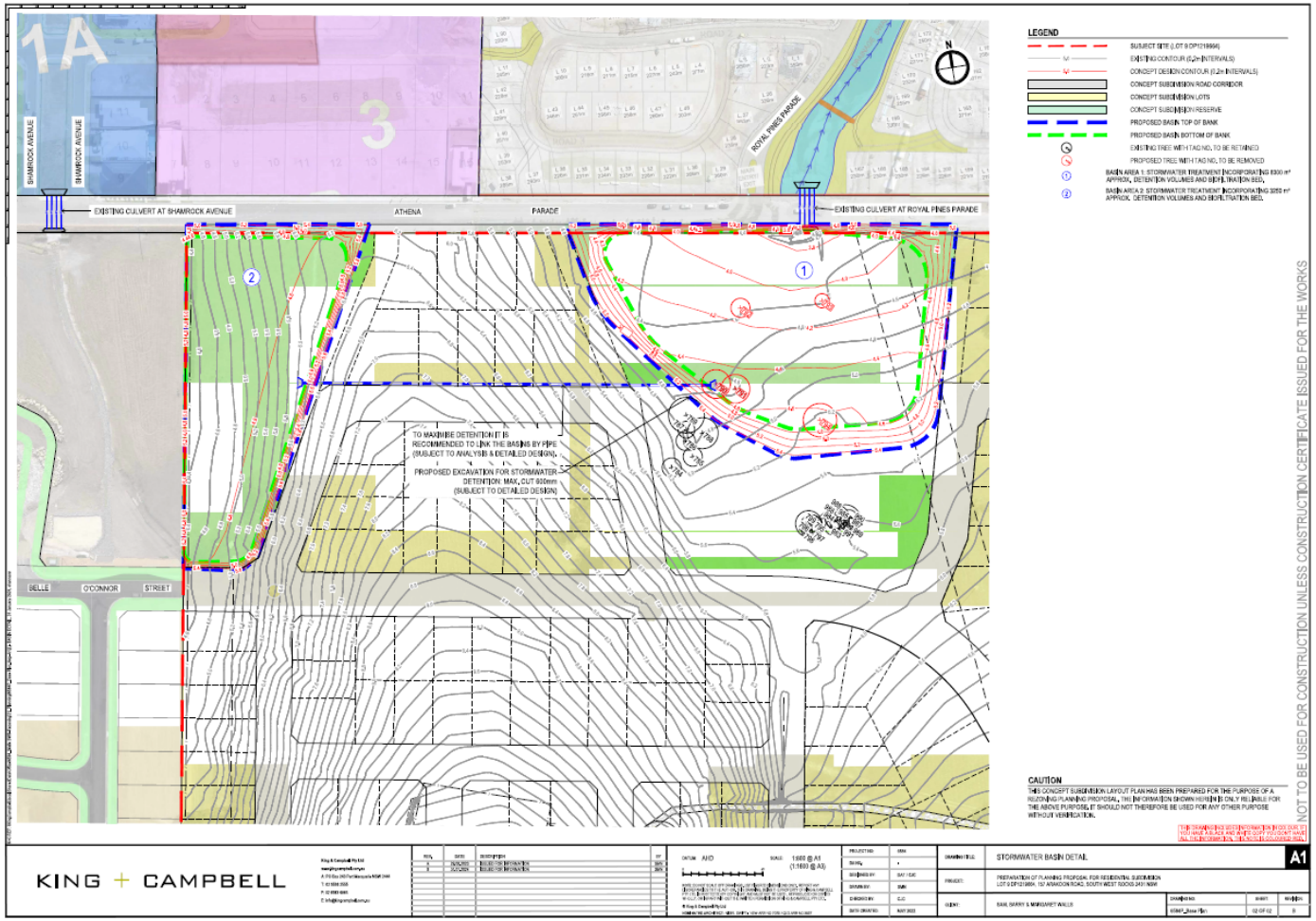
# 6. References

Chenoweth EPLa and Bushland Restoration Services (2012), South East Queensland Ecological Restoration Framework. manual.

Biodiversity Australia (in press) Biodiversity Development Assessment Report: Arakoon Road, South West Rocks. Report

## A-1 Basin Design

King and Campbell – 6584P -Base Plan, Stormwater Basin Detail, Revision B, dated 31 January 2024



## A-2 Basin 1 Planting Species List

If any species from this list cannot be procured or grown a replacement species from the species pallet from PCT 4004 can be used to revegetation the Subject Land.

| Species | Common name | Abundance |
|---|---|---|
| **Trees** | | |
| *Melaleuca quinquenervia* | Five-veined paperbark | 174 |
| *Eucalyptus robusta* | Swamp mahogany | 174 |
| *Casuarina glauca* | Swamp sheoak | 174 |
| *Banksia integrifolia* | Coastal banksia | 174 |
| *Glochidion ferdinandi* | Cheese tree | 174 |
| **Shrubs** | | |
| *Acacia longifolia* | - | 243 |
| *Melaleuca ericifolia* | Swamp paperbark | 243 |
| *Melaleuca salignus* | Willow bottlebrush | 243 |
| *Melaleuca linariifolia* | Snow in summer | 243 |
| *Melaleuca pachyphyllus* | Wallum bottlebrush | 243 |
| **Grasses and grass-like** | | |
| *Gahnia sieberiana* | Red-fruit saw-sedge | 360 |
| *Baloskion pallens* | - | 349 |
| *Machaerina juncea* | Bare twig-rush | 349 |
| *Machaerina teretifolia* | - | 349 |
| *Machaerina articulata* | Jointed twig-rush | 349 |
| *Lomandra longifolia* | Spiny-headed mat-rush | 349 |
| **Ferns** | | |
| *Telmatoblechnum indicum* | Bungwall | 349 |
| **Forb** | | |
| *Philydrum lanuginosum* | Frogsmouth | 349 |
| *Dianella caerulea* | Blue flax-lily | 349 |
| **Other** | | |
| *Livistona australis* | Cabbage Tree Plam | 349 |
| | **Total number of plants** | 5 586 |

## A-3 Basin 2 Planting Species List

| Species | Common name | Abundance |
|---|---|---|
| **Trees** | | |
| *Melaleuca quinquenervia* | Five-veined paperbark | 424 |
| *Eucalyptus robusta* | Swamp mahogany | 424 |
| *Casuarina glauca* | Swamp sheoak | 424 |
| *Banksia integrifolia* | Coastal banksia | 424 |
| *Glochidion ferdinandi* | Cheese tree | 424 |
| **Shrubs** | | |
| *Acacia longifolia* | - | 592 |
| *Melaleuca ericifolia* | Swamp paperbark | 592 |
| *Melaleuca salignus* | Willow bottlebrush | 592 |
| *Melaleuca linariifolia* | Snow in summer | 592 |
| *Melaleuca pachyphyllus* | Wallum bottlebrush | 592 |
| **Grasses and grass-like** | | |
| *Gahnia sieberiana* | Red-fruit saw-sedge | 857 |
| *Baloskion pallens* | - | 849 |
| *Machaerina juncea* | Bare twig-rush | 849 |
| *Machaerina teretifolia* | - | 849 |
| *Machaerina articulata* | Jointed twig-rush | 849 |
| *Lomandra longifolia* | Spiny-headed mat-rush | 849 |
| **Ferns** | | |
| *Telmatoblechnum indicum* | Bungwall | 849 |
| **Forb** | | |
| *Philydrum lanuginosum* | Frogsmouth | 849 |
| *Dianella caerulea* | Blue flax-lily | 849 |
| **Other** | | |
| *Livistona australis* | Cabbage Tree Plam | 849 |
| | **Total number of plants** | 13578 |

## A-4 – Reserve area Planting Species List

| Species | Common name | Abundance |
|---|---|---|
| **Trees** | | |
| *Melaleuca quinquenervia* | Five-veined paperbark | 209 |
| *Eucalyptus robusta* | Swamp mahogany | 209 |
| *Casuarina glauca* | Swamp sheoak | 209 |
| *Banksia integrifolia* | Coastal banksia | 209 |
| *Glochidion ferdinandi* | Cheese tree | 209 |