Vegetation & Fauna Management Plan

Lots 3,4 and 5 in DP 1265834, Morisset

Prepared for

Ingenia Communities

Final V3 / 17th January 2022

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
APZ	Asset Protection Zone
BC Act	Biodiversity Conservation Act 2016
Bio Act	Biosecurity Act 2015
Council	Lake Macquarie City Council
DoEE	Commonwealth Department of the Environment and Energy
DPI NRAR	NSW Department of Primary Industries – Natural Resource Access Regulator (Former DPI – Water / NSW Office of Water)
ECA	Environmental Conservation Area
EEC	Endangered Ecological Community
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	Hectare
KPI	Key Performance Indicator
LGA	Local Government Area
LMCC	Lake Macquarie City Council
Native Vegetation	Native vegetation includes all the vegetation that is indigenous to Australia, covering individuals as well as communities that existed prior to European Settlement.
OEH	NSW Office of Environment and Heritage
Provence	Refers to seed collected from natural populations growing in the same vegetation community and position in the landscape within a reasonable (closest possible) distance of the area being restored.
RaMP	Rehabilitation and Maintenance Plan
Rehabilitation	Any attempt to restore elements of structure or function to an ecological system without necessarily attempting complete restoration to any specific prior condition.
Regeneration	Describes the restoration of natural ecosystems through the natural cyclic processes of renewal and self-maintenance of species and their populations.
Restoration	Re-establish exactly the original native plant community.
Revegetation	Replanting of native vegetation.
Site	The area subject to the proposed development and surrounding non-developed areas
VMA	Vegetation Management Area
VFMP	Vegetation Management Plan
VPA	Voluntary Planning Agreement
Weed	Non-native plant species that have moved into areas of native vegetation.
WM Act	NSW Water Management Act 2000
WoNS	Weeds of National Significance

1 Introduction

MJD Environmental has been engaged by Ingenia Communities, to prepare a Vegetation & Fauna Management Plan (VFMP) for the rehabilitation and management of Retained Vegetation and Habitat on Lots 3,4 and 5 in DP 1265834, under the development application DA/1288/2019, hereafter referred to as the 'subject site' (site).

The subject site is located in Morisset and is generally situated south of Dora Street, west of Wyee Rd, and east of the Newcastle Central Coast Rail line (Refer to **Figure 1)**. The site is situated on the southern extent of the former Morisset Golf Course, north of E2 Conservations lands to the south.

1.1 Aims

The aims of this VFMP are to:

- Ensure that important vegetation attributes of the site are properly protected, managed, maintained and enhanced in a manner that is responsive to impacts associated with the approval.
- Ensure the VFMP is prepared by a suitably qualified and experienced person/ company and implemented by suitably qualified contractors;
- Ensure tree and vegetation protection adjacent to the site
- Detail management measures for minimising impacts on fauna;
- Detail habitat values and opportunities for the site;
- Ensure mitigation measures for the interface between the development site and adjacent native vegetation;
- Identify project tasks, including timing, sequencing, and duration;
- Detail responsibilities for the VFMP implementation, management and monitoring; and
- Provide a simple, concise practical working document for use that contains achievable rehabilitation aims and objectives that consider future maintenance activities for a site.

1.2 Objectives

The objectives of the VFMP are to:

- Ensure vegetation and habitat clearance is undertaken in such a way as to allow fauna to relocate to alternative or artificial habitat
- Ensure that habitat connectivity is retained through the subject land linking conservation areas in the locality
- Establish a weed-free self-maintaining ecosystem matching the Lake Macquarie vegetation community map unit and fauna assemblage in conservation areas on the subject land;
- Ensure the VFMP is prepared by a suitably qualified and experienced person/ company and implemented by suitably qualified contractors;
- Assess the vegetation management issues relating to the site;
- Detail appropriate rehabilitation and management measures;
- Identify project tasks, including timing, sequencing and duration; and
- Detail responsibilities for the VFMP implementation, management and monitoring. This is to include performance criteria and corrective actions.

MORISSET GOLF COURSE

FIGURE 1: SITE LOCATION

Legend

Subject Site

Study Area

0 140 280 560

Meters

1:10,000

N

W E

S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, NSW Spatial Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 1/12/2021| Version 1 | Z:\19051 - Morisset Golf Course\19051_Services_20210603.mxd | This plan should not be relied upon for critical design dimensions.

1.3 Administration

1.3.1 Site Particulars

Locality	The subject site is situated in Morisset, NSW
Land Title	Lots 3,4 and 5 in DP 1265834
LGA	Lake Macquarie City Council
Developer	Ingenia communities Pty Ltd

1.3.2 Definitions

Several terms and abbreviations are used throughout this VFMP. Reference to and familiarisation with the glossary at the front of this report is important to define terms and to avoid any incongruities during VFMP implementation.

1.3.3 Role & Responsibilities

The key stakeholders associated with this VFMP are:

- The person/ firm preparing the VFMP – MJD Environmental
- The proponent – Ingenia Communities Pty Ltd
- The contractor(s) who will be responsible for VFMP implementation – Civil Contractor, Vegetation Contractor, Ecologist (fauna),
- The person/ firm who will undertake inspections and compliance of VFMP implementation by the vegetation contractor(s) on behalf of the proponent and prepare a brief statement of outcomes – Consultant & Council

1.3.4 Legislation, Guidelines & Approvals

Guidelines

This VFMP is informed by LMCC Vegetation Management Plan Guideline (2013), LMCC Draft Natural Areas Management Guidelines (2019), LMCC Flora & Fauna Survey Guideline (2012).

Legislation

Key legislation generally relating to this VFMP and the site project approvals include the following:

- Commonwealth Environment Protection and Biodiversity Conservation Act 1997
- Biodiversity Conservation Act 2016
- Biosecurity Act 2015
- NSW Environmental Planning and Assessment Act 1979
- NSW Water Management Act 2000

Approvals

This VFMP applies to works carried out in accordance with LMCC DA/1288/2019

Table 1 provides a brief comment against the condition component to guide VFMP reading and demonstrate compliance.

Table 1 Compliance with Consent Conditions

Condition Item	Comment
General Terms of Approval and Concurrence Requirements	
Condition 10. Water NSW – General Terms of Approval	A separate VMP exists for NRAR CAA
Conditions to be satisfied prior to the issue of the Construction Certificate	
Condition 24. Vegetation Management Plan and Implementation A person qualified in natural vegetation management, ecology or bush regeneration shall prepare a Vegetation and Fauna Management Plan (VFMP) in consultation with Council's Development Planner Flora and Fauna. The VFMP shall be prepared in accordance with the Lake Macquarie City Council Vegetation Management Plan Guidelines and the LMCC Flora and Fauna Survey Guidelines. The VFMP shall exclude any Biodiversity Offset area and a separate VFMP shall be prepared for any Offset Site. The VFMP is to include:	
A staged construction / operation plan, including identification of stockpile areas during construction.	See **Appendix A**
Staged management actions for identified management zones, including reference to offset credit retirement obligations.	See **Sections 4.1** & **4.4**
▪ Pre-clearing survey protocols to identify: o Important ecological values to be retained in addition to those already identified under the BDAR, including: ▪ Hollow-bearing trees; ▪ Charmhaven Apple (*Angophora inopina*) ▪ Wallum Froglet (*Crinia tinnula*) ▪ Squirrel Glider (*Petaurus norfolcensis*) habitat	See **Section 4.1**
Tree Retention / Removal Plan as a result of the pre-clearing surveys.	See **Section 4.1**
Detailed weed management objectives and strategies.	See **Sections 4.4** & **4.8**
Natural regeneration strategies for the first 12 months after works have been completed	See **Section 4.4**

Condition Item	Comment
Soil translocation protocols for the translocation of soils around the large dam, in accordance with Part 2 of the Draft LMCC Soil Translocation Guideline under the *Draft LMCC Vegetation Management Plan Guidelines (2020).*	See **Section 4.2** & Error! R eference source not found.
Management strategies for any modification works to the existing large dam to the south of the site (direct and indirect).	See **Section 4.2**
Adaptive management strategies for any uncertain impacts identified under the Biodiversity Assessment Method (2017).	See **Section 4.4**
Proposed revegetation actions within each management zone.	See **Section 4.4**
Detailed management strategies, including rehabilitation actions for riparian lands impacted by the access roads.	See **Section 4.4.6**
Detailed management and monitoring of aquatic habitats on site, including during construction and operation. Monitoring is to include (but not limited to) water quality and aquatic ecosystem health.	See **Section 4.3**
Hollow-bearing tree and coarse woody debris clearing / relocation protocols	See **Section 4.1**
Nest box and artificial hollow installation strategies	See **Section 0**
Nest Box location plan, including types of boxes suitable for target species.	Pending Installation
Fauna management strategies for construction and operational works for existing fauna on site, including the population of Eastern Grey Kangaroo (*Macropus giganteus*) on site.	See **Section 4.6**
Threatened species relocation protocols for threatened species identified during pre-clearing surveys. Protocols are to include pre-clearing strategies, construction management strategies and operational management strategies, including ongoing monitoring.	See **Section 4.6**
Monitoring assessments for Squirrel Gliders on site and their habitat, including any glider poles to be installed.	See **Section 4.6.2**
Monitoring of hydrological processes to the Endangered Ecological Community Swamp Sclerophyll Forest identified as PCT 1718 Swamp Mahogany – Flax leaved Paperbark swamp forest on coastal lowlands of the Central Coast within the subject site.	See **Section 4.3**
Detailed dam management protocols for any modification to existing dams within the project area. Protocols are to include detail on the management of edge effects to the large dam and small dam within the subject site and proposed ongoing monitoring.	See **Section 4.2**
Appropriate fencing and conservation signage (temporary and permanent) types are to be provided in the VFMP and shown on a plan to identify	See **Section 4.7**

Condition Item	Comment
locations of types of fencing and signage to be installed. Fencing and signage are to be installed: ▪ along boundaries ▪ around 'no-go' zones ▪ and around any retained native vegetation / trees. The VFMP is to provide a suitable example of proposed temporary and permanent signage to be installed. The example may be adapted with the approval of Council's Development Planner Flora and Fauna.	
Works schedule	See **Section 6**
The VFMP shall be submitted to and approved by Council's Development Planner Flora and Fauna. The VFMP is to be implemented in perpetuity from the time of receiving the construction certificate.	See **Section 6**
Bi-annual monitoring reports are to be provided to Council's Development Planner Flora and Fauna for review and approval: ▪ every 6 months from the date of receiving the construction certificate and ▪ from the date of approval of the reviewed monitoring reports thereafter. Monitoring reports are to be provided to Council's Development Planner Flora and Fauna for review for a minimum of 5 years after works have been completed. Maintenance reports are to be provided for a further 5 years to ensure ongoing maintenance of biodiversity values under the VFMP.	See **Section 5**
Condition 28. Squirrel Glider Poles Within one month of vegetation clearing commencing within the development footprint, an assessment shall be undertaken to determine if Squirrel Gliders can continue to move through the area without going to ground, using the principles in Council's Squirrel Glider Planning and Management Guidelines. The results of this assessment shall be confirmed by Council's Development Planner Flora Fauna. If required, structures (glider poles) shall be provided to establish a functioning corridor to enable fauna movement (in particular Squirrel Gliders) between the development site and adjoining lands (in all directions), including across Lot 2 DP 1047043, 118a Dora Street, Morisset. Input from a squirrel glider expert shall be obtained and included in the design, placement and to confirm the number of these structures. They must be designed in consultation with Council and with consideration to site constraints including power lines and traffic/public safety requirements, have regard to any requirement of the Roads and Maritime Services, and be certified by a practicing structural engineer. If required,	See **Section 4.6.2**

Condition Item	Comment
the poles shall be installed within three months of vegetation clearing commencing, and monitored for a minimum of ten years with an annual monitoring statement provided to Council.	
Conditions to be satisfied prior to the Commencement of Works	
Condition 52. Nest Box Installation A qualified ecologist or wildlife carer shall supervise installation of nest boxes and/or artificial hollows. At least 6 temporary nest boxes shall be installed: a) At least two weeks prior to clearing and maintained for five years; b) At least four metres above ground; c) Of a design suitable for species that may be residing in trees marked for removal; d) Of a durable material (i.e.; marine ply or equivalent). e) Of a design that is consistent with NSW Government 2011, Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects - Guide 8: Nest boxes, prepared by Roads and Traffic Authority, September 2011 and NSW Government 2008, Guidelines for the design, construction and placement of nest boxes, prepared by Department of Environment, Climate Change and Water, Biodiversity Conservation Section. f) At an orientation that is suitable for the species that the nest box has been designed. Micro bat nest boxes shall be orientated at a north to north westerly aspect. Bird and mammal boxes shall be orientated at an east facing aspect; g) In a manner that minimises damage to the trees and surrounding vegetation; and h) With a unique number affixed that can be read from the ground. Nest boxes are to remain within adjoining vegetation to provide additional temporary roosting habitat whilst tree hollows are felled for installation. Felled hollows are to be inspected by the Project Arborist prior to installation as artificial hollows to confirm the structural integrity of the hollow section is considered safe for reinstallation. Suitable artificial hollows are to be installed within retained bushland under ecological supervision in accordance with the above installation requirements. The total number of permanent artificial hollows and nest boxes to be installed is to be a minimum of 12 artificial hollows / nest boxes suitable for a range of fauna species. Excess tree hollows not installed as artificial habitat are to either: ▪ be provided to Council for use in future habitat augmentation within Lake Macquarie, or ▪ retained for habitat enhancement for any offset site.	See **Section 0**

Condition Item	Comment
A plan shall be provided as part of a Vegetation and Fauna Management Plan (VFMP) showing the location and types of nest boxes / artificial hollows in relation to the development. The plan is to differentiate between temporary nest boxes and permanent structures. The number affixed to the bottom of each nest box / artificial hollow shall also be shown on the plan.	
Conditions to be satisfied during demolition and construction works	
Condition 80. Vegetation Management Plan and Implementation Implementation of the VMP shall commence immediately upon any construction work commencing and shall be carried out in accordance with the VMP approved schedule of works.	See **Section 6**
Condition 81. Hollow Bearing Tree Removal A qualified ecologist or wildlife carer shall supervise removal of any hollow-bearing trees to ensure mitigation against any native animal welfare issues. Where possible, removal of trees with habitat hollows shall be undertaken in either March, April, September or October, to minimise impact to threatened species that could breed and or hibernate within hollows on site. Trees with habitat hollows shall be removed at least 24 hours after other vegetation approved for removal to encourage any residing fauna to relocate. Any hollow-bearing trees shall be felled in one to two metre sections, beginning at the top of the crown. Lengths cut from the trees shall be in a manner that shall preserve the hollows with each section inspected and appropriately treated to minimise impact to fauna. Written confirmation shall be provided to Council's Development Planner Flora and Fauna confirming species detected during hollow bearing tree removal. Removal of habitat trees shall be undertaken in a staged manner as set out below: ▪ Stage 1 – A preclearance survey shall be conducted with all habitat trees to be marked up with a 'H' and bands placed around the tree barrel using fluorescent paint or flagging tape. Where possible, a matrix of trees shall also be maintained to facilitate movement displaced fauna into refuge habitat. These trees are to be marked up with a band of fluorescent paint or flagging tape around the tree barrel during the pre-clearance survey. ▪ Stage 2 – All trees other than those marked up during Stage 1 are to be removed. ▪ Stage 3 – Habitat trees and matrix of trees (where required) shall be removed under the direct supervision of a qualified ecologist or wildlife carer. Ideally removal of trees with habitat hollows shall be undertaken	See **Section 4.1**

Condition Item	Comment
outside of hollow dependent fauna hibernating and breeding periods (i.e. preferred clearing times occur in March/April and October/November). In the event hollow-bearing trees are to be felled outside of these periods, a qualified ecologist or wildlife carer shall stag-watch hollow-bearing trees in the week prior to clearing and be onsite during tree clearing. Hollow-bearing trees are to be 'soft felled' by machinery (excavator or similar). The operator shall tap the tree barrel to alert any resident fauna, followed by a period of waiting/observation of no less than one minute. This is to be repeated as required by the supervising ecologist or wildlife carer. Trees are to be 'soft felled' by the operator and when deemed safe, the supervising ecologist or wildlife carer shall inspect all hollows for fauna. All felled habitat trees are to remain insitu on the ground for at least one night before being stockpiled for processing". Lengths cut from the trees shall be in one or two metre sections, in a manner that will preserve the hollows with each section inspected by the supervising ecologist or wildlife carer.	
Conditions to be satisfied prior to issue of an Occupation Certificate	
Condition 100. Vegetation Management Plan and Implementation Written approval from Council's Development Planner Flora and Fauna shall be submitted to the Certifying Authority demonstrating that VMP outcomes, including the VMP works schedule and nest box requirements have been met, prior to the issue of the Final Occupation Certificate.	See **Section 5**
Operational Conditions	
Condition 121. Vegetation Management Plan and Implementation Bi-annual monitoring statements shall be provided to Council's Development Planner Flora and Fauna verifying compliance with the VMP. Outcomes of the VMP shall be maintained in perpetuity.	See **Section 5**
Condition 122. Nest Boxes Nest boxes / artificial hollows shall be monitored by a qualified ecologist to determine their usage and repairs or replacement (as required). Monitoring shall be carried out on an annual basis for a minimum period of five years following installation and/or as otherwise agreed with Council. If feral bees establish in the nest box during the monitoring phase, an appropriately qualified person shall remove them. The box shall be replaced with one that has carpet on the inside of the box roof, and if appropriate, surface insect spray to deter bees from establishing.	See **Section 0**

2 Water Management Act

The subject site is affected by waterfront land, being within 40m of a mapped watercourse. The development of waterfront land requires Controlled Activity Approval by the NSW Natural Resources Access regulator (NRAR). Two 1st order streams (under the Strahler System of classification) pass under Wyee Rd at two culverts, forming a junction near the northern boundary of the subject site and running as a 2nd order watercourse coarsely in line with said boundary to the large dam. The waterline discharges from the dam under the rail line in the east. Under the Water Management Act, 1st order watercourses require a 10m Vegetated Riparian Zone (VRZ) either side of the highest bank of the channel (2 x 10m + channel width riparian corridor), and 2nd order watercourses require a 20m VRZ (2 x 20m + channel width corridor). NRAR General Terms of Approval require a VMP over the riparian corridor, which will not be directly addressed in this VFMP. The Water Management Act outcome is detailed in **Figure 2**

MORISSET GOLF COURSE

FIGURE 2: WATER MANAGEMENT ACT OUTCOME

Legend

- Subject Site
- Study Area
- Riparian Zone
- Waterfront Land
- Cadastral Boundaries

0 35 70 140

Meters

1:2,500

N W E S

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Aerial: NearMap (2021) | Data: MJD Environmental, NSW Spatial Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 2/12/2021| Version 1 | Z:\19051 - Morisset Golf Course\19051_DA1288_20211201.mxd | This plan should not be relied upon for critical design dimensions.

3 Landscape and Ecological Context

A site inspection was carried out by MJD Environmental in November 2021 to gain an understanding of the sites ecological setting and vegetation mapping for consideration in preparation of this VFMP.

The inspections considered:

- The vegetation present within the conservation site;
- Weed species present;
- Site resilience;
- Management Zones;
- Management Issues; and
- Presences/absences of threatened species.

A desktop assessment of the existing vegetation mapping for the area using LMCC Vegetation Community & Plant Community Types Map coupled with previous site mapping undertaken by Kleinfelder for associated BDARs, describes vegetation within the site as PCT 1636 Scribbly Gum - Red Bloodwood - Angophora inopina heathy woodland (LMCC Map Unit 31 - Coastal Plains Scribbly Gum Woodland), and PCT 1718 (LMCC MU 37 - Swamp Mahogany - Paperbark Forest). The latter vegetation community is commensurate with listed Endangered Ecological Community (EEC) *Swamp Sclerophyll Forest on Coastal Floodplains* under the Biodiversity Conservation Act (2016) (Refer to **Figure 3**).

Table 2 Vegetation Communities and associated EECs

Plant Community Type (PCT) (BAM 2015)	Vegetation Community (Bell & Driscoll 2016)	Threatened Ecological Community
1636 - Scribbly Gum - Red Bloodwood - Angophora inopina heathy woodland on lowlands of the Central Coast	MU 31 - Coastal Plains Scribbly Gum Woodland	No
1718 - Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast	MU 37 - Swamp Mahogany - Paperbark Forest	Yes, commensurate with BC Act listed EEC *Swamp Sclerophyll Forest on Coastal Floodplains*

The surrounding environment is defined by the RE2 Private Recreation zoned former Morisset Country Club golf course, with scattered stands of native and exotic canopy, boundary corridors of mostly native canopy, and broad areas of previously managed turf which has devolved into pasture grasses and annual weeds. To the west runs Wyee Rd and to the east the Central Coast & Newcastle Rail line. A riparian corridor runs west-east to the north of the development site, incorporating a large, constructed dam, with generally good condition native vegetation in wooded areas. The dam hosts several species of aquatic weeds and drains to the northeast into a culvert under the rail line. The former golf course is primarily located to the north of the development, which incorporates the southernmost portion. To the south of the RE2 land is an E2 zoned woodland remnant.

The site includes areas of high quality bushland which have been assessed as providing potential habitat for threatened fauna and flora, and maintaining the connectivity of these areas with larger tracts of vegetation throughout the locality is addressed herein, as well as procedures for minimising impact on fauna through staged removal of vegetation and methods to suppress weeds which may threaten retained vegetation. The vegetation communities present on the site are summarised in **Table 2** and detailed below.

Coastal Plains Scribbly Gum Woodland (MU 31 – PCT 1636)

This area occurs through the subject site and connects to the E2 land in the south. The native component of the vegetation throughout the former golf course most closely aligns with this community, albeit absent native understorey. The vegetation within the development site is a broadly intact remnant

of this community, crossed with informal tracks and with two cleared lobes near the dam. All structural layers are present and weed infestation is minimal except for near patch edges. The native canopy of the former gold course hosts *Eucalyptus haemastoma* and *Corymbia gummifera*, with *Angophora costata* and *Eucalyptus capitellata* occurring in the buffer to Wyee Rd. In the remnant forest of the development, the same species are present in the canopy, with *Angophora inopina* present as sub-canopy. Shrubs present are diverse and include *Petrophile pulchella*, *Lambertia formosa, Leptospermum trinervium, Hakea dactyloides, Leptospermum polygalifolium* subsp. *polygalifolium, Grevillea sericea Platysace linearifolia, Leucopogon microphyllus,* and *Epacris pulchella*. The understorey is dominated by *Entolasia stricta, Xanthorrhoea laterale, Ptilothrix deusta, Lepidosperma laterale, Cyathochaeta diandra, Aristida warburgii* and *Lepyrodia scariosa, Gompholobium pinnatum,* and *Pteridium esculentum*.

Weeds in this zone are generally limited to the cleared former golf course and include *Lantana camara*, *Axonopus fissifolius, Richardia brasiliensis*, and *Paspalum dilatatum*.

Swamp Mahogany Paperbark Forest (MU 37 – PCT 1718)

This community occurs in the riparian corridor running west-east to the north of the development, in association with the junction of two 1st order streams into a 2nd order stream (under the Strahler classification) that discharges under the rail line in the east. The watercourse includes the large constructed dam around which there is limited vegetation. The vegetation that makes up the community is in generally good condition with a limited number of high threat weeds with an established presence, generally nearer the edges. The canopy is dominated by *Eucalyptus robusta* and *E. resinifera* with a sub-canopy of *Melaleuca sieberi, M. nodosa* and *M. linariifolia*. The sub-canopy is very dense, and shrubs occurring below it at low densities include *Pulteneae villosa, Melaleuca thymifolia* and *Leptospermum juniperinum*. The ground layer is dominated by *Gahnia clarkei* throughout, with accompaniment dependent on degree and frequency of inundation. In lower areas, *Schoenus brevifolius, Baumea rubiginosa, Empodisma minus* and *Hemarthria uncinata* co-occur, and on higher ground *Entolasia marginata, Ischaemum australe, Imperata cylindrica, Hydrocotyle sibthorpioides*, *Gleichenia dicarpa* and *Centella asiatica* are representative.

Exotic species generally occur on edges with some core infestations, and include *Ageratina adenophora, Rubus fruticosus* sp. agg., *Ambrosia tenuifolia*, *Lantana camara, Paspalum dilatatum, Pinus radiata* and *Bidens pilosa*. The eastern extent of the western riparian corridor, which is often inundated, hosts Hight Threat Exotic aquatic weeds *Eichhornia crassipes* (Water Hyacinth - WONS) and *Ludwigia peruviana* (Water Primrose).

Cleared Land

This occurs on former fairways in the site, and around the dam. Dominated by turf and pasture species including *Cynodon dactylon, Paspalum dilatatum* and *Cenchrus clandestinus* in addition to annual weeds, with some native groundcovers.

MORISSET GOLF COURSE

FIGURE 3: PLANT COMMUNITY TYPES AND THREATENED ECOLOGICAL COMMUNITIES

Legend

- Subject Site
- Study Area
- Cadastral Boundaries

Threatened Ecological Communities

- Swamp Sclerophyll Forest on Coastal Floodplains

Plant Community Types

- Cleared
- Dams
- Managed Pine Parkland
- Non-Native Vegetation
- PCT 1636: Scribbly Gum - Red Bloodwood - Angophora inopina heathy woodland on lowlands of the Central Coast
- PCT 1718: Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast

0 35 70 140

Meters

1:2,500

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, NSW Spatial Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 2/12/2021| Version 1 | Z:\19051 - Morisset Golf Course\19051_DA1288_20211201.mxd | This plan should not be relied upon for critical design dimensions.

4 Management Actions

4.1 Survey and Clearing Protocols

Pre-clearance Survey

Prior to the commencement of any vegetation removal, a preclearance survey will be conducted by the Project Ecologist to identify any areas containing significant habitat features, which include but are not limited to;

- Tree hollows
- Nests
- Arboreal termite terrariums
- Observations of faunal occupation such as burrows
- Nest boxes previously installed within the site by persons other than the proponent or contractors operating under this scope of works

To ensure a high level of visibility for construction/vegetation clearing contractors, during the pre-clearance survey, any significant habitat features or trees that are known to have resident fauna present will be;

- Marked around the trunk of the tree at approximately 1.5 metres high with a band and a 'H' marked on no fewer than three sides of the trunk using fluorescent spray marking paint;
- Marked with highly visible flagging tape; and
- A GPS point taken.

An updated tree retention / removal plan will be provided to council following surveys.

Baseline Monitoring

Baseline monitoring will provide a template for ongoing monitoring reports for submission to Council and will include:

- Mapping of all habitat features identified in pre-clearance survey outside of development footprint to create hollow density assessment for determining placement of nestboxes and/or artificial hollows as per **Section 0**.
- Squirrel Glider Corridor refuge, habitat and vegetation profiles for arboreal travel assessment, as per **Section 4.6.2**
- Assessment of Eastern Grey Kangaroo population, young at foot and pouch estimates as described in **Section 4.6.1**
- Weed Assessment as per **Section 4.8.5**, **Figure 5** & **Appendix D**
- Aquatic habitat assessment – turbidity, pH, nutrient loading, visual survey and aural survey of fauna as described in **Section 4.3**
- Establishment of photo points of key areas as described in **Section 5**

Site Establishment and Pre-Clearing Protocol

Contractors undertaking vegetation clearing and construction works on the adjacent construction areas must observe the following protocols. Unless explicitly assigned to other parties, the responsibility for adhering to the protocols outlined below lies with the Contractor carrying out the works described.

The following procedures are required to be undertaken prior to clearing, construction, and other development works within the project area:

- All Contractors who will be involved in the clearing of vegetation on site are required to undertake training in this procedure through pre- start briefings or toolbox talks with a focus on the environmental risks associated with the clearing works. Site personnel are to be:
    - Made aware of clearing limits and how they are marked. All contractors are in possession of relevant plans identifying clearing limits and Site boundary on all Site plans.
    - Informed that they are not to encroach on areas beyond the clearing limits, such encroachment includes but is not limited to:
        - vehicle movements
        - vehicle parking
        - storage of materials or machinery
        - stockpiling of soil, vegetation, or timber
    - Informed of the 3-stage clearing process for trees
    - Informed of the method of marking habitat trees to be retained until stage 3 clearing
- Flicker tape to be installed on construction site boundaries to demarcate no go zones.

Significant Habitat/Hollow Bearing Tree Felling and Removal Protocol

A qualified ecologist or wildlife carer shall supervise removal of any hollow-bearing trees to ensure mitigation against any native animal welfare issues.

Underscrubbing of vegetation <3m in height should be carried out prior to beginning tree clearance to encourage fauna to vacate the site and ensure visibility of habitat tree marking.

Removal of trees shall be undertaken in a staged manner as set out below:

- Stage 1 – A preclearance survey shall be conducted with all habitat trees to be marked up with a ‘H’ and bands placed around the tree barrel using fluorescent paint or flagging tape. Where possible, a matrix of trees shall also be maintained to facilitate movement displaced fauna into refuge habitat. These trees are to be marked up with a band of fluorescent paint or flagging tape around the tree barrel during the pre-clearance survey.
- Stage 2 – All trees and vegetation other than those marked up during Stage 1 are to be removed.
- Stage 3 – After a minimum period of 24 hours post-Stage 2 to allow fauna to relocate, habitat trees and matrix of trees (where required) shall be removed under the direct supervision of a qualified ecologist or wildlife carer.

Removal of trees with habitat hollows should be undertaken outside of hollow dependent fauna hibernating and breeding periods wherever possible (i.e. preferred clearing times occur in March/April and October/November). In the event hollow-bearing trees are to be felled outside of these periods, a qualified ecologist or wildlife carer shall stag-watch hollow-bearing trees in the week prior to clearing and be onsite during tree clearing.

In accordance with consent conditions, hollow-bearing trees shall be preferentially felled by an arborist in one to two metre sections, beginning at the top of the crown. Lengths cut from the trees shall be in a manner that shall preserve the hollows with each section inspected and appropriately treated to minimise impact to fauna. Where an arborist deems trees unsafe to climb, trees may be mechanically cleared.

Mechanically cleared trees are to be ‘soft felled’ by machinery (excavator or similar). The operator shall tap the tree barrel to alert any resident fauna, followed by a period of waiting/observation of no less than

one minute. This is to be repeated as required by the supervising ecologist or wildlife carer. Following felling and when safe, all hollows are to be inspected by the Ecologist for resident fauna. Felled habitat trees are to remain in-situ on the ground for at least one night before being stockpiled for processing.

Hollows are to be salvaged for re-use as artificial hollows in retained vegetation. Lengths cut from the trees shall be in one or two metre sections, in a manner that will preserve the hollows with each section inspected by the supervising ecologist or wildlife carer

Written confirmation shall be provided to Council's Development Planner Flora and Fauna confirming species detected during hollow bearing tree removal.

4.2 Dam Modification Management

4.2.1 Fauna Welfare Management

Any changes to the large or small dam associated with the development which require dewatering to lower the water level to facilitate works must be planned with advice from and undertaken with supervision from the Project Ecologist. If any dam is to be filled in, the Project Ecologist must advise and supervise the dewatering below 30% of capacity, and using a net or similar ensure that any resident fauna are safely removed and relocated to appropriate habitat nearby.

Supplementary planting along the southern boundary of the dam will facilitate fauna movement between areas of retained Swamp Forest. See Landscape Plans (**Appendix B**) and **Section 4.4.3**.

4.2.2 Soil Translocation Protocol

Any soil translocation undertaken as part of dam modification works or other landscape works or associated works must comply with the LMCC Draft Natural Areas Management Guidelines Part 2 – Soil Translocation Guideline (Error! Reference source not found.**G**).

4.3 Hydrology and Aquatic Habitat Management & Monitoring

4.3.1 Hydrology

Monitoring is required to assess the effects on PCT 1718 of hydrology changes over the site, including the changes to the dam boundaries and the construction of the diversion drain to the east of the dam. Monitoring is to include any overflow from the dam or the diversion drain into retained areas of PCT 1718 which may spread weed propagules, the erosion of any topsoils from PCT 1718, the deposition of any sediments in PCT 1718, or the infestation of areas of PCT 1718 with new weed flushes. Any of the aforementioned impacts will be required to be rectified to the satisfaction of Council's Development Planner Flora and Fauna and Council's Vegetation Establishment Officer.

4.3.2 Aquatic Habitat

The condition of aquatic habitats within retained vegetation and the development site are to be monitored, including the riparian corridor and the large dam. Monitoring must take place during construction and operation. Monitoring is to include comprehensive water quality testing, which shall be assessed against baseline water quality tests prior to works. Aquatic habitats must also be monitored for aquatic weed infestations and controlled as per **Sections 4.4** & **4.8**.

Aquatic habitat monitoring shall include:

- Turbidity, pH and nutrification of standing or flowing water in aquatic habitats;
- Visual assessment of invertebrates species, fish and tadpoles;
- Aural assessment of diurnal calling amphibians.

4.4 Vegetation Management Areas & Actions

To assist required management prior to works, during operations and following construction, the site will be categorised into separate Vegetation Management Areas (VMAs) for both managed clearance and retained habitat management, that will allow for easy identification of areas and the required management actions and works proposed (Refer to **Figure 4**).

4.4.1 VMA 1 – Western Core Swamp Forest (1.41ha)

This VMA includes the retained vegetation mapped as Swamp Mahogany Forest west of the large dam inside the development site. This vegetation is in good condition, with weeds penetrating on edges and in scattered infestations. Exotic species recorded in association with VMA1 include *Eichhornia crassipes* (Water Hyacinth), *Ludwigia peruviana* (Water Primrose), *Rubus fruticosus* agg. (Blackberry Complex), *Ageratina adenophora* (Crofton Weed), *Paspalum dilatatum*, *Senna pendula* var. *glabrata* (Cassia), and *Cortaderia* spp. (Pampas Grass).

Rehabilitation works proposed within VMA 1:

- Weed control is to be carried out using methods such as hand removal, frill/drill and fill, and cut and paint to minimise harm to native plants and encourage natural regeneration. Spot spraying is not to be used for primary weed control, but may be used for follow-up e.g. for Crofton Weed regrowth. All weeds identified above are to be continually suppressed with the aim of eradication. Any new weed species identified must be included in contractor reports and monitoring reports to Council and must be suppressed. Sweeps through the native vegetation of this VMA are to be undertaken at least 4 times per year after systematic primary control of weeds (Refer **Section 4.8**).
  The following weeds are a particular threat to riparian areas:
    - Water Hyacinth (*Eichhornia crassipes*) must be continuously suppressed in all areas using integrated weed management, including physical removal, biological control and chemical control as per DPI guidelines.
    - Ludwigia (*Ludwigia peruviana*) must be continuously suppressed in all areas using physical removal and chemical control as per DPI guidelines.
- Ongoing weed control is to be maintained in perpetuity.
- The annual monitoring of weed control works will determine the requirements associated with the restoration of native vegetation in this VMA. Natural regeneration in the VMA should be achievable as the bushland is in good condition with diverse groundcovers and good leaf litter. Brush matting is to be used at appropriate times of year to help shrubs and groundcovers colonise areas with reduced cover following weed removal.

4.4.2 VMA 2 – Eastern Core Swamp Forest (0.35ha)

This VMA includes the retained vegetation mapped as Swamp Mahogany Forest between the large dam and the rail line. This vegetation is in moderate condition, with some core weed infestations of *Lantana* camara (Lantana) and *Ageratina adenophora* (Crofton Weed). Weeds penetrating on edges and in scattered infestations in VMA2 include *Andropogon virginicus* (Whiskey Grass), *Cinnamomum camphora* (Camphor Laurel), *Paspalum dilatatum* (Paspalum), *Rubus fruticosus* agg. (Blackberry), and *Erythrina x sykesii* (Coral Tree).

- Weed control is to be carried out using methods such as hand removal, frill/drill and fill, and cut and paint to minimise harm to native plants and encourage natural regeneration. Spot spraying is not to be used for primary weed control within the VMA, but may be used for follow-up e.g. for Crofton Weed regrowth. All weeds identified above are to be continually suppressed with the aim of eradication. Any new weed species identified must be included in contractor reports and monitoring reports to Council and must be suppressed. Sweeps through the native vegetation of this VMA are to be undertaken at least 4 times per year after systematic primary control of weeds (Refer **Section 4.8**).

  - Water Hyacinth (*Eichhornia crassipes*) and Ludwigia (*Ludwigia peruviana*) must be continuously monitored for and any outbreaks immediately suppressed.

- The annual monitoring of weed control works will determine the requirements associated with the restoration of native vegetation in this VMA. Natural regeneration in the VMA should be achievable as the bushland is in good condition with diverse groundcovers and good leaf litter. Brush matting is to be used at appropriate times of year to help shrubs and groundcovers colonise areas with reduced cover following weed removal.
- Herbicide treatment (spot spray) is recommended for any highly invasive weed species occurring on the edges of this area, particularly; *Lantana camara, Rubus fruticosus* agg., and *Andropogon virginicus*.
- Woody weed species should be treated with herbicide via the cut/scrape and paint method. Systematic searches through the VMA should be undertaken on every site visit.
- Ongoing weed control is to be maintained in perpetuity.

4.4.3 VMA 3 – Habitat Linking Corridor (Adjacent Dam) (0.77ha)

This VMA includes the perimeter of the large dam in the north-eastern extent of the development site.

- Vegetation works in this zone will be according to approved Landscape Plans (**Appendix B**).
- Locally occurring tree species (*Eucalyptus robusta*) around the perimeter of the dam are to be planted at a frequency sufficient for Squirrel Gliders to travel across the site without going to ground. Spacing to be confirmed with Council's Development Planner Flora and Fauna (refer **Section 4.6.2**).
- Tree species to be planted as linking habitat are specified in the Biodiversity Development Assessment Report Mitigation Measures (Kleinfelder 2020) as *Eucalyptus robusta* (Swamp Mahogany) which will also serve as foraging resources for other threatened fauna species (e.g. Swift Parrot).
- Squirrel Glider poles may require installation as per **Section 4.6.2** to maintain connectivity while canopy establishes
- The northern border of the dam will also be rehabilitated using translocated soil from cleared native vegetation areas (refer **Section 4.2.2** and **Appendix G**)
- Weed control in the maintenance phase of translocation is to be carried out using methods such as hand removal, frill/drill and fill, and cut and paint to minimise harm to native plants and encourage natural regeneration. Spot spraying is not to be used for primary weed control, but may be used for follow-up (Refer **Section 4.8**).
- Ongoing weed control is to be maintained in perpetuity.
- Tree guards may be required to be installed at the time of planting to protect against grazing animals, frost and help with moisture retention.
- Planting should commence in Autumn, however assisted plant establishment via watering will be at the discretion of the contractor and with due consideration of seasonality. Planting in alignment with Approved Landscape Plans (**Appendix B**)
- Ongoing management of this area will be required to suppress weeds among plantings and on the edges of adjacent VMAs. Sweeps of the revegetation area should be undertaken every visit, and at least 4 times per year (Refer **Section 4.8**).

4.4.4 VMA 4 – Wyee Rd Habitat Linking Corridor (0.39ha)

This VMA includes the boundary vegetation to the west of the development footprint adjacent to Wyee Rd, connecting vegetation to the south of the site in the E2 zoned land to the riparian corridor (VMAs 1-

2) and north to Mandalong Rd and future connections across the former golf course. Weeds occurring in this zone include *Lantana camara* and pasture associated exotic forbs and grasses.

- Weed control is to be carried out using methods such as hand removal, frill/drill and fill, and cut and paint and spot spray to minimise harm to native plants and encourage natural regeneration (Refer **Section 4.8**).
- Revegetation of canopy is to be undertaken with *Angophora inopina* and other diagnostic canopy species from PCT 1636 if required to ensure sufficient habitat linkage for Squirrel Gliders (refer **Section 4.6.2**)
- Squirrel Glider poles may require installation as per **Section 4.6.2** to maintain connectivity while canopy establishes
- Tree guards may be required to be installed at the time of planting to protect against grazing animals, frost and help with moisture retention.
- Ongoing weed control is to be maintained in perpetuity.

4.4.5 VMA 5 – Development Clearing Area (20.57ha)

- Pre-clearance survey of all clearing areas is to be conducted by the Project Ecologist prior to works (refer **Section 4.1**).
- Protection of retained trees and native vegetation within the development footprint must be installed in compliance with consent conditions.
- Vegetation clearance must be undertaken in a staged approach according to **Section 4.1** and the conditions of consent.
- Weed control is to be carried out using methods such as blanket spraying (with glyphosate) to continuously suppress weeds infesting borders of construction areas which may threaten retained native vegetation. Avoid off target damage to nearby native vegetation. Following dieback, debris should be slashed to encourage weed seedbank to emerge prior to follow up blanket spraying (Refer **Section 4.8**).
- Ongoing weed control is to be maintained until landscaping is completed.
- Landscaping and revegetation in this VMA in accordance with approved Landscape Plans (**Appendix B**).

4.4.6 VMA 6 – Riparian Lands Adjacent to Access Roads (0.17ha)

This VMA includes all lands mapped as PCT 1718 or mapped at PCT 1636 immediately adjacent to PCT 1718 where that land will abut access roads to be constructed as part of the development. Works in this VMA are to be undertaken prior to and during construction of access roads in order to prevent impact from construction and operation on retained native vegetation.

- Weed control is to be carried out using methods such as hand removal, cut and paint and spot spraying to minimise harm to native plants and encourage natural regeneration. Spot spraying should only be used if deemed necessary. Sweeps through the native vegetation of this VMA are to be undertaken on every site visit and at least 4 times per year (Refer **Section 4.8**).
- Top soil from the areas of intact native vegetation proposed to be impacted by the road crossings are to have the native vegetation mulched into the ground layer and at the completion of vegetation removal a minimum of 100mm of top soil is to be removed and stockpiled away from potential contamination from exotic weeds and soils from these areas. The top soil is to be excavated prior to the commencement of any earth works associated with the site. All top soil shall be free of contaminants such as seeds and propagules of weeds. If disturbance has occurred within the VMA, but outside of the construction footprint, the top soil is to be reinstated throughout impacted areas of the VMA during the rehabilitation stage and post construction phase.

- Coir logs or suitable alternative shall be installed to assist with erosion control immediately following completion of earthworks.
- Revegetation works: Natural regeneration of native plants from the seed bank of topsoil throughout the VMA should be monitored over a 12-month period with a 6-month review. If natural regeneration of native species is < 50% cover at the 12-month period infill planting will be needed. Planting should commence in Autumn, however assisted plant establishment via watering will be at the discretion of the contractor and with due consideration of seasonality
- In all areas immediately adjacent to access roads (**VMA-6a 0.02ha** – within 1m of extent of construction), dense plantings of competitive native groundcovers (site-indigenous species of *Lomandra*, as well as *Imperata cylindrica* and other site-indigenous tussock grasses) should be installed in a strip at least 1m wide to stabilise the VMA and act as a buffer to weed ingress from adjacent development.
- Native Mulch (derived from site) is to be installed prior to revegetation if native regeneration is below 50%, as above. Mulch will be used to supress weed growth, increase water retention in soils and provide protection against erosion issues that may occur due to the removal of vegetation. Mulch will need time (3-4 weeks) to settle before and if plantings are installed. Ongoing weed control is to be maintained until planting commences.
- Ongoing weed control is to be maintained in perpetuity.

Plate 1: VMA 1, in the west facing culvert

Plate 2: VMA 1, eastern extent core

Plate 3: VMA 1, eastern extend inundated edge

Plate 4: VMA 2, edge of large dam

Plate 5: VMA 3, good condition core

Plate 6: VMA 3, Lantana edge infestation

Plate 7: VMA 3, western extent showing Crofton weed infestation in easement

4.5 Nest Boxes

4.5.1 Installation

A qualified ecologist shall install nest boxes and/or artificial hollows. At least six (6) temporary nest boxes shall be installed:

- At least two weeks prior to clearing and maintained for five years;
- At least four metres above ground;
- Of a design suitable for species that may be residing in trees marked for removal;
- Of a durable material (i.e.; marine ply or equivalent).
- Of a design that is consistent with NSW Government 2011, Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects - Guide 8: Nest boxes, prepared by Roads and Traffic Authority, September 2011 and NSW Government 2008, Guidelines for the design, construction and placement of nest boxes, prepared by Department of Environment, Climate Change and Water, Biodiversity Conservation Section.
- At an orientation that is suitable for the species that the nest box has been designed. Micro bat nest boxes shall be orientated at a north to north westerly aspect. Bird and mammal boxes shall be orientated at an east facing aspect;
- In a manner that minimises damage to the trees and surrounding vegetation; and
- With a unique number affixed that can be read from the ground.

Nest boxes are to remain within adjoining vegetation to provide additional temporary roosting habitat whilst tree hollows are felled for installation.

The total number of permanent artificial hollows and nest boxes to be installed is to be a minimum of twelve (12) artificial hollows / nest boxes suitable for a range of fauna species.

A portion of the artificial hollows or nest boxes are to be installed at agreed intervals in consultation with Council's Development Planner Flora and Fauna as temporary refuge for Squirrel Gliders travelling through the Wyee Rd habitat linking corridor

Excess tree hollows not installed as artificial habitat are to either:

- be provided to Council for use in future habitat augmentation within Lake Macquarie, or
- retained for habitat enhancement for any offset site.

4.5.2 Monitoring

Nest boxes / artificial hollows shall be monitored by a qualified ecologist to determine their usage and repairs or replacement (as required). Monitoring shall be carried out on an annual basis for a minimum period of five years following installation and/or as otherwise agreed with Council.

If feral bees establish in the nest box during the monitoring phase, an appropriately qualified person shall remove them. The box shall be replaced with one that has carpet on the inside of the box roof, and if appropriate, surface insect spray to deter bees from establishing.

4.6 Fauna Management

4.6.1 *Macropus giganteus* (Eastern Grey Kangaroo) Resident Population

An assessment of habitat connectivity over the site determined that the ideal emigration of the Eastern Grey Kangaroo (EGK) population is to the south and east, where woodland is crossed with large

powerline easements for foraging and access under the rail line is facilitated to the east. The large tract of woodland to the east of the north-south easement connects to Pourmalong Creek and ultimately the large open coastal areas north of the Morisset Hospital. The network of easements and tracks throughout the woodland should provide sufficient open areas with emergent grass and herbaceous growth for EGKs to feed while moving through the landscape. It is anticipated that the population will gravitate to open areas which mirror the habitat of the golf course.

A coarse management tool for encouraging EGKs to move in this direction would be periodically herding animals to the southern extent of the site as development stages progress. The Project Ecologist can coordinate a team to herd animals down the fairways and past the development after clearing for each stage has been completed and prior to bulk earthworks. Temporary fencing may be installed by the civil contractor to prevent return to the former golf course. The Project Ecologist shall monitor the status of the remaining population, noting group size, young at foot, and apparent pouch young, to determine the functional response to the habitat change.

Signage shall be installed by LMCC along Wyee Rd and Mandalong Dr informing drivers that the potential for macropod activity on roads is increased while the population disperses

4.6.2 *Petaurus norfolcensis* (Squirrel Glider) Habitat Connectivity

Squirrel glider habitat connectivity must be assessed within one (1) month of clearing works commencing to determine whether an arboreal corridor is retained through which gliders can travel without resorting to going to ground. While habitat linking vegetation will be planted in the form of scattered canopy trees, poles may be required to facilitate safe movement while trees establish and attain sufficient height. Connectivity is to be maintained between patches of retained vegetation north / south along the western corridor and east west through the swamp forest and around the dam.

To assess existing connectivity, a canopy gap analysis is to be assessed in field to ensure that development works where crossings occur through corridors and/or tree removal in the development areas do not establish hostile connections for the Squirrel Glider. For the purposes of this analysis a hostile connection is defined as a gap of 35m or greater where there is insufficient vegetation for a glider to launch from and land on in either direction of travel.

Fauna Pole Specifications

The specifications for the glider pole installation have been developed from information outlined in the Roads and Maritime Services Fauna Pole Specification to ensure the poles are installed in a manner that is generally accepted for the purposes of this proposal.

General Specifications

- The Glide angle (of Squirrel Gliders) is 1m Vertical Metre X 1.8 (Horizontal).
- To allow for Squirrel gliders to land at a safe height. The Glide angle required will be 2 metres above the ground level. (equation = Pole Height X 1.8 - 2).

Poles

- Timber poles are to be rated at 12kN (Nominal working strength), Treated grade SD2
- The nominal working strength (kN) will be in accordance with the recommendations made by the site engineer.
- The heights of each pole will be as per table 2, with the launch beams at the stated heights above ground level. The required depth of burial of the poles for stabilisation will be as per Ausgrid specification NS220 Table 9.2.1 Wood Pole Data table (See **Appendix H**)
- The diameter at the base of the pole will be determined by the nominal working strength required as per Ausgrid specification NS220 Table 9.2.1 Wood Pole Data table.
- Minimum Pole Butt and Head per Ausgrid PEC Vsn. 1.974.

- Poles to be backfilled with compacted select backfill.
- Aluminium caps to reduce predation are to be installed on the tip of the poles, these caps are to be 4mm thick and 900mm in diameter. The placement of the caps should be no less than 400mm above the lunch beam on each pole.

Launch Beams

- Launch beams are to as per RMS specification (**Appendix I**). The launch beam is to be 250X250X2400mm treated timber bulkhead (F22 grade).
- Beams are to be installed in a manner that will facilitate the movement of glider species in a north and south direction.
- "L" shaped galvanised steel brackets with galvanised bolts to be used to secure the launch beam.
- Launch beam will be installed at 400mm below the tip of the pole.

4.6.3 Fauna handling

Displaced fauna shall be:

- Observed and assisted as required moving toward refuge habitat;
- Self-relocation of fauna is to be encouraged whenever possible, e.g. in the case of highly mobile fauna such as birds or large mammals, and in situations where retained bushlands are in close proximity relative to the mobility of the fauna species, so as to minimise stress to the animal;
- Care should be taken not to disturb fauna which is attempting to self-relocate. Stop work for a sufficient period of time to allow the animal to move off site and ensure that site personnel and equipment are not positioned in between the animal and adjacent bushland such that avenues of escape are obstructed;
- When fauna capture is necessary, inspect fauna immediately for any injuries. To minimise stress to the animal and reduce the risk of further injury by:
    - Handling fauna carefully and as little as possible
    - Covering larger animals with a towel or blanket and placing in a large box
    - Placing small animals in a calico bag, tied at the top
    - Keeping the animal in a quiet, cool, ventilated, and dark place away from construction activities. This location is to be designated in advance of construction work
- Where handling frogs is necessary, captured frogs must be handled in accordance with the *Hygiene Protocol for the Control of Disease in Frogs* (DECC 2008), specifically:
    - A new pair of disposable gloves must be used between the handling of each frog;
    - Use one plastic bag per frog when transporting frogs. Do not reuse bags.
    - Do not release frogs into new areas a significant distance from their location of recovery
- Dangerous animals such as venomous reptiles must not be handled by inexperienced/unqualified personnel. The following actions must be taken when a dangerous animal is identified within the construction footprint:
    - Exclude all personnel from the vicinity, until the fauna move on; or
    - Contact the Project Ecologist. The Project Ecologist may nominate to contact a rescue agency or professional snake handler to assist including:
        - Hunter Wildlife Rescue 0418 628 483

- Craig Adams SSSafe (snake handler):0409 786 659
- Lake Macquarie Snake Catcher, Murrays Beach (snake handler): 0409 586 620

o The Project Ecologist or other nominated personnel are, where practical, to keep the dangerous animal in sight where it remains within the construction site.

- Any microbats that are disturbed during the clearing process and do not take flight will need to be handled by an ecologist with up to date Australian Bat Lyssavirus vaccination. Microbats are to be placed in a suitable tree hollow, or if none are available in a calico bag and kept in a quiet, dark, ventilated place until nightfall.

4.6.4 Release of fauna

- All fauna captured during tree felling supervision must be released as soon as practical after the animal is caught, and only when the animal is determined to be fit for release;
- Release the animal outside the development footprint into adjacent habitat within the VFMP or E2 Conservation zoned land in the local area if appropriate;
- Time the release of the animal to coincide with the active period of the species; i.e. release nocturnal animals at dusk;
- Do not undertake fauna relocation during periods of heavy rainfall or extreme weather conditions, unless the animal is excessively stressed by captivity;

4.6.5 Injured fauna management

- Contact the Project Ecologist if an injured animal is found on or in the vicinity of the construction site. The Project Ecologist will determine if the animal is seriously injured and requires attention. Injured fauna are to be taken/handed over to vet or wildlife carer to be treated/ rehabilitated and released back into their local habitat:
  - Fur and Feathers Rescue Farm at Dolittle Ranch 0404827293
  - Hunter Wildlife Rescue 0418 628 483
  - Sugarloaf Animal Hospital: 02 4955 1833
  - Edgeworth Animal Medical Centre: 02 4958 1800
  - Craig Adams SSSafe (snake handler): 0409 786 659
- Contact local wildlife rescue agency and/or veterinary surgeon if the Project Ecologist is not present or cannot immediately attend the site. Follow advice from the Project Ecologist, wildlife rescue agency and/or veterinary surgeon while waiting for any of the above parties to attend the site;
- Once the rescue agency arrives at the site, they assume responsibility for the animal. Any decisions regarding the care of the animal will be made by the rescue agency;
- In the event that the rescue agency and/or local veterinary service cannot be contacted, the Project Ecologist, in their absence, will deliver the injured animal to the agency/local veterinary service as soon as possible;
- In the event that the individual is mortally injured euthanasia shall be used. If the injured animal is in distress, and a veterinarian or suitably authorised carer cannot attend to the animal in a timely manner, the Project Ecologist may euthanise the animal by appropriate means. Cervical dislocation or blunt force trauma will be used on small species. On the rare occasion that medium to large animal is injured as a result of the project works, a qualified vet will be contacted. If euthanasia is required, the ecologist must do so strictly in accordance with the Project Ecologist's approved Animal Research Authority issued by the NSW Department of Primary Industry.

- The Project Ecologist must record the following information about any animal euthanised or leaving the site for treatment:
    - Species
    - Location where animal was found (GPS co-ordinates if possible)
    - Date
    - Sex (if possible)

4.7 Fencing

4.7.1 Site Establishment

The site boundary is to be demarcated temporarily with visible flicker tape to prevent unnecessary impact on retained vegetation from site works within the adjacent development area. When adjacent works are functionally completed, permanent fencing is to be erected around the site.

Exclusion fencing is to be erected to protect retained vegetation on and adjacent to the development site, in compliance with LMCC *Development Control Plan 2014 Guidelines – Tree Preservation and Native Vegetation Management Guidelines* (Section 6) and the Australian Standard AS4970-2009 – *Protection of Trees on Development Sites.*

Sediment fencing along the boundary of retained vegetation fringing creek lines is to be installed temporarily during earth works and construction works to prevent sedimentation degrading vegetation and watercourses. All earth works within the site are to be conducted in a sensitive manner that does not unnecessarily impact the creek bed and bank.

Temporary fencing (flicker tape) and 'no-go' signage (See **Plate 8**) to be installed on the boundary of all areas of native vegetation to be retained to protect conservation values during construction, prior to commencement of works. Civil contractors, sub-contractors, plant and machinery are not to enter these areas (See **Figure 4**). Following construction, permanent fencing and signage are to be installed:

- along boundaries
- around 'no-go' zones
- and around any retained native vegetation / trees.

4.7.2 Exclusion Zones

Exclusion fencing shall be installed around all native vegetation that shall be retained on and adjoining the site to minimise damage, prior to the commencement of works. Vegetation exclusion fencing shall be maintained in good working order for the duration of works.

All plant/machinery is excluded from retained native vegetation in conservation lands. Exception may apply at the discretion and supervision of the Vegetation Management Contractor for the installation of salvaged tree hollows or other habitat.

4.7.3 Fauna-Friendly Fencing

All fencing within the development site, including acoustic barriers, should be fauna-friendly, and not prevent the safe movement of fauna through linking corridors or from the development site to adjacent habitat. Boundary fencing should be visible for nocturnal or crepuscular fauna. Plain strand wire shall be tagged with metal tags for wildlife visibility at minimum intervals of every 30cm. No barb is to be used anywhere on the site.

Permanent fencing to be established between the development and retained vegetation interface to be as specified in project Landscape Plans (Refer to **Appendix B**).

Plate 8 Example of temporary fencing

4.8 Weed Management

Weed monitoring and management is to be undertaken by a qualified and experienced bush regeneration contractor at least 4 times per annum and is to occur in perpetuity with annual targets of:

- a minimum 90% survival rate of any installed tubestock;
- <5% weed cover for Conservation areas
- <5% general weed cover for edges of conservation lands
- Suppression with the objective of eradication of WoNS, High Threat Exotics, and woody weeds.

During this time any species likely to significantly invade the VMA's, prevent natural regeneration, or impede native seedling growth is to be managed. Priority shall be given to significant infestations of species listed as Weeds of National Significance (WoNS) and Biosecurity Weeds, thereafter transformer weeds and woody weeds shall be treated within all VMAs.

Weed removal techniques should be appropriate to the weed type, growth form, ecology, and to the existing VMA conditions. Wherever possible, weed removal should be carried out prior to annual seed set. Spring is the most optimal season for herbicide treatment. Herbicide spraying should be limited to the cleared land to be revegetated, as preparation for planting and for weed management during establishment. Herbicide spraying is to be repeated twice (allow 6 weeks between sprays) or until 90% dieback has occurred. Herbicide spraying is to be minimised in Good condition bushland in favour of manual primary works, and spot-spray used to control regrowth. Woody weeds should be treated with herbicide via the cut and paint method in areas of high native presence to avoid off target damage. Weed control methods have been outlined in **Appendix E**.

Seeds will germinate rapidly after the parent plant has been removed due to increases in light and habitat availability and chemical release. Therefore, ongoing monitoring and weed control will be undertaken that will involve control of minor infestations and flushes. Treatment methods are likely to be a combination of herbicide spraying and hand augmented techniques.

4.8.1 Weeds of National Significance

Weeds of National Significance (WoNS) are the highest priority species targeted for sustained nationally coordinated action under the Australian Weeds Strategy. This strategy provides for national management to eradicate WoNS species from parts of the country where Australia's productive capacity & natural ecosystems are affected. Each WoNS has a strategic plan that outlines strategies and an action required to control the weed and identifies those responsible for each action. Individual landowners and managers are ultimately responsible for managing WoNS species. State and territory governments are responsible for overall legislation and administration.

WoNs which occur on site based on field assessment:

- *Asparagus aethiopicus* (Ground Asparagus)
- *Lantana camara* (Lantana)

- *Rubus fruticosus* aggregate. (Blackberry)
- *Senecio madagascariensis* (Fireweed)
- Eichhornia crassipes (Water Hyacinth)

4.8.2 Biosecurity Act Weeds

The NSW Biosecurity Act 2015 replaces the repealed Noxious Weeds Act as of July 2017. The new Act establishes a General Biosecurity Duty as well as several key management tools to allow for effective, risk-based management of biosecurity matters (Refer to **Table 3**). Applicable to all species determined either State level priority weeds (by NSW DPI) or Regional listed priority weeds (by Hunter Local Land Services), the General Biosecurity Duty requires that "any person [landholder] who deals with a biosecurity matter and has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised." Commensurate with this requirement, the Hunter Regional Strategic Weed Management Plan categorises specific management objectives to demonstrate compliance in relation to priority weeds occurring in the Hunter Local Land Services Region.

Table 3 Regulatory tools of the Biosecurity Act

Regulatory Tool	Description
Prohibited Matter	Biosecurity matter listed in Schedule 2, Part 1 of the *NSW Biosecurity Act 2015*, for the purpose of preventing entry of that matter into NSW or a part of NSW. Prohibited matter relevant to the region is listed in Appendix A1.1 of this plan. Prohibited matter includes weeds nationally targeted for eradication and presently not in NSW.
Control Order	Establishes one or more control zones and related measures to prevent, eliminate, minimise or manage a biosecurity risk or impact. Control orders are for managing weeds under approved eradication programs and last for five years (or can be renewed for longer-term eradication programs). Weed Control Order 2017 (Part 6, Division 1), under the *NSW Biosecurity Act 2015*, will include weeds that are subject to a Control Order for the purpose of eradication. Further Control Orders will be proposed, as needed, to address subsequent eradication campaigns.
Biosecurity Zone	Aims at containment of a species and provides for ongoing strategic management in a defined area of the state. A Biosecurity Zone specifies the measures that must be taken in the defined area to manage the weed. Species may also be subject to strategic responses tailored by the region, either within the zone or outside it.
Mandatory Measures Regulation	Requires parties to take specific actions with respect to weeds or carriers of weeds. Mandatory Measures are defined in the regulations and include prohibition on certain dealings - including Weeds of National Significance (WoNS) (Division 8 Clause 33), Parthenium weed carriers - machinery and equipment (Division 8, Clause 35), and duty to notify of importation of plants into the state (Division 8, Clause 34).
Regional Recommended Measures	Aims to provide regional specific measures for each Local Land Services Region.
Prohibited Dealings	Must not be imported into the State or Sold.

4.8.3 High Threat Exotics

The Biodiversity Assessment Method (BAM) is established under the NSW Biodiversity Conservation Act 2016 which assesses 'high threat weeds' or 'high threat exotic plant cover' as plant cover composed of vascular plants not native to Australia that if not controlled will invade and out compete native plant species plant cover composed

4.8.4 Exotic Species Observed

Site inspection/assessment recorded a total of 23 weed species presented in Table 4 below.

Table 4 Weed Species Present on Site

Species	Common Name	Area	Biosecurity Act 2015	WoNs	HTE
Ageratina adenophora	Crofton Weed	All of NSW	General Biosecurity Duty		*Yes*
Andropogon virginicus	Whiskey Grass	-	-	-	Yes
Asparagus aethiopicus	Ground Asparagus	All of NSW	General Biosecurity Duty & Prohibition on Dealings	Yes	Yes
Axonopus fissifolius	Carpet Grass	-	-	-	Yes
Cenchrus clandestinus	Kikuyu	-	-	-	Yes
Cinnamomum camphora	Camphor laurel	All of NSW	General Biosecurity Duty	-	Yes
Conyza spp.	Fleabane	-	-	-	-
Cortaderia spp.	Pampas Grass	All of NSW & #Hunter	General Biosecurity Duty, #Regional Recommended Measure (for Regional Priority – Containment)		Yes
Erythrina x sykesii	Coral Tree				Yes
Gomphocarpus fruticosus	Cotton Bush	-	-	-	-
Hypochaeris radicata	Cat's Ears	-	-	-	-
Lantana camara	**Lantana**	**All of NSW**	**General Biosecurity Duty & Prohibition on Dealings**	**Yes**	**Yes**
Ligustrum sinense	Small-leaved Privet	All of NSW	General Biosecurity Duty	-	Yes
Lonicera japonica	Japanese Honeysuckle	All of NSW	General Biosecurity Duty	-	Yes
Ludwigia peruviana	Water Primrose	All of NSW & **Hunter	General Biosecurity Duty, **Regional Recommended Measure (for Regional Priority – Containment)		Yes
Paspalum dilatatum		-	-	-	Yes
Pinus spp.	Pine Tree	-	-		Yes
Plantago lanceolata	Plantain	-	-	-	-
***Rubus fruticosus* aggregate.**	**Blackberry**	**All of NSW & *Hunter**	**General Biosecurity Duty, Prohibition on Dealings & *Regional Recommended Measure**	**Yes**	**Yes**
Senecio madagascariensis	**Fireweed**	**All of NSW**	**General Biosecurity Duty & Prohibition on Dealings**	**Yes**	**Yes**
Senna pendula	Cassia	All of NSW	General Biosecurity Duty	-	-
Stenotaphrum secundatum	Buffalo Grass	-	-	-	Yes
Verbena spp.	*Purple Top*	-	-	-	-

**The plant should not be bought, sold, grown, carried or released into the environment. Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread from their land. Land managers to reduce impacts from the plant on priority assets.*

***Land Area 1: Land managers should mitigate the risk of new weeds being introduced to their land.*

#Core infestation area: Land managers should mitigate spread from their land. Land managers to reduce impacts from the plant on priority assets.

NSW WeedWise, NSW Department of Primary Industries (Accessed 23-11-2021)

4.8.5 Weed Assessment Map (National Trust Method)

A weed assessment map has been produced (Refer to **Figure 5** & **Appendix D**) in accordance with the National Trust Method to delineate the site from 'Good' to 'Very Poor' based on weed presence and

density. The majority of the site is mapped as 'Good' due to the large areas of remnant vegetation across the site with minimal weed presence, and high native diversity in patches which do host weedy stands. Area of each category is as follows:

1) Good = 1.83ha
2) Fair = 0.31ha
3) Very Poor = 0.77ha

MORISSET GOLF COURSE

FIGURE 4: VEGETATION MANAGEMENT AREAS

Legend

- Subject Site
- Study
- Cadastral Boundaries

Vegetation Management

- VMA1
- VMA2
- VMA3
- VMA4
- VMA5 (Clearing Area)
- VMA6
- VMA6a

0 35 70 140

Meters

1:2,500

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, NSW Spatial Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 15/12/2021| Version 1 | Z:\19051 - Morisset Golf Course\19051_DA1288_20211201.mxd | This plan should not be relied upon for critical design dimensions.

MORISSET GOLF COURSE

FIGURE 5: WEED DENSITY MAP (NATIONAL TRUST METHOD)

Legend

- Subject Site
- Study Area
- Cadastral Boundaries

Weed Density

- Good
- Fair
- Very Poor

0 35 70 140

Meters

1:2,500

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, NSW Spatial Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 | Date: 2/12/2021| Version 1 | Z:\19051 - Morisset Golf Course\19051_DA1288_20211201.mxd | This plan should not be relied upon for critical design dimensions.

4.9 Revegetation

Revegetation is proposed in VMAs 3, 4 & 6. All works in VMA 3 are according to approved Landscape Plans (**Appendix B**).

No revegetation is to occur in resilient areas of VMAs 1 & 2 – these areas must be supported to regenerate naturally. Brush matting of areas cleared of woody weed stands or where tracks have been rehabilitated is an acceptable intervention to encourage regeneration from site seed stock at appropriate times of year. On site edges, or in areas where stands of weeds have been removed and natural regeneration is not apparent within 12 months, infill planting is to be carried out to achieve strata densities in **Table 5** using tubestock species appropriate to the vegetation community being regenerated.

Revegetation is to be undertaken in late March to late September to avoid hot weather and plant loss.

Plant guards may be required to protect plantings from grazing – grazed plants will need to be replaced.

Naturally occurring remnant vegetation, preferably from the study area, is the best source of seed and/or vegetative material for revegetation. Generally, these plants will have evolved to suit local environmental conditions and assist in the preservation of local provenance / genetic stock. On this basis native plants for revegetation shall be sourced from suppliers that have obtained their stock by harvesting seed from local populations, however if unavailable, seed or tube stock must be sourced from the Lake Macquarie LGA or a 50km buffer of the site to maintain genetic provenance of the Lower Hunter/ Central Coast region.

Plant species selection for each Vegetation Community has been derived from the appropriate vegetation communities from the LMCC Vegetation Community & Plant Community Types Map and assigned to the corresponding PCT as more appropriate local data (MALD). Densities are approximate based on stems per hectare outcome and the final densities and species selected from the list will be subject to availability to the contractor at the time of planting. Refer to **Table 5** for recommended species selection for each community.

Table 5 Recommended Revegetation Species for Communities on Site

Scientific Name	Common Name	Planting Density
LMCC MU31 – Coastal Plains Scribbly Gum Woodland (associated PCT 1636 Scribbly Gum - Red Bloodwood - Angophora inopina heathy woodland)		
Canopy Species		
Eucalyptus haemastoma	Sydney Blue Gum	1 individual per 10m^2
Angophora inopina	Charmhaven Apple	
Eucalyptus capitellata	Brown Stringybark	
Angophora costata	Smooth-barked Apple	
Corymbia gummifera	Red Bloodwood	
Subcanopy Species		
Allocasuarina littoralis	Black She-Oak	1 individual per 5m^2
Melaleuca sieberi		
Leptospermum trinervium	Slender Tea-tree	
Shrubs		
Banksia oblongifolia	Fern-leaved Banksia	1 individual per 2m^2
Lambertia formosa	Mountain Devil	

Scientific Name	Common Name	Planting Density
Persoonia levis	Broad-leaved Geebung	
Hakea laevipes		
Isopogon anemonifolius	Broad-leaf Drumsticks	
Dillwynia retorta		
Pimelea linifolia	Slender Rice Flower	
Platysace linearifolia		
Banksia collina		
Comesperma ericinum	Pyramid Flower	
Grevillea sericea	Pink Spider Flower	
Petrophile pulchella	Conesticks	
Bossiaea stephensonii		
Leucopogon microphyllus		
Pultenaea paleacea	Chaffy Bush-pea	
Hakea bakeriana		
Bossiaea heterophylla	Variable Bossiaea	
Hibbertia obtusifolia	Hoary Guinea Flower	
Monotoca scoparia		
Bossiaea obcordata	Spiny Bossiaea	
Leptospermum polygalifolium		
Acacia terminalis	Sunshine Wattle	
Gompholobium latifolium	Golden Glory Pea	
Epacris pulchella	Wallum Heath	
Dampiera stricta		
Melichrus procumbens	Jam Tarts	
Leucopogon attenuatus	A Beard-heath	
Platysace ericoides		
Mirbelia rubiifolia	Heathy Mirbelia	
Gompholobium pinnatum	Pinnate Wedge Pea	
Groundcovers		
Gompholobium glabratum	Dainty Wedge Pea	4 individuals per 1m^2
Hibbertia vestita		
Xanthorrhoea latifolia		
Entolasia stricta	Wiry Panic	
Anisopogon avenaceus	Oat Speargrass	
Themeda australis	Kangaroo Grass	
Aristida warburgii		

Scientific Name	Common Name	Planting Density
Panicum simile	Two-colour Panic	
Aristida vagans	Threeawn Speargrass	
Eragrostis brownii	Brown's Lovegrass	
Aristida ramosa	Purple Wiregrass	
Lomandra obliqua		
Patersonia glabrata	Leafy Purple-flag	
Lomandra filiformis	Wattle Matt-rush	
Billardiera scandens	Hairy Apple Berry	
LMCC MU37 – Swamp Mahogany - Paperbark Forest (associated PCT 1718 Swamp Mahogany - Flax-leaved Paperbark swamp forest)		
Canopy Species		
Eucalyptus robusta	Swamp Mahogany	1 individual per 10m^2
Eucalyptus resinifera	Red Mahogany	
Subcanopy Species		
Melaleuca nodosa	Black She-Oak	1 individual per 5m^2
Melaleuca sieberi		
Melaleuca linariifolia	Slender Tea-tree	
Shrubs		
Leptospermum juniperinum	Prickly Tea-tree	1 individual per 2m^2
Melaleuca thymifolia	Thyme Honey-myrtle	
Pultenaea villosa		
Pimelea linifolia	Slender Rice Flower	
Petrophile pulchella	Conesticks	
Dodonaea triquetra	Hop Bush	
Groundcovers		
Gompholobium glabratum	Dainty Wedge Pea	4 individuals per 1m^2
Centella asiatica	Indian Pennywort	
Dianella caerulea var. assera		
Entolasia marginata	Bordererd Panic	
Gahnia clarkei	Tall Saw-sedge	
Viola hederacea	Native Violet	
Lomandra longifolia	Spiny-headed Mat-rush	
Schoenus brevifolius		
Baumea rubiginosa		
Ischaemum australe		
Empodisma minus		
Hemarthria uncinata	Matgrass	

4.9.1 Mulching

All mulch shall be free of contaminants such as seeds and propagules of weeds. Avoid the use of pine mulch as the acidity level is not suitable for the native vegetation being used. Mulch will be established to a depth of 75-100mm. Mulch has been shown to increase the survival rate of plants in soils with poor water holding ability however excessive (thick) mulching may limit the likelihood of natural regeneration. Mulch should be installed immediately post weed control/scalping to allow time for mulch to settle into soil prior to revegetation works. Use only native mulch derived from nearby site/s within the adjacent development if possible.

4.9.2 Irrigation

Plants are to be watered in upon installation, repeated in 1 week and 1 month at a minimum. Watering of plantings should be continued as required until all plants are established. Weather and site conditions will determine the frequency of watering for plants over the maintenance period to ensure they do not perish. Moisture levels and plant health should be monitored regularly during establishment by the vegetation contractor.

Watering should be undertaken early morning or late afternoon to avoid the hottest part of the day and minimise water loss.

4.9.3 Plant Replacement

In areas where plants have been completely removed (i.e. as a result of vandalism or accidental damage) or where rehabilitation has failed within the VMA, been damaged or is suffering from pests and/or disease, replanting should be undertaken in appropriate mild seasonal conditions.

Plants lost or damaged should be replaced to maintain a minimum of 90% survival rate of the recommended plant densities. Initial and careful consideration of the health of tube stock, site establishment and seasonality should assist establishment while minimising loss.

5 Monitoring and Reporting

The following monitoring and reporting section has been developed to ensure proposed works in **Section 5** are completed and compliant with the conditions of consent and objectives of the VFMP and monitoring reports produced bi-annually for a minimum of 5 years after works have been completed and maintenance reports completed for a further 5 years to ensure ongoing maintenance of biodiversity values under the VFMP.

In addition to the reporting photo monitoring points shall be established during the implementation of this VFMP. Photo monitoring provides visual baseline data that documents the initial condition and progression of native vegetation regeneration and will be used to inform the vegetation monitoring works. Photo monitoring points must amply cover rehabilitation areas in all VMAs and all significant weed infestations to demonstrate progress.

5.1 Compliance and Monitoring Report

The compliance and monitoring report will include:

- An assessment of riparian habitat condition including impacts of changes to hydrological processes on PCT 1718 land as per **Section 4.3** and water quality in watercourses and dams.
- Assessment of Squirrel Glider habitat links including height of all installed canopy trees which have been installed to achieve required glide connections, condition of glider poles,
- Provide updated photos at designated monitoring points (bi-annually – Spring & Autumn)
- Record condition of regenerating vegetation within the VFMP area
- Weed density report as per walkover of the entire VFMP area

- Include any corrective action requirements to be carried out before the next monitoring and compliance inspection which may include, but are not limited to:
    - Repair/replacement boundary demarcation/ fencing;
    - Weed management;
    - Additional restoration works such as soil and mulch replenishment or more intensive irrigation of plantings;
    - Revegetation works if required; and
    - Rubbish removal
- Detail any modifications made to the VFMP implementation based on unforeseen events and the actions that will ensure delivery in accordance with the VFMP aims and objectives.
- Any unauthorised activity affecting the implementation of the VFMP known to occur during the timeframe of the VFMP, must be reported to Council's Vegetation Establishment Officer by the proponent or contractor within 48 hrs. This includes unauthorised access and unauthorised development.

The Annual Report is to be sent to Lake Macquarie City Council Development Planner Flora and Fauna and Vegetation Establishment Officer.

5.2 NRAR VMP Reporting

The contractor engaged to carry out the works under this VFMP is required to satisfy in parallel the works and reporting/monitoring requirements of the CAA VMP prepared for NRAR.

6 Implementation

The VFMP is to be implemented in perpetuity from the time of receiving the construction certificate.

The implementation of management actions outlined in **Section 4** have been summarised and tabulated along with, responsibilities, performance criteria and corrective actions in **Table 6** below. A key component of the VFMP implementation is monitoring of habitat and compliance of works carried out by contractors on site and preparation of compliance reports (**Section 5**).

A compliance report on VFMP implementation will be prepared following commencement of works and then monitoring reports produced bi-annually for a minimum of 5 years after works have been completed and maintenance reports completed for a further 5 years to ensure ongoing maintenance of biodiversity values under the VFMP. Reports are to be submitted to the proponent within 1 month of each compliance inspection such that any overarching approval obligations can be met. The monitoring reports will:

- Detail progress against the VFMP implementation schedule (**Table 6**);
- Include monitoring of fauna population and habitat outcomes and progress;
- Include any corrective action requirements to be carried out before the next monitoring and compliance inspection; and
- Detail any modifications made to the VFMP implementation based on unforeseen events and the actions that will ensure delivery in accordance with the VFMP aims and objectives.

To assist in tracking monitoring and compliance, contractors must submit regular update reports to the proponent and person/ firm undertaking inspections and compliance on activities carried out within the VFMP. These updates should include (but not be limited to):

- Status of rehabilitation – success of natural regeneration and comments on revegetation as required;
- Use established photo monitoring locations and provide updated photos with each report (Refer to **Sections 4.1** & **5.1**);
- Weeds– areas and extent of treatment required incl. methods employed;
- Issues relating to unsolicited access or damage, dumping of rubbish etc; and
- Detail any corrective actions that are required and/or have been employed.

Table 6 Management Actions & Schedule

Action	Responsibility	KPI	Timing	Corrective Action
VMA - All				
Site Establishment				
Notify Council	Proponent	Give Council at least 48 hrs notice of commencement of VFMP works	Prior to commencement of VFMP works	Revert back to KPI
Fencing				
Install temporary boundary fencing and signage around conservation lands as per **Section 4.7** and **Plate 1**	Civil works contractor	Prevent unnecessary impact from site works within the neighbouring lands	Prior to commencement of VFMP works	Revert back to KPI
Install permanent fence and signage as per **Section 4.7**	Civil Works Contractor	Install permanent perimeter fence to prevent dumping and unauthorised access	Following completion of construction works	Revert back to KPI
Baseline Monitoring & Pre-clearance Survey				
Undertake pre-clearance and baseline monitoring surveys including establishment of photo points as per **Section 4.1**. Baseline report to be produced for Council.	Project Ecologist	Baseline results delivered to Council's Development Planner Flora and Fauna within 1 month of commencement of VFMP works	Prior to commencement of development works	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
Weed Management & Site Maintenance				
Primary Weed Management - Removal of WoNS, Biosecurity Act Weeds, transformer weeds (HTE) and woody weeds in accordance with **Sections 4.4** & **4.8**.	Vegetation Management Contractor	Target weed species cover to be reduced and maintained at less than 5% cover in retained vegetation and less than 5% cover for edges of development site to encourage natural regeneration and maintain healthy coverage. Avoid off target damage.	During periods of active growth and/or on a minimum quarterly interval pending growth of weeds	Continue weed control and increase frequency as required to control any weed flush.
Undertake follow up weed control in all areas. Apply manual hand removal and/or cut and paint method, spot spray as appropriate in accordance with **Sections 4.4** & **4.8**.	Vegetation Management Contractor	Target weed species cover to be reduced and maintained at less than 5% cover to allow continued natura regeneration and maintain healthy native coverage capable of suppressing weed ingress.	Minimum of quarterly visits, to be maintained in perpetuity	Continue weed control and increase frequency as required to control any weed flush.
Sweeps for weeds and rubbish removal	Vegetation Management Contractor	Remove all rubbish and any weeds that can be manually removed.	During site works for weed management	Revert back to KPI
Rehabilitation				
Site inspection in accordance with **Sections 4.1** & **5**	Project Ecologist	Inspect rate of natural regeneration of native plants. Record observations (< or > 50% native cover) and weed density and cover against weed control KPIs	Prior to VFMP works, then bi-annually for 5 years	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
Habitat Augmentation				
Squirrel glider pole installation	Civil Contractor	Glider poles installed according to plan developed with Councils Development Planner Flora and Fauna	Poles shall be installed within three months of vegetation clearing commencing	Revert back to KPI
Nest Box Installation	Project Ecologist	6 temporary nest boxes installed	Prior to habitat tree felling	Revert back to KPI
Artificial Hollow Installation	Civil Contractor	Nest boxes installed in retained or adjacent vegetation to make a total of 12 artificial hollows / nest boxes	Operational, beginning after habitat tree clearing	Revert back to KPI
Artificial Habitat / Nest Box Plan	Project Ecologist	Plan provided to Council showing locations and types of augmented habitat	Operational, following salvaged hollow installation	Revert back to KPI
Ongoing Monitoring				
Bi-annual monitoring of all vegetation management and habitat augmentation actions for 5 years after implementation of VFMP in accordance with **Sections 4 & 5**	Project Ecologist	Monitoring initially undertaken 6 months after issue of Construction Certificate and thereafter 6 months from approval of reviewed monitoring reports. Monitoring report delivered to Council's Development Planner Flora and Fauna within 1 month of monitoring.	Operational, beginning 6 months after issue of Construction Certificate	Revert back to KPI
Squirrel Glider Pole Monitoring	Project Ecologist	Annual Monitoring statement supplied to Council	Annually for 10 years	Revert back to KPI
Maintenance reports of vegetation management works for 5 years after completion of monitoring reports in accordance with **Section 5**	Vegetation Management Contractor	Annual report delivered to Council's Development Planner Flora and Fauna within 1 month of completion of annual works.	Operational, beginning 5 years after VFMP implementation	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
VMA 1 & 2				
Baseline Survey				
Aquatic Habitat Monitoring in accordance with **Section 4.3.2**	Project Ecologist	Pre-works report of aquatic habitat variables delivered to Council within 1 month of commencement of VFMP works	Prior to commencement of works	Revert back to KPI
Weed Management & Site Maintenance				
Primary Weed Management – Primary Treatment of Aquatic Weeds in accordance with **Sections 4.4** & **4.8**.	Vegetation Management Contractor	Continual integrated suppression of high threat aquatic weeds – no infestation of new areas	During periods of active growth and/or on a minimum quarterly interval pending growth of weeds	Continue weed control and increase frequency as required to control any weed flush.
VMA 3 & 4				
Baseline Survey				
Squirrel Glider Habitat Connectivity Assessment in accordance with **Sections 4.1** & **4.6.2**	Project Ecologist	Pre-works assessment of existing vegetation connections for Squirrel Glider movement through the site delivered to Council within 1 month of commencement of VFMP works	Prior to commencement of works	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
Revegetation (VMA 3)				
Installation of *Eucalyptus robusta* for habitat connectivity as per approved Landscape Plans	Landscape Contractor	100% survival of planted *Eucalyptus robusta*	Initially and throughout VFMP Implementation and in perpetuity	Replacement plantings annually to maintain 100% survival and establishment of sufficient connectivity
Revegetation (VMA 4)				
Installation of locally indigenous canopy species for habitat connectivity as per **Sections 4.4.4** & **4.9**	Vegetation Management Contractor	100% survival of habitat linking canopy species; habitat connection maintained as per approved plan	Initially and throughout VFMP Implementation and in perpetuity	Replacement plantings annually to maintain 100% survival and establishment of sufficient connectivity
VMA 5				
Baseline Monitoring & Pre-clearance Survey				
Undertake Pre-clearance surveys including habitat tree mark-up, including potential habitat linking matrix in accordance with **Section 4.1**	Project Ecologist	Compliance supplied to Proponent including GPS points of hollow bearing trees and map	Prior to commencement of works	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
Operational				
Hollow bearing tree removal supervision in accordance with **Section 4.1**	Project Ecologist	Compliance supplied to Proponent including GPS points of hollow bearing trees and map, and any fauna species encountered during clearance.	During clearing work	Revert back to KPI
Weed Management & Site Maintenance				
Undertake weed control in all areas. Apply high volume spray	Vegetation Management Contractor	Target weed species cover to be reduced and maintained at less than 5% cover to prevent weed ingress into adjacent retained vegetation	Operational, during construction	Continue weed control and increase frequency as required to control any weed flush.
VMA 6				
Weed Management & Maintenance				
Topsoil to be salvaged from Swamp Mahogany Forest vegetation to be cleared as per **Section 4.4.6**	Civil Contractor	Native vegetation mulched to ground and 100mm weed free topsoil salvaged and stockpiled away from potential weed contamination	Prior to construction works on access roads	Revert back to KPI
Erosion protection installed (coir logs or similar) around construction areas in accordance with approved Erosion and sedimentation plan	Civil Contractor	Erosion protection installed	Prior to construction works on access roads	Revert back to KPI

Action	Responsibility	KPI	Timing	Corrective Action
Weed control of disturbed areas of PCT 1718 lands	Vegetation Management Contractor	Weed coverage <1% of disturbed areas of PCT 1718 lands prior to topsoil installation	Immediately access road works completed, repeated monthly until topsoil installed	Continue weed control and increase frequency as required to control any weed flush.
Top soil is to be reinstated throughout impacted areas of the VMA	Civil Contractor	Weed free topsoil installed and spread evenly over areas of disturbance within PCT 1718 lands adjacent to access roads	At least 1 week but no more than 1 month after weed control	Revert to KPI
Revegetation				
Native Mulch* (derived from site) is to be installed following 6 or 12 month review of natural regeneration if native cover or trajectory less than 50%	Civil Contractor / Vegetation Management Contractor	Native mulch installed (if required) at a depth of 100mm in disrturbed areas	Following 6/12 month review	Revert to KPI
Revegetation* (if required)as per per **Section 4.4.6**	Vegetation Management Contractor	Native vegetation cover > 50% as at 12 months from construction of roads	Not before 12 months after initial disturbance for construction, following assessment of natural recruitment	Install Native Plantings as per **Section 4.9**
6a – edge plantings as per **Section 4.4.6**	Vegetation Management Contractor	Competitive, locally-indigenous tussock species installed at 8/m^2 in areas immediately adjacent (<1m) of access road construction edges	Immediately following topsoil installation	Install Native Plantings as per **Section 4.9**

* Revegetation and mulching only to occur if natural regeneration is <50% at the 6-12 month site inspection

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Appendix A Plans of Proposal

ROAD AS PART OF "TOURIST ACCOMMODATION" DA OR FIRE TRAIL WITHIN RIGHT OF ACCESS CONNECTED TO WYEE ROAD SEE ACCESS PLAN 114

"TOURIST ACCOMMODATION" BY ADW JOHNSON

WASTE WATER PUMP STATION

ROAD WITHIN RIGHT OF ACCESS CONNECTED TO DORA STREET SEE ACCESS PLAN 114

SWAMP MAHOGANY FOREST

DAM

SWAMP MAHOGANY FOREST

ROAD

STAGE 9
STAGE 7
STAGE 5
STAGE 3
STAGE 2
STAGE 10
STAGE 8
STAGE 6
STAGE 4
STAGE 1

LOT 558
DP 755242

WYEE

EXISTING EASEMENT

MAIN NORTHERN RAIL LINE

STAGE	SITE No.s	No. SITES
1	101-145	45
2	201-260	60
3	301-335	35
4	401-437	37
5	501-538	38
6	601-639	39
7	701-742	42
8	801-841	41
9	901-941	41
10	1001-1051	51
	TOTAL	429

LAKE MACQUARIE CITY COUNCIL

Approved plans for
Development Consent No: DA/1288/2019
Date of Approval: 14/08/2020

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ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
DA	07/07/2020	SHORT TERM SITES MOVED TO STAGE 1	AM	LG	DATUM: A.H.D. CONTOUR INTERVAL:	0 25.0 50.0 62.5m SCALE: 1:1250 (FULL)	

drawing title:

PROPOSED SUBDIVISION SHOWING STAGES

location: Wyee Road, Morisset

council: Lake Macquarie

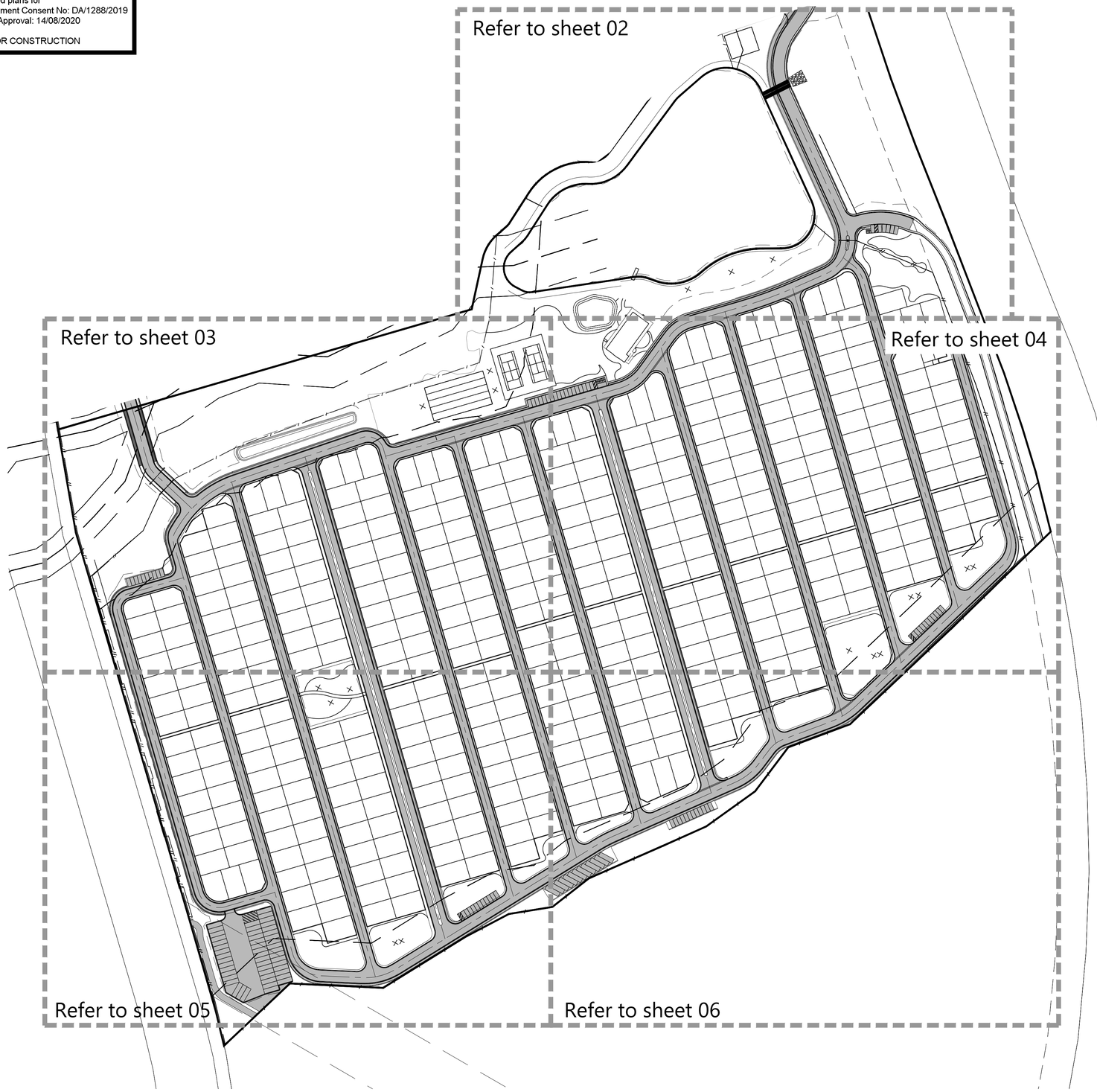
dwg ref: 239813(3)-DA-03-DA

client: WINARCH CAPITAL

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
www.adwjohnson.com.au

working beyond expectations

Appendix B Landscape Plans



Drawing Schedule

PLANTING SCHEDULE

Botanical Name	Common Name	Pot Size	Density/Spacing
Street Trees/Perimeter Trees			
Acmena smithii	Lilly Pilly	45 Litre	As Shown
Banksia integrifolia	Coastal Banksia	45 Litre	As Shown
Corymbia 'Scentuous'	Dwarf lemon Scented Gum	45 Litre	AsShown
Elaeocarpus eumundi	Quondong	45 Litre	As shown
Glochidion ferdinandi	Cheese Tree	45 Litre	As shown
Melicope elleryana	Pink Euodia	45 Litre	As Shown
Tristaniopsis 'Luscious'	Water Gum	45 Litre	As Shown
Waterhousea 'Whisper'	Weeping Lilly Pilly	45 Litre	As shown
Supplementary Tree Planting			
Angophora costata	Smooth Barked Apple	45 Litre	As shown
Corymbia gummifera	Red Bloodwood	45 Litre	As shown
Eucalyptus haemastoma	Scribbly Gum	45 Litre	As shown
Eucalyptus robusta	Swamp Mahogany	45 Litre	As shown
Amenity Trees			
Elaeocarpus eumundi	Quondong	45 Litre	As shown
Brachychiton 'Jerilderie Red'	Jerilderie Red	45 Litre	As Shown
Jacaranda mimosifolia	Jacaranda	45 Litre	As shown
Lagerstroemia cvs	Crepe Myrtle	45 Litre	As Shown
Magnolia grandiflora	Bull Bay Magnolia	45 Litre	As Shown
Nyssa sylvatica	Tupelo	45 Litre	As Shown
Tristaniopsis 'Luscious'	Water Gum	45 Litre	As Shown
Waterhousea 'Whisper'	Weeping Lilly Pilly	45 Litre	As shown
Ulmus parvifolia	Chinese Tallow	45 Litre	As Shown
Accent Plants			
Archontophoenix cunninghamiana	Bangalow Palm	45 Litre	As Shown
Asplenium australasicum	Birds Nest Fern	5 Litre	3m^2
Clivia miniata	Clivia	5 Litre	4m^2
Crinum perdunculatum	Crinum Lily	5 Litre	3m^2
Doryanthes excelsa	Minmi Lily	25 Litre	1m^2
Philodendron 'Xanadu'	Xanadu	5 Litre	3m^2
Phormium Tenax 'Maori Chief'	New Zealand Flax	2.5 Litre	4m^2
Phormium Tenax 'Sweet Mist'	New Zealand Flax	2.5 Litre	4m^2
Shrubs			
Acmena 'Allyn Magic'	Dwarf Lilly Pilly	5 Litre	0.7m
Banksia spinulosa	Hairpin Banksia	2.5 Litre	1m
Gardenia 'Florida'	Gardenia	5 Litre	0.7m
Grevillea 'Honey Gem'	Honey Gem	5 Litre	As Shown
Hibbertia scandens	Snake Vine	2.5 Litre	2m^2
Loropetalum chinense	Fringe Flower	5 Litre	1m
Pittosporum 'Miss Muffet'	Japanese Pittosporum	5 Litre	1m
Syzygium 'Reliance'	Lilly Pilly	5 Litre	1m^2
Westrigia 'Zena'	Coastal Rosemary	2.5 Litre	0.7m
Groundcover and Grasses			
Carex appressa	Tall Rush	Tubestock	5m^2
Carpobrotus glaucescens	Pigface	2.5 Litre	2m^2
Dianella Caerulea 'Little Jess'	Blue Flax Lily	2.5 Litre	4m^2
Dianella Cuerulea	Blue Flax Lily	2.5 Litre	4m^2
Dianella caerulea	Flax Lily	Tubestock	5m^2
Grevillea 'Mt Tamboritha'	Prostrate Grevillea	2.5 Litre	2m^2
Hardenbergia violacea	Native Sarsparilla	Tubestock	2m^2
Liriope 'Just Right'	Turf Lily	50mm tube	4m^2
Liriope variegata	Variegated Turf Lily	50mm tube	4m^2
Lomandra 'Katrinus'	Spiny Matt Rush	50mm tube	4m^2
Lomandra 'Shara'	Dwarf Spiny Matt Rush	50mm tube	4m^2
Loropetalum 'Purple Pixie'	Fringe Flower	2.5 Litre	4m^2
Myoporum parvifolium	Creeping Boobialla	2.5 Litre	4m^2
Lomandra longifolia	Matt Rush	Tubestock	5m^2
Themeda australis	Kangaroo Grass	Tubestock	5m^2
Basin and Dam Edge Planting			
Baumea rubiginosa	Soft Twig Sedge	Tubestock	5m^2
Carex appressa	Tall Rush	Tubestock	5m^2
Eleocharis acuta	Spike Rush	Tube stock	3m^2
Ficinia nodosa	Knobby Club Rush	Tubestock	5m^2
Juncus usitatus	Pin Rush	Tubestock	5m^2
Lomandra longifolia	Matt Rush	Tubestock	5m^2

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Scale 1 : 1500 @ A1

Revisions			Revisions		
Issue	Details	Date	Issue	Details	Date
	Draft Issue	22.08.19			
A	DA Issue	26.08.19			
B	DA Issue	28.10.19			
C	Revised DA Issue	24.01.20			
D	Revised DA Issue	31.01.20			

Project:
Lifestyle Living Estate

Client:
Winarch Capital Pty Ltd

Title:
Cover Sheet, Plant & Drawing Schedule

Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-100

Site - General Description

This landscape design report has been prepared in accordance with the requirements of Lake Macquarie City Council Development Control Plan 2014 - Revision 7 (DCP).

The subject site comprises of part Lot 2 DP 1047043, 118 Dora Street, Morisset. The proposal is located within the southern portion of the Morisset Golf Course. Currently the area consists of golf fairways, a large dam, creek line and bush land. The Lot is currently zoned RE2 Private Recreation and E2 Environmental Conservation.

Landscape Character and Visual Amenity

The landscape character varies from that of a a semi rural nature with open turf fairways, scattered trees and dams to native bushland areas. Lake Macquarie City Council's 'Scenic Quality Guidelines' nominates the site as being located within the Morisset Landscape Setting Unit. This unit has a 'Moderate' Scenic Quality Rating and a 'Medium' Viewer Accessibility Level. The site has been identified as being within 'Scenic Management Zone 12'. Future development in these areas should have regard to protecting key landscape elements including pockets of native vegetation and vegetation on ridgelines and in and around residential areas and commercial centres. A balance between built form and the natural landscape should be achieved. Any views of development from main roads, the coast or lake should be softened by screening vegetation and appropriate design measures such as set-backs. Existing view corridors should be preserved and enhanced, as well as opportunities for new view corridors identified.

Proposed Development

The proposed development comprises of a Lifestyle Living Estate with 428 residential lots, community facilities, car parking, caravan parking and open space areas.

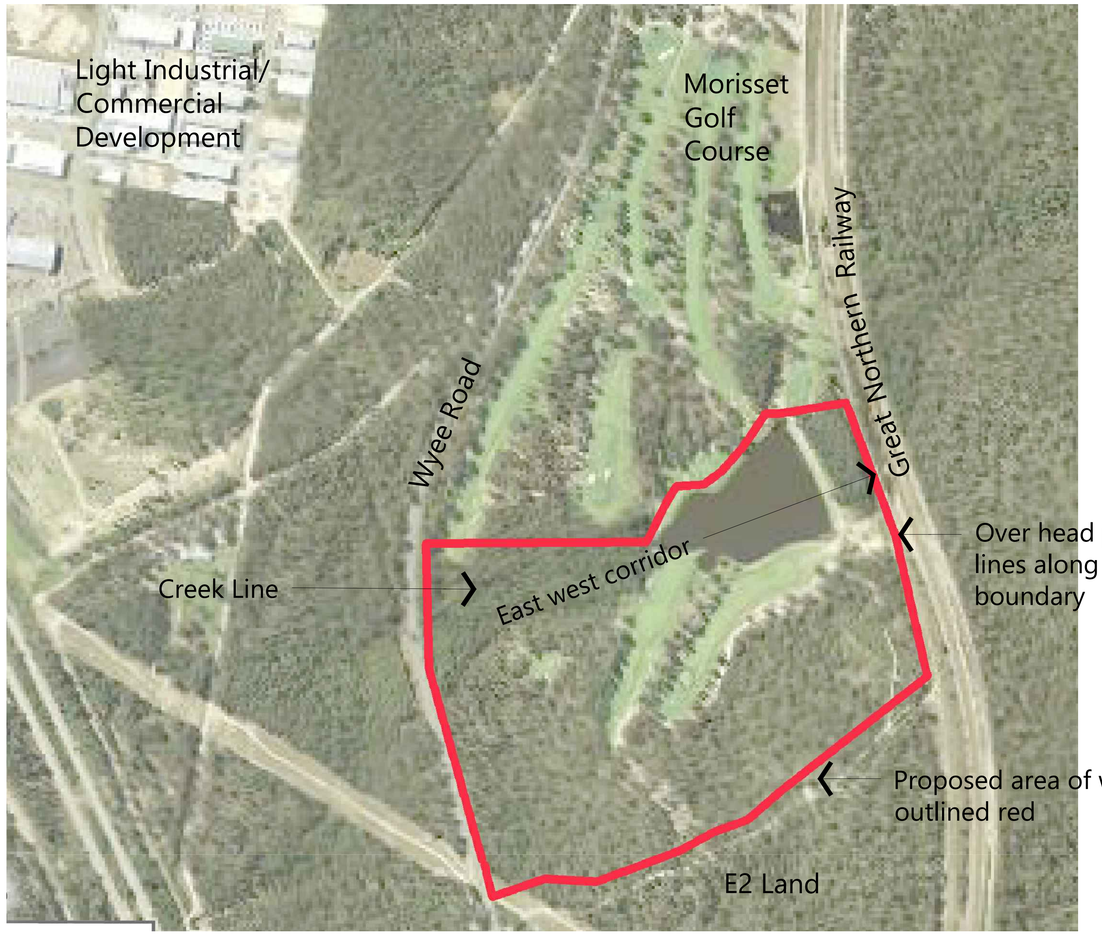
Proposed Landscape Works and Objectives

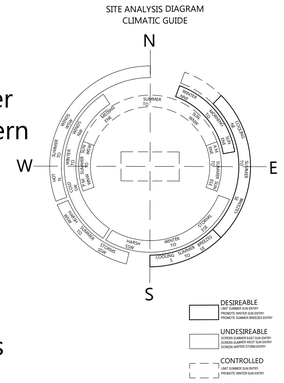
The proposed landscape aims to retain areas of existing bush land and trees within the site particularly the riparian vegetation located in the northern portion of the site. The existing site characteristics have been considered and have been enhanced with landscape related elements, these include planting which:

- Complements the existing character and the desired future character surrounding development
- Provides shade and amenity to residents
- Softens the development from surrounding viewpoints
- Is consistent with CPTED principles
- Is consistent with APZ requirements

Landscape Themes

The proposed planting palette is based on the character of the surrounding landscape. Some areas of existing bush land/trees will be retained and maintained in accordance with APZ requirements. The entry road and entry threshold into the proposal will use the same species to provide a continuation of the surrounding landscape and provide a sense of place. Areas around the community centre will be a mixture of native and exotic plantings to give the development a resort like feel. Similarly the community park areas are to planted in much the same way to provide an attractive and restful landscape to enjoy while walking or relaxing while sitting. Street trees will be small to medium sized native trees dependant on soil space. Planting around the existing dam and proposed basins will include native grasses tolerant of periodic inundation.





LAKE MACQUARIE CITY COUNCIL

Approved plans for
Development Consent No: DA/1288/2019
Date of Approval: 14/08/2020

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Project:
Lifestyle Living Estate

Client:
Winarch Capital Pty Ltd

Title:
Site Analysis & Report

Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-101

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Project:
Lifestyle Living Estate

Client:
Winarch Capital Pty Ltd

Title:
Landscape Plan

Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-102

D09609452

Matchline: see Sheet 02 for continuation

Existing Swamp Mahogany vegetation to be retained

Shelters with tables and seating around recreational facilities.

Emergency access/fire trail.

Vegetation of water quality basins to future vegetation management plan.

Angophora inopina to be retained where possible throughout IPZ.

Managed IPZ

APZ

Chain mesh fence.

Central road planting consisting of small trees, accent plants low shrubs, groundcovers and grasses.

Retained vegetation corridor.

Acoustic fence.

6000

15000

9000

Existing boundary vegetation to be retained where possible.

Matchline: see Sheet 04 for continuation

Matchline: see Sheet 05 for continuation

LEGEND

- Proposed trees
- Accent plants
- Screening shrubs
- Mass planting
- Riparian vegetation
- Retained vegetation
- Turf
- Shelters
- Park seats
- Acoustic fencing

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Project:
Lifestyle Living Estate

Client:
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Title:
Landscape Plan

Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-103

Matchline: see Sheet 02 for continuation

Matchline: see Sheet 03 for continuation

Matchline: see Sheet 06 for continuation

Community building refer to sheet 107 for detail

Acoustic fence to eastern boundary adjoining rail corridor.

Central road planting consisting of small trees, accent plants low shrubs, groundcovers and grasses.

Central access path.

Mass planting to front of acoustic fence.

Planting to interface between residential lots and communal areas.

Shelters with tables and seating within community parkland.

Acoustic fence.

APZ

LEGEND

- Proposed trees
- Accent plants
- Screening shrubs
- Mass planting
- Riparian vegetation
- Retained vegetation
- Turf
- Shelters
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- Acoustic fencing

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Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
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Job No: 1940
Revision: D
Sheet: L-104

D09609452

Matchline: see Sheet 03 for continuation

Matchline: see Sheet 06 for continuation

Centrally located park with shelters and BBQ facilities

Acoustic fence to boundary with Wyee Road.

Existing boundary vegetation to be retained where possible.

Central road planting consisting of small trees, accent plants low shrubs, groundcovers and grasses.

Shelters with BBQ facilites to selected communal parks.

Planting to interface between residential lots and communal areas.

Caravan storage.

APZ

6000

15000

9000

LEGEND

- Proposed trees
- Accent plants
- Screening shrubs
- Mass planting
- Riparian vegetation
- Retained vegetation
- Turf
- Shelters
- Park seats
- Acoustic fencing

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Title:
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Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-105

Matchline: see Sheet 04 for continuation

Matchline: see Sheet 05 for continuation

Shelters with BBQ facilites to some communal parks.

Planting to interface between residential lots and communal areas.

Visitor parking.

Turf and scattered trees within APZ.

Caravan storage.

LEGEND

- Proposed trees
- Accent plants
- Screening shrubs
- Mass planting
- Riparian vegetation
- Retained vegetation
- Turf
- Shelters
- Park seats
- Acoustic fencing

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Project:
Lifestyle Living Estate

Client:
Winarch Capital Pty Ltd

Title:
Landscape Plan

Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-106

Community Centre

Typical Details — Scale 1:200@A1

Entry Treatment

Elevation — Scale 1:20@A1

LEGEND

- Proposed trees
- Accent plants
- Screening shrubs
- Mass planting
- Riparian vegetation
- Retained vegetation
- Turf
- Shelters
- Park seats
- Acoustic fencing

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Scale 1 : as noted

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D	Revised DA Issue	31.01.20			

Project:
Lifestyle Living Estate

Client:
Winarch Capital Pty Ltd

Title:
Community Centre and East West Corridor

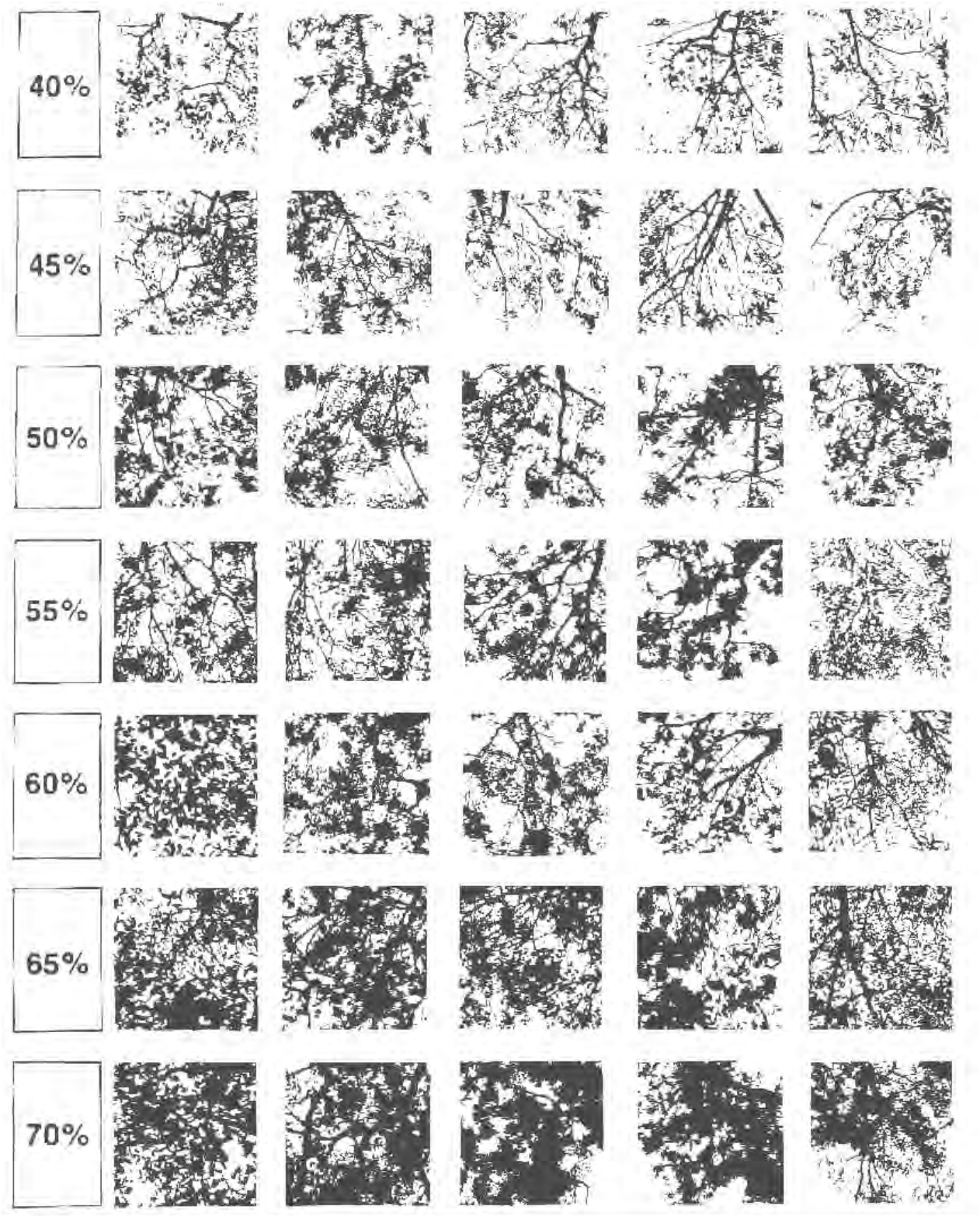
Site: 118 Dora Street, Morisset
Lot 2 DP 1047043
Date: 31 January 2020
Job No: 1940
Revision: D
Sheet: L-107

Appendix C Specht – Percentage Crown Cover

APPENDIX 1

SPECHT – PERCENTAGE CROWN COVER

McDonald, RC et al. 1990, *Australian Soil and Land Survey Field Handbook* 2nd Edn.



Appendix D National Trust Weed Assessment

APPENDIX 2

NATIONAL TRUST METHOD

National Trust of Australia (NSW) 1999. *Bush Regenerators' Handbook*. National Trust, Sydney.

This method needs to be undertaken by colour coding a simple sketch map.

Colour Code	% Native Range	% Weed Range	Condition of Bushland	Description	Intervention required
Green	75 > 100	0 > 25	**Good**	Virtually weed free, a healthy native community	**Minimal** evention of future impacts. Removal of possible scattered weed.
Blue	50 > 75	25 > 50	**Fair**	Minor infestations of weeds ,natives dominate the site	**Low** Requires removal of minor impact (e.g. overuse) and of low level weed invasion.
Orange	25 > 50	50 > 75	**Poor**	erely infested, Regeneration of native species is being suppressed.	**Medium** Removal of impacts required. Removal of weeds. Additional 'kick start" to promote natural regeneration, e.g. fire, physical disturbance.
Red	0 > 25	75 > 100	**Very Poor**	Bushland replaced by exotic species OR only mature specimens of highest stratum remain – no seedlings or saplings due to infestation of understory with exotics	**Medium or high** Ability of system to recover is lost or seriously limited. Definitely needs a "kick-start" or may need reconstruction to approximate original system.

Appendix E Weed Control Methods

Acceptable weed removal techniques

Note this list is not exhaustive, however intended to provide a guide to assist in VFMP implementation.

General

- The contractor shall take all care not to poison existing desirable vegetation when undertaking herbicide control methods;
- The correct herbicide shall be selected and used appropriately to ensure effective results on all noxious weeds;
- Herbicide control is not to be used within or near water courses. The contractor shall obtain all required permits prior to use of herbicides near any water course and submit details of proposed spraying and chemicals to be used for approval prior to commencement;
- Noxious weed removal shall be carried out as described utilising weed removal techniques outlined in this specification. Should the contractor feel that techniques selected in the report will prove un-effective or inefficient; the contractor shall notify the ecologist nominating alternative procedures for review;
- All herbicide spraying is to be undertaken using apparats deemed as appropriate, generally this will be Knap-Sack or vehicle mounted spray boom in large areas. All other methods of herbicide application are not to be used onsite unless discussed and approved in writing by the Ecologist; and
- The contractor shall ensure any spray drift is kept to an absolute minimum.

Herbicide Spraying

- Herbicides should not be applied prior to rain occurring. This reduces the herbicides effectiveness as well as being transported in runoff to creek lines and waterways. The use of herbicides should be considered when;
- There are small areas of dense noxious weeds with few or no native plants to protect;
- There are large areas of noxious weeds;
- The noxious weeds are growing too rapidly for physical removal; and
- The spraying of weeds must only be undertaken by experienced persons with Chemcert or equivalent qualifications. The success of each treatment must be evaluated by the operator after a set period of time and re-applied (if Necessary) according to the labelled effectiveness for each herbicide. Care must be taken when applying herbicides near drainage lines to avoid excess use due to the sensitivity of the alter bodies into which runoff will eventually flow.

Mechanical Removal

- Mechanised removal using plant in a manner that does not impact the watercourse bed and bank.
- Once initial treatment has occurred follow up cut and paint will be required to ensure any remaining plants are treated. Should any plants be found that are small enough to pull out successfully by hand this is preferred. Ensure that all roots are removed. Hand pulling techniques are outlined below; and
- Hand removal will be required most probably after initial treatment and will be used in the event of new seedling emergence which will have recolonised after initial removal. Hand removal shall be employed ensuring that all roots are removed as described below.

Hand Removal

- Best undertaken when the soil profile is moist to ensure full and ease of removal and disposal off site;
- Apparent seeds and fruit are to be removed and placed in a bag for removal and disposal off site;
- Firmly take hold of the seedling at ground level, pull and manipulate backwards and forwards until it releases cleanly. If the plant is held too high it may break resulting in root material left behind in the soil. Remaining plant material may re-establish in this instance;
- All roots remaining within the soil shall be removed;
- Should the seedling have a spreading root system, roots will require individual removal; and
- All seedlings and hand pulled weeds are to be placed in a bag, removed from site and disposed of sensibly.

Woody Weed Removal Techniques

- Cut and Paint woody weeds to 10cm basal diameters;
- Stem injection;
- Frilling or Chipping - Plants should be actively growing and in good health;
- Deciduous plants should be treated in spring and autumn when leaves are fully formed;
- For multi-stemmed plants, inject or chip below the lowest branch to treat each steam individually; and
- Herbicides must be injected immediately before plant cells close (within 30 seconds) and translocation of herbicide ceases.

Appendix F LMCC Natural Area Planting Specification

NATURAL AREA PLANTING SPECIFICATION

All Bushland regeneration/restoration works within the public domain shall be co-ordinated with LMCC 's nominated Natural Assets officer within the period of the VMP.
LMCC Natural Assets Co-ordinator - 4921 0056
VEGETATION MANAGEMENT PLAN (VMP) and
BUSHLAND RESTORATION SPECIFICATION

1.0 GENERAL
Discrepancies within the planting schedule and the drawing should be referred to LMCC Development Planner Flora and Fauna. Make no substitutions unless approved.
Substitutions shall not be approved unless the contractor complies with this specification.
2.0 WORK NEAR TREES
Protection: Protect trees to be retained from damage from ground works as per AS 4970 Protection of Trees on Development Sites. Take necessary precautions, including the following: -
Harmful Materials: Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks, even for short periods. Prevent wind-blown materials from materials such as cement from harming trees and plants.
Damage: prevent damage to tree bark. Do not attach stays, guys and the like to trees.
Work under trees: Do not add or remove topsoil within the drip line, use hand methods so root systems are preserved intact and undamaged. Open up excavations under tree canopies for as short a period as possible.
Roots: Where it is necessary to cut tree roots, use means such that the cutting does not unduly disturb the remaining root system. Work to be supervised and inspected by the project arborist prior to covering.
Compacted Ground: Prevent compaction of the ground under trees.
Machines – **no vehicles** within TPZ.
3.0 SOILS
3.1 DEFINITIONS
Source Soil**:**
Soil for the works shall be free from noxious weeds etc. Soil shall be assumed to be placed to all revegetated areas and backfill to all plantings. Unless otherwise directed by site supervisor, the Bush Regeneration Contractor is responsible for the removal and or disposal of all spoil or excess soil excavated in the process of implementing the Bushland Restoration works.
3.2 SOIL LEVELS
Finished soil levels shall allow mulch to be finished to top of kerb, gravel pavement, existing levels or as otherwise shown on drawings.
Consolidation
Compact lightly and uniformly in 100 mm layers. Avoid differential subsidence and excess compaction and produce a finished topsoil surface which has the following characteristics:
• Finished to design levels.
• Smooth and free from stones or lumps of soil.
• Graded to drain freely, without ponding, to catchment points.
• Graded evenly into adjoining ground surfaces.
• Ready for planting.
4.0 PLANT MATERIAL
Plants shall be of the species, sizes and quantities as shown on the drawing. Plants shall be vigorous, well established, of good form, not soft or forced, free from disease and insect pests. Plants shall have large healthy root systems, not root bound and all trees with a single leading shoot.
NOTE 1: Plant sources must be of local provenance stock where possible.
NOTE 2: when advanced tree stock is required Refer to AS2303: 2018.
4.1 TREE SUPPLY SPECIFICATION
True to type
Type: Supply plant stock which are true to type. Plants sources must be of local provenance stock where possible.
Species List – contractor to supply species list to LMCC before any planting commences. This list will be from the relevant LMCC Map Unit (Bell S)2016

Health and vigour
Health: Supply trees with foliage size, texture and colour consistent with that shown in healthy specimens of the species.
Vigour: Supply trees with extension growth consistent with that shown in vigorous specimens of the species.
Freedom from pests and disease
Foliage: Restrict attack by pests and disease to < 10% of the foliage, such that potential for long term success of the trees is not affected.
Root division
Root systems: Fibrous with repeated and sequential division.
Root direction
Roots growing out or down: > 90% of roots within root ball at every stage of development.

For trees in pots > 45L
Balance of crown
Maximum variation in crown bulk on opposite sides of stem axis: ± 20%.
Uniformity of growth

Stem taper
Support: Supply trees which are self-supporting unstaked.
Other than tube stock or small trees:
Calliper: At least 1.2 x calliper at 1 m above ground.
Pruning history
General: Comply with the recommendations of AS 4373.
Pruning wounds: Confine fresh pruning wounds to < 25% of the clean stem height.
Wound diameter: < 33% of stem diameter immediately above point of pruning.
Pruning location: Clean cut at branch collar.
Included bark
Bark ridge: Convex (outwardly pointing) at junctions between co-dominant stems, and stems and branches.
Apical dominance
Apical bud: If appropriate for the species, supply trees which have a defined central leader and intact apical bud.
5.0 PLANTING
Use LMCC Map Unit (Bell S) (as specified) as a reference for planting arrangement.
No planting in rows.
Planting to replicate the Map Unit species composition.

6.0 MULCH
Use mulch, which is free of deleterious and extraneous matter such as soil, weeds and sticks. Place mulch to the required depth (75mm), clear of plant stems, and rake to an even surface flush with surrounding finished levels.
Mulch type shall be: 'Forest Blend' (Coarse 20-40mm) delivered by an approved supplier.
7.0 PLANT ESTABLISHMENT
7.1 SCOPE
All rubbish related to Bushland Restoration works shall be removed by the Developer or Bush Regeneration contractor at each site visit.
Period: The Planting Establishment Period commences at the end of the approved planting program. It is acceptable the planting program will be across the duration of the VMP.
NOTE: excluding the last year of the VMP.
Recurrent Works: Throughout the Planting Establishment Period, continue to carry out recurrent works including, watering, weeding, rubbish removal, fertilising, pest and disease control, staking and tying, replanting, mulching and keeping the site neat and tidy.
Replacements: Continue to replace failed, damaged or stolen plants for the extent of the Planting Establishment Period.
Mulched Surfaces: Maintain the surface in a clean and tidy condition and reinstate the mulch as necessary.
Turfed Areas: there are no turfed areas within VMPs.
Stakes and Ties: If required - Adjust or replace as required. Remove stakes and ties if they are not required.
Site Water: The contractor shall assume there is no site water available other than that which is provided as part of the works. The contractor shall be responsible for supplying water and/or paying for water for the duration of the works.
APZs. –
Exceptions may occur where it is a requirement of the RFS code and the APZ will be managed as native grassland with any shrubs or trees removed to meet RFS requirement. There will be no mowing.

8.0 WEED MANAGEMENT
8.1 GENERALLY
Identify and map all weeds on site and effectively remove them. There are three stages in the management of weed removal and management; these are primary weed removal, secondary treatment and ongoing maintenance. Weed infestations that threat the integrity of existing native bushland generally occur on the edge of bushland, creek lines and in areas of disturbed or cleared land.
Weeds pose a threat to the native plants as they compete for light and nutrients. Invasive species pose particular issues along drainage lines where seeds can be transported from upstream infestations.
As a guide, management priorities for weeds will be based on the status of the weed e.g. WON'S or Priority Weeds for the Hunter Biosecurity duty. Other factors such as infestation size, viability of control and location will also need consideration.

8.2 KEY PRINCIPLES
The key principles when undertaking weed management are:
- Confirm the extent of the infestation
- Protection of the existing native vegetation
- Thorough weed and rubbish removal
- Effective management of drainage and nutrients
- If required - supplementary planting to assist in ground stabilisation and revegetation
- Ongoing monitoring and maintenance

8.3 WEED REMOVAL AND MANAGEMENT
8.3.1 Weed Removal
The principles related to the protection of valued vegetation in the process of removing unwanted vegetation whether it be by hand, machine or herbicide are applicable for all situations. The methodologies outlined below can be adapted to suit the management of both large and small weed infestations.
Acceptable methods for the removal of weeds may include:
• On larger woody weeds, cutting the trunk and poisoning the remaining stump with concentrated glyphosate herbicide.
• Spraying actively growing leaves with glyphosate herbicide.
• Splatter gun for use on high-density weed
• Hand removal of the entire plant taking care not to leave plant material or dislodge seeds.

8.4 DISPOSAL OF WEED MATERIAL
Displaced weed material is to be disposed of off site where there is no potential of seed dispersal. Where areas of ground are disturbed from the weed removal the soil shall be tamped into place and covered with site leaf litter or site mulch (free from weed seed) to avoid erosion. Follow up weeding is essential to ensure the success of the initial weeding activities and should be carried out at regular intervals throughout the maintenance period.
Weed germination may occur in areas to be planted. This can be controlled by light scarification.

8.5 HERBICIDE
Herbicide application shall only be used where there is no possibility of damage to native vegetation from overspray or wind drift. Particular care should be taken in riparian zones and creek lines. Herbicide should be used in accordance with the manufacturers' recommended rates or Off Label Permit. A follow up treatment, two weeks after the initial sprays required to kill any regrowth of seed. Any use of herbicide is to be according to the label and conducted in a responsible manner. People using herbicide shall be properly attired, suitably trained and able to recognise the different plant species in the treatment zone prior to using herbicide. Use only approved herbicide: as per the VMP

9.0 HABITAT MATERIALS
Any habitat materials identified in consultation and approved by any of the following LMCC representatives – (Ecologists, Arborist, Vegetation Establishment Officer, Natural Areas Project Co-ordinator) to be harvested from the construction area for use and placement within the VMP area to be stockpiled keeping with current thoughts on provenance. The SER Australia National Standards Appendix 3 should be used as a reference. For use in an agreed location. tree barrels > 300mm dbh, large stumps.

10.0 THREATENED SPECIES
Any identified threatened species or TEC needs to be flagged and protected from encroachment/disturbance or damage. See Section 2.5 of TEMPLATE DOC

11.0 SOIL TRANSLOCATION: refer to Part 2 of Trial Natural Areas Management Document.

12.0 HOLD POINTS / WITNESS POINTS
• All Bushland regeneration /restoration and public domain works as approved in the VMP shall be coordinated with nominated LMCC Natural Assets Officer during the period of the VMP.
• The following hold point/witness point inspections (where applicable) are to be carried out by a nominated LMCC Natural Assets Officer:

HOLD POINT	COMPLETED	DUE
Before planting commences - Pre ordered – Species list of plants supplied for **restoration to** be **submitted** to **LMCC Natural** Assets Officer. This list will be the relevant LMCC Vegetation **Community Map** Unit **- Bell.** S. 2016 or part **thereof**.	Yes/No	
If required - Site meeting to discuss any specific onsite issues before works commence	Yes/No	
Plantings shall be maintained for a minimum of 52 weeks	Yes/No	
Soil Translocation and plant materials completed	Yes/No	
Tree Protection Plan		Prior to onsite works
WITNESS POINT		
Completion of ANY nominated spreading or placement of habitat timbers, rocks and mulch in accordance with the VMP	Yes/No	
All Drawings referred to for on ground works are stamped and approved by LMCC	Yes/No	
Species list submitted	Yes/No	

10. LOCAL PROVENANCE STOCK
Plant species native to the particular (VMP) area and LMCC Map Unit are to be used. Refer to the VMP and drawings to clarify which LMCC Map Unit is being referenced.
Wherever possible always use seed stock or plant material of local provenance. This is most important with trees and shrubs.
All native bushland stock is to be sourced from documented local provenance preferably within 10km of a VMP area wherever possible. When local provenance sourcing is not available seed can be collected from a larger geographic area, including the Lake Macquarie Catchment Region and beyond if necessary. This will be subject to discussion with LMCC ecologist.

DRAFT SPECIFICATION COMMENTS VERSION 1

Appendix G LMCC Soil Translocation Guideline

PART 2

Lake Macquarie City Council

SOIL TRANSLOCATION GUIDELINE

The guidelines are designed to match suitability of donor and recipient sites and to minimise disturbance at the donor site and the soil seed bank, as well as to ensure optimum results on the recipient site and effectively carry out ongoing monitoring

This Guideline provides developers and consultants working with Council on the process for the translocation of topsoil within or between development sites by setting out a detailed methodology for the preparation, establishment and monitoring required.

Soils within vegetation types contain seed banks that are an underutilized yet valuable source of native plant species and genetics. Soil translocation provides a valuable resource for native vegetation management and a practical alternate solution for developers to reduce costs for plantings and associated rehabilitation works, reduce the amount of soil to be transported offsite while achieving high quality results for vegetation establishment.

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NOTE: While the whole document is seen as important the sections in bold blue are considered critical points to be understood.

This seed bank must be viewed by all workers on the site as a non-renewable resource, and must be seen as valuable.

The tasks are ordered chronologically and must be performed in the order and manner stated using the specified equipment.

Any changes to the order or method of these specifications must be authorised by LMCC Council via the Translocation Project Manager.
The tasks have been allocated to different positions as described below:

Project Managers: LMCC Council Translocation Project Manager to supervise the variety of works to be undertaken at the donor and recipient sites. The project manager should ensure that the tasks are done to specification, in the appropriate order and in a timely manner. Tasks such as the co-ordinating pre-translocation works at both the recipient and donor sites can happen concurrently, if applicable.

Bush Regeneration internal staff/contractor: Person(s) suitably qualified to carry out seed collection, weed control and bush regeneration works at both the recipient and donor sites. Preferably with AABR accreditation.

Flora expert: suitably qualified person/s, with experience working in local ecological communities, to undertake pre and post flora surveys, monitoring and evaluation of translocation program.

1. Donor site selection

Translocation material will specifically be removed from within the identified healthy remnant. The soil profile and seed bank located within the area of the donor strip has remained undisturbed from fire and physical disturbance and has surpassed or is nearing the seed banks recommended threshold interval. The donor site needs to be a minimum size of 50% of the proposed recipient area to be rehabilitated.

2. Recipient site selection

Selection criteria:

- *within the same LMCC Map Unit (Bell.S) 2016, locality and habitat as the donor site*
- has low or nil potential for natural or assisted regeneration;
- has secure tenure for conservation purposes; and
- appropriate approval to translocate to the recipient site can be gained for the site within a timely manner.

Site preparation works at recipient site:

This stage **must** be carried out before any vegetation clearing work begins at the donor site. The recipient sites must be fully prepared to eliminate stockpiling and reduce costs of machinery hire.

2. Recipient Site Preparation Tasks	Responsibility	Other
2.1 Confirm the site is free from contaminants such as acid sulphate soil, slag, lead, asbestos etc. Testing required.		Hold Point- no works to commence until completed
2.1 Eradicate all weeds from site and adjacent bushland.	Bush regeneration internal staff	
2.2 Assess subsoil suitability and prepare site soil in consultation with LMCC staff or their representatives. This will include an assessment of the subsoil to support future plant growth and the need for subsoil removal from the donor site. Other activities may involve removal of unsuitable material, levelling, ripping, capping and/or remediation of drainage issues.	Bush regeneration / earthworks contractor	
2.3 Erect fencing and signs to prevent public access as directed by LMCC staff or their representatives.	Bush regeneration internal staff	
2.4 Install silt fence or other erosion control devices where necessary. Silt fences must be installed with 4 strands of strained wire, one at the top of the fence post, one at 600mm above ground for attachment of the top of the silt fence, one at 300mm mid sediment fence and one 50mm above ground level, to maximise the life of the fence. All-star picket posts are to be capped with safety caps. Sediment control on site is required to be monitored for the life of the project.	**Bush regeneration internal staff**	
2.5 **Preparation will involve removal of the organic layer and A horizon i.e. the top 100mm of the soil profile to remove weed seedbank competition. The A horizon containing weed seed must not be mixed in with the subsoils of the recipient site.**	**Bushland internal staff**	
2.6 This will then be followed by de-compacting and scarifying the top 100mm of the exposed subsoil profile (B Soil horizon) in order to provide suitable conditions for translocated soil material and to insure the successful establishment of the donor material's seed bank after initial stimulation. Using machinery such as Excavator, Backhoe and Rotary Hoe remove • Contaminants – (typically - concrete, general rubbish, weeds, highly nutrified soils etc.).		

• Undertake any decompaction /scarification. • Avoid damage to canopy tree root system by establishing a protection zone excluding machinery within drip line. • All works within dripline to be done manually.		
2.7 Following soil preparation of the recipient site 2 successive weed removal treatments (at a minimum 3-week interval) are to be undertaken on the disturbed areas and the surrounding edges, up to 1m outside of the silt fence boundary. This is to minimize weed growth competition and the impact on post translocation germination.	Bush regeneration internal staff	
2.8 The laying and pinning of Geotech fibre in strips of 0.5 meters surrounding the recipient site to minimize the impact of edge effects.	Bush regeneration internal staff	
2.9 Permanent labelling of individual quadrats is to be undertaken on the outer southern and northern edges of the quadrat locations.	Bush regeneration internal staff	
2.10 Long-term photo monitoring points are to be located, installed and documented. Photo records are to be undertaken in the initial stage as a baseline and long-term monitoring is to be carried out as outlined in point 6.	Flora expert /Project managers	

3. Site preparation works at donor site:

This stage **must** be carried out before any vegetation clearing work begins at the donor site to minimise the translocation of weeds and to take a record of the species diversity at the donor site prior to translocation.

3. Donor Site Preparation Tasks	**Responsibility**
3.1 Following liaison with Project Manager to determine recipient site location, identify and mark boundary of site for salvage.	Flora expert /Project managers
3.2 Confirm the site is free from contaminants such as acid sulphate soil, slag, lead, asbestos etc. Testing required.	
3.3 Photo monitoring points are to be located, installed and documented. Photo records are to be undertaken in the initial stage as a baseline and for future reference. Monitoring is to be carried out as outlined in point 6.	Flora expert /Project managers
3.4 Map and GPS all site features.	Flora expert /Project managers
3.5 Conduct general vegetation survey within soil excavation area. **Vegetation surveys within the excavation area are to be completed to identify the following:** **- All flora species counted and identified within donor site area.** **- Record each species present and the abundance of each species. The abundance of each species may be recorded via the Braun-Blanquet scale or similar.** **For example, NPWS (2000) used:** **1 = rare, few individuals present and cover < 5%;** **2 = Uncommon and cover <5%;** **3 = common and cover < 5%;** **4 = (Very abundant and cover < 5%) OR (5% <= Cover < 20%);** **5 = (20% <= Cover < 50%);** **6 = (50% <= Cover < 75%);** **7 = (75% <= Cover < 100%).** **NPWS (2000) The native vegetation of the Cumberland Plain, Western Sydney – Technical Report, NSW National Parks and Wildlife Service.**	**Flora expert / Bush regeneration internal staff**
3.6 Undertake levy pole assessment within the donor site to assess pre-translocation vegetation structure. A maximum 100m transect across the gradient of the site is to be undertaken with vegetation height of all structure recorded at 10m intervals	Bush regeneration internal staff
3.7 Salvage all available viable seed from understory and canopy species. Include collection of all seeds stored in woody fruits on plants (including eucalypt trees) with loppers. Seed collected must be clearly labelled with scientific name, date of collection, collectors' name and location and site identifier.	**Bush regeneration internal staff**

NOTE: High value plants including- cycads, grass trees, Gymea etc. may require translocation which will be determined by LMCC project officer following initial assessment of donor site.	
3.8 Eradicate all weeds from soil excavation area.	Bush regeneration internal staff

4. Removing material from donor site.

4. Removal from donor site tasks	**Responsibility**
4.1 Undertake inspection for fauna likely to be disturbed by translocation project works and if required relocate fauna from site to suitable habitat.	LMCC Ecologist
4.2 Cut all standing shrubbery with brush cutters. While ensuring soil horizon and vegetation up to 100mm is left undisturbed.	Bush regeneration internal staff
4.3 Remove cut brush material from site and dispose appropriately. Material can be mulched and used elsewhere if suitable. While removing ensure minimal disturbance to the soil horizon and vegetation up to 100mm. All shrubs with up to 300 DBH are included in removal.	Bush regeneration internal staff
4.4 Scrape topsoil including the leaf litter and O soil horizon - minimum depth 200mm – max 300mm	Bush regeneration (supervising) machine and plant operator
4.5 Leaf litter layer O and A horizon from donor site is to be loaded, thoroughly mixed and transported immediately to the recipient sites. Donor material must not be stockpiled and stored. Mixing of the donor material will occur when donor material is being loaded onto trucks for transport and during spread across the recipient site.	**Bush regeneration (supervising) machine and plant operator**
4.6 Donor material must be spread evenly at the recipient site to a depth of approximately 100mm – 200mm **(effectively at a ratio between 1:1 and 1:2)** Translocated material is to be spread across the recipient site with the use of an excavator or back-hoe. Material must be spread in a manner that ensures machinery does not drive over and compact any laid donor material.	Bush regeneration internal staff/ Internal plant operator
4.7 Bush regeneration staff are to be on site while material is being spread to ensure that any suitable propagules such as lignotubers, stolons, rhizomes, bulbs etc. that have been left lying above ground are correctly planted and fauna can be rescued.	Bush regeneration internal staff
4.8 Logs collected from the donor site will be placed at 10m intervals across the contour lines of the recipient site to minimise erosion, create suitable habitat and site microclimate's and provide site access for future monitoring and weed control works.	Bush regeneration internal staff/ Internal plant operator

Notes:

- Erosion control at the donor site must be carried out in accordance with LMCC specifications for building sites.
- It is important to ensure that none of the translocated material is contaminated by weed seed or other propagules, or soil material from other sites. Therefore, all machinery and vehicles must be cleaned prior to arrival at the site.
- Hosing down of machinery or vehicles is not permitted in the vicinity of the donor site.

- Machinery or persons with weed seed or other propagules, or soil material from other sites are not permitted to enter the recipient site. This provision will be enforced by LMCC officers or their representatives.
- Disturbance to the topsoil should be minimised prior to its translocation, therefore removal of vegetative material should be done by hand and trees are not to be removed until the topsoil has been excavated unless otherwise directed by the project manager.

5. Site establishment at Recipient Site

5. Site Establishment – Watering and Weed control	Responsibility
5.1 Watering; **Dependent upon environmental conditions watering of translocated material may be required to ensure successful establishment of vegetation. Watering would be required when germination of the soil seed bank is triggered through a natural rain event however follow up rainfall events are unlikely or not received. In this instance it is important to assist establishment of the triggered seedbank by implementing a watering regime during establishment. A minimum of one weekly watering across the entire site for a period of 3 months would be required.**	**Bush regeneration internal staff with water supply cart**
5.2 Weed control; At regular intervals the recipient site shall be monitored for weed invasion, In the event of weed invasion, control action using appropriate weed control techniques shall be undertaken. The use of herbicides will be kept to an absolute minimum. Timing for these actions are required at a minimum of 3 months, 6 months, 12 months, 18 months, 24 months and then annually for at least 5 years. Every care shall be taken at the site to minimise disturbance to seedlings while weeding works are carried out. Required frequency of site visits will be dependent on the size and location of the recipient site and health of the donor material. An onsite assessment will be carried out prior to project commencement by the project officer to determine the required weed control frequency during recipient site establishment.	Project manager, Bush regeneration internal staff

Monitoring and on-going adaptive management

This stage will be implemented for at least 5 years.

<table>
<tr><th>6. Monitoring Tasks</th><th>Responsibility</th></tr>
<tr><td>Pre-translocation monitoring at Donor and Recipient sites will include:

- Photo point set up as per LMCC VMP guidelines - NE and SW corners of 20 x 20 quadrat.
- Specific vegetation survey within donor strips including species abundance, species richness and percentage foliage cover
- Levy pole surveys are to be undertaken along the transect as per 3.5 of this document.</td><td>Project manager/Flora expert</td></tr>
<tr><td>6.1
Quadrat Surveys

Quadrat surveys must be undertaken at the following time frames; 3, 6, 9, 12, 18, 24 months then yearly for at least 3 years. Survey data is to be recorded and forwarded to LMCC Ecologist Flora/Fauna.

<table>
<tr><th>Steps</th><th>Tasks</th><th>Record Document</th></tr>
<tr><td>1</td><td>Photo monitoring as per VMP guidelines.</td><td></td></tr>
<tr><td>2</td><td>Species abundance/richness counts</td><td>Plot Monitoring</td></tr>
<tr><td>3</td><td>Native and exotic species % cover abundance</td><td>Plot Monitoring Sheet</td></tr>
<tr><td>4</td><td>Levy pole assessment as per guidelines - from 6 months</td><td>Levy pole assessment sheet - Hard drive and back up disc</td></tr>
</table>

Quadrats shall be surveyed for the following; species diversity and abundance where by every species is identified and counted, including stem counts and stem heights.

Percentage cover abundance taken for each quadrat in the following increments <10%, 10 - 20%, 30-40%, 40-50%, 60-70%, 80-90%, 90-100%.</td><td>Project manager/Flora expert</td></tr>
<tr><td>6.2 Levy Pole assessments
Quadrat Levy pole assessments are to be carried out in conjunction with all monitoring timeframes outlined in point 6 and as per 3.5 of this document.</td><td>Project manager/Flora expert</td></tr>
<tr><td></td><td></td></tr>
</table>

Appendix H Wood Pole Data table (AusGrid)

9.2 Pole data

9.2.1 Wood pole date table

Ausgrid Item No.	Length (m)	Nominal Working Strength (kN)	Nominal Breaking Load (kN)	Max. Allowable Tip Load (kN) (See Note 1)		Self Windage of Pole Structure Equivalent Tip Load (kN)		Default Sinking Depth (m) (See Note 3)			Min. Diameter (mm) (See Note 4)				Mass (kg)
				Max. Wind & Failure Contain.	Sustained	Max. Wind	Failure Contain.	Weathered Rock	Very Stiff Clay	Dense Sand	Butt	Ground Line	Tip	Bored Hole w. concrete	
1	8	4	16	9. 86	5. 62	0. 85	0. 16	1. 30	1. 61	2. 17	249	235	185	450	313
2		6	25	14. 79	8. 43	0. 98	0. 19	1. 49	1. 85	2. 39	283	269	219	500	410
3		8	33	19. 71	11. 24	1. 10	0. 21	1. 59	1. 96	2. 51	310	296	246	600	500
4		12	49	29. 35	16. 73	1. 26	0. 24	1. 88	2. 34	2. 81	352	338	288	600	664
5	9. 5	4	16	9. 87	5. 63	1. 09	0. 21	1. 35	1. 68	2. 22	267	251	191	500	413
6		6	24	14. 60	8. 32	1. 26	0. 24	1. 53	1. 89	2. 43	302	286	226	600	546
7		8	33	19. 51	11. 12	1. 39	0. 26	1. 71	2. 12	2. 66	331	315	255	600	663
8		12	48	28. 88	16. 46	1. 61	0. 31	2. 04	2. 54	2. 99	375	359	299	600	879
12	11	6	24	14. 44	8. 23	1. 53	0. 29	1. 53	1. 90	2. 45	318	301	230	600	694
13		8	32	19. 20	10. 94	1. 70	0. 32	1. 73	2. 14	2. 66	348	331	260	600	848
14		12	48	29. 05	16. 56	1. 99	0. 38	1. 96	2. 41	2. 89	397	380	309	600	1115
15	12. 5	4	16	9. 46	5. 39	1. 55	0. 29	1. 62	2. 02	2. 54	292	274	192	500	657
16		6	24	14. 37	8. 19	1. 83	0. 35	1. 84	2. 28	2. 77	333	315	233	600	858
17		8	32	19. 21	10. 95	2. 03	0. 39	2. 18	2. 72	3. 11	365	347	265	600	1046
18		12	48	28. 98	16. 52	2. 38	0. 45	2. 28	2. 82	3. 23	416	398	316	750	1375
19	14	6	24	14. 20	8. 10	2. 11	0. 40	1. 82	2. 25	2. 73	346	327	234	600	1042
20		8	32	19. 27	10. 98	2. 38	0. 45	2. 05	2. 55	3. 00	381	362	269	600	1260
21		12	48	28. 83	16. 43	2. 77	0. 53	2. 28	2. 82	3. 24	433	414	321	750	1658
22	15. 5	6	24	14. 18	8. 08	2. 41	0. 46	1. 89	2. 36	2. 85	359	339	235	600	1232
23		8	32	19. 04	10. 85	2. 71	0. 51	2. 16	2. 68	3. 08	394	374	270	600	1488
25		12	48	28. 73	16. 38	3. 18	0. 60	2. 37	2. 95	3. 31	449	429	325	750	1962
26	17	6	23	14. 01	7. 98	2. 71	0. 51	1. 98	2. 47	2. 93	371	349	235	600	1440
27		8	32	18. 95	10. 80	3. 05	0. 58	2. 09	2. 59	3. 02	408	386	272	750	1749
31		12	47	28. 46	16. 22	3. 58	0. 68	2. 49	3. 09	3. 43	464	442	328	750	2284

Ausgrid Item No.	Length (m)	Nominal Working Strength (kN)	Nominal Breaking Load (kN)	Max. Allowable Tip Load (kN) (See Note 1)		Self Windage of Pole Structure Equivalent Tip Load (kN)		Default Sinking Depth (m) (See Note 3)			Min. Diameter (mm) (See Note 4)				Mass (kg)
				Max. Wind & Failure Contain.	Sustained	Max. Wind	Failure Contain.	Weathered Rock	Very Stiff Clay	Dense Sand	Butt	Ground Line	Tip	Bored Hole w. concrete	
32	18. 5	6	23	13. 93	7. 94	3. 02	0. 57	2. 05	2. 56	3. 00	382	359	234	600	1668
33		8	31	18. 84	10. 74	3. 41	0. 65	2. 16	2. 70	3. 10	420	397	272	750	2012
37		12	48	28. 55	16. 27	4. 00	0. 76	2. 58	3. 22	3. 50	479	456	331	750	2634
38	20	8	31	18. 83	10. 73	3. 76	0. 71	2. 25	2. 79	3. 18	432	408	272	750	2298
39		12	47	28. 41	16. 20	4. 42	0. 84	2. 67	3. 34	3. 58	492	468	332	750	2999
40	21. 5	8	31	18. 62	10. 61	4. 09	0. 78	2. 31	2. 91	3. 26	442	417	270	750	2593
41		12	47	28. 22	16. 09	4. 83	0. 89	2. 76	3. 45	3. 66	504	479	332	750	3376
42	23	12	47	28. 14	16. 04	5. 27	1. 00	2. 85	3. 56	3. 74	516	490	332	750	3763
9	10 Stay Poles	25	100	60. 00	34. 00	2. 15	0. 40	2. 30	2. 80	3. 20	485	472	388	750	1633
10		35	140	84. 00	47. 60	2. 36	0. 44	2. 45	3. 00	3. 40	537	524	440	750	2042
11		45	180	108. 00	61. 20	2. 54	0. 47	2. 60	3. 15	3. 75	584	571	487	750	2451

Notes:

1. Max. Allowable Tip Loads are generally based on Strength Reduction Factors of 0. 60 for Strength Limit and 0. 34 for Serviceability Limit. Strength Limit is usually the limiting factor, but serviceability limit may be of concern on tight-strung rural lines.
2. Self windage of pole is based on average above-ground diameter for SD2 class pole and includes a factor of 1. 1 to allow for windage of crossarms, insulators and other fittings. A design max. wind pressure of 1300Pa has been used, and for failure containment 240Pa. The centre of pressure is assumed to be at a point halfway between the tip and ground line.
3. Default Sinking Depths shown are based on typical soil bearing strengths, allowing for concrete backfill with the bore diameters shown and using the Brinch Hanson method, applying the following parameters:

   Weathered Rock (Shale Class V) C = 250 kPa γ = 18. 0 kN/m3

   Very Stiff Clay C = 125 kPa γ = 18. 6 kN/m3

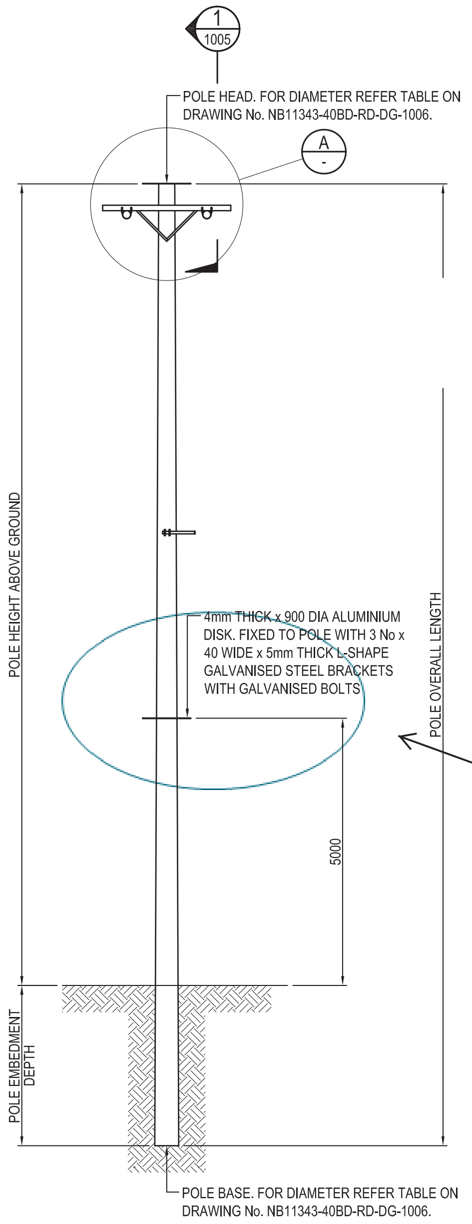
   Dense Sand φ = 38º γ = 19. 0 kN/m3

   (C = Shear strength, γ = Weight/Density, φ = Angle of Internal Friction)

   Designs where any significant departure from the above listed soil types is expected should utilise actual cone penetration test data and or apply the methodology described in Clause 9.3 of this Manual. Note that this methodology allows for different soil types, backfill and bore diameters.

   See also NS128 Specification for Pole Installation and Removal Clause 9.3 Pole Sinking Depths.
4. Pole diameters and masses assume strength class SD2 Timber. Diameters for SD3 class poles will be larger.

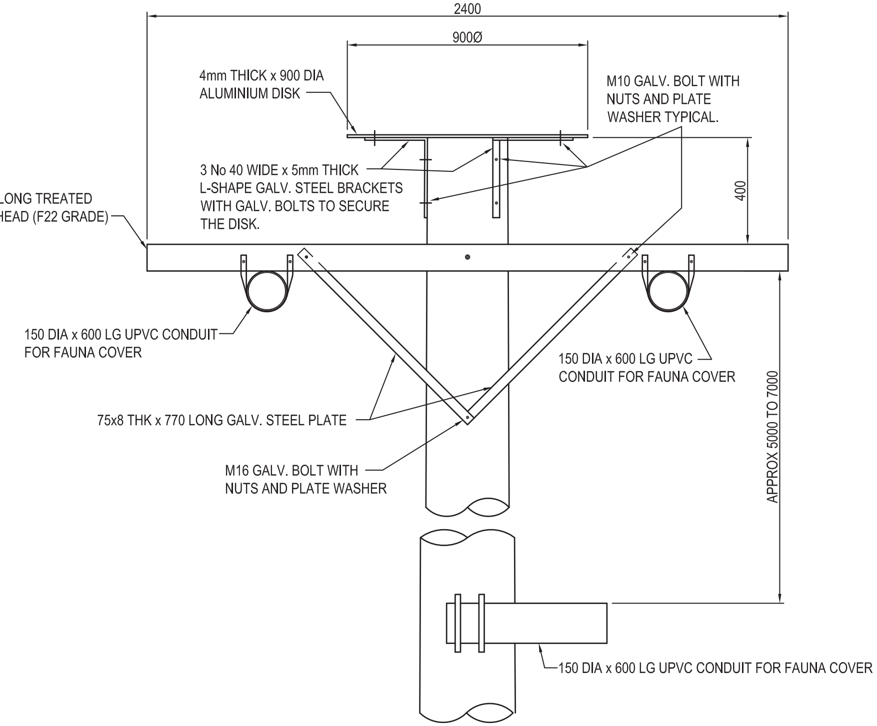
Appendix I RMS Glider Pole Specification



TYPICAL FAUNA POLE ELEVATION

SCALE 1:100

Aluminum disk may/ may not to be installed to facilitate glider landing at lower heights.



NOTES:

1. DIMENSIONS ARE IN MILLIMETRES U.N.O.
2. DESIGN LIFE OF STRUCTURES IS 40 YEARS.
3. DESIGN LOADS:-
   - DEAD LOAD = 4 TO 6 kg/m TOTAL MASS OF ROPE CAGE.
   - LIVE LOAD = 0.6 kN POINT LOAD.
4. TIMBER POLES SHALL BE IN ACCORDANCE WITH AS 3818.11 AND TREATED GRADE SD2.
5. TIMBER POLES TO BE BACKFILLED WITH COMPACTED 3% CEMENT STABILISED SAND AFTER PLACEMENT IN GROUND.
6. UNLESS OTHERWISE SPECIFIED, STEEL ITEMS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH AS 4680.
7. UNLESS OTHERWISE SPECIFIED, ISOMETRIC PRECISION HEXAGON BOLTS AND SCREWS SHALL BE PROPERTY CLASS 4.6 TO AS 1110
8. UNLESS OTHERWISE SPECIFIED, ISOMETRIC HEXAGON COMMERCIAL BOLTS AND SCREWS SHALL BE PROPERTY CLASS 4.6 TO AS 1111
9. UNLESS OTHERWISE SPECIFIED, BOLTING CATEGORY FOR COMMERCIAL, BOLTS SHALL BE 4.6/S IN ACCORDANCE WITH AS 4100
10. UNLESS OTHERWISE SPECIFIED, ISOMETRIC HEXAGONAL NUTS SHALL BE PROPERTY CLASS 5 TO AS 1112
11. DAMAGED GALVANISED SURFACES SHALL BE RENOVATED WITH A SUITABLE TWO PACK ORGANIC ZINC-RICH PRIMER.
12. BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH AS 1214.
13. UNLESS OTHERWISE SPECIFIED, STAINLESS STEEL SHALL BE GRADE 316 TO AS2837
14. REFERENCE SHALL ALSO BE MADE TO RMS SPECIFICATION B241 - MANUFACTURE AND SUPPLY OF MINOR STEEL ITEMS.
15. FOR FOUNDATION LEVELS OF POLES AND GEOTECHNICAL INFORMATION, REFER TO TABLES ON DRAWING No. NB11343-40BD-RD-DG-1006.
16. FOUNDING LEVELS SHALL BE VERIFIED ON SITE BY AN EXPERIENCED GEOTECHNICAL ENGINEER PRIOR TO PLACING OF POLES.
17. THE WELD CATEGORY SHALL BE GP IN ACCORDANCE WITH AS 1554 PART 1.
18. WELDING SYMBOLS COMPLY WITH AS 1101 PART 3.
19. MAIN CABLES AND ARBOREAL LADDER CABLES SHALL BE TO AS1222.1-1992.
20. 150 DIA UPVC CONDUIT FOR FAUNA COVER TO BE FIRMLY ATTACHED WITH GALVANISED STEEL STRAPS.

Rated attachment point to be designed and installed at or near the top of the pole to facilitate climbing

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
C	19.11.13	ISSUED FOR TENDER	FB	TD	MR
B	17.06.13	ISSUED FOR TENDER	JG	TD	TR
A	13.03.13	100% DETAIL DESIGN	SH	TD	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	S.H.	17.06.13
DRAFTING CHECK	L.A.	17.06.13
DESIGNER	D.H.	17.06.13
DESIGN CHECK	T.D.	17.06.13
PROJECT MANAGER	T.R.	17.06.13

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:20 — 0.2 0 0.2 0.4 AT A3

SCALE 1:100 — 1 0 1 2 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

CLIENT: NSW GOVERNMENT — Transport Roads & Maritime Services

STATUS

VOLUME: 02 | RMS REGISTRATION No: DS2012/000280

PHASE: IFT | DRAWING No: NB11343-40BD-RD-DG-1004 | REV: C

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

Plot Date: 26 Nov 2013, - 10:50:29