



Transport  
Roads & Maritime  
Services

# APPENDIX B2

## Flora and Fauna Management Sub Plan Toolijooa Road Fill Works stage of Foxground and Berry bypass

JANUARY 2014



## Document control

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## Appendices

- Appendix A** Not used
- Appendix B** Not used
- Appendix C** Pre-clearing / Ground Disturbance Inspection checklist
- Appendix D** Fauna Handling and Rescue Procedure
- Appendix E** Fauna Rescue Event Record
- Appendix F** Unexpected Threatened Flora Species / EEC Find Procedure
- Appendix G** Weed Management Strategy
- Appendix H** Pre-Construction Survey
- Appendix I** Not used

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## Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
DPI	Department of Primary Industries (Fishing and Aquaculture)
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
FFMP	Flora and Fauna Management Plan
FM Act	<i>Fisheries Management Act 1994</i>
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NW Act	<i>Noxious Weeds Act 1993</i>
OEH	Office of Environment and Heritage
Project, the	The Princes Highway Upgrade - Foxground and Berry Bypass Project, defined as “ <i>The construction and operation of approximately 11.6 kilometres of two lane divided carriageways (with the exception of the cutting through Toolijooa Ridge which comprises two lanes plus a climbing lane in each direction), with provisions for the possible future widening to three lanes within the road corridor (if required in the future).</i> ”
RMS	Roads and Maritime Services
SoC	Revised Statement of Commitments included in the Submissions Report
TSC Act	<i>Threatened Species and Conservation Act 1995</i>

# 1 Introduction

## 1.1 Context

This Flora and Fauna Management Sub Plan (FFMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Toolijooa Road Fill Works stage of the Foxground and Berry bypass Project (the Project).

This FFMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the RMS Statement of Commitments (SoC), the mitigation and management measures listed in the Foxground and Berry bypass Environmental Assessment (EA) and applicable legislation.

## 1.2 Background

The *Princes Highway upgrade – Foxground and Berry bypass Environmental Assessment* (AECOM, 2012) assessed the impacts of construction and operation of the Project on flora and fauna.

As part of the EA development, a detailed flora and fauna assessment was prepared to address the Director-General's Requirements issued by the then Department of Planning. The flora and fauna assessment was included in the EA as:

- Volume 2 Appendix F Technical paper: terrestrial flora and fauna; and
- Volume 2 Appendix G Technical paper: aquatic ecology and water quality management.

For the purposes of the flora and fauna assessment, the study area is defined as the Project area and the additional area likely to be directly or indirectly affected by the Project. For the terrestrial ecology assessment the study area comprised the Project area and a 50 m buffer either side of the Project. For the aquatic ecology assessment the study area comprised aquatic habitat and biota upstream and downstream of the Project area.

## 1.3 Environmental management document system overview

The overall Environmental Management document system for the Project is described in the Construction Environmental Management Plan (CEMP).

The FFMP is part of Fulton Hogan's environmental management framework for the Toolijooa Road Fill Works stage of the Project, as described in Section 4.1 of the CEMP. In accordance with CoA B36 (b), this Plan has been developed in consultation with the Office of Environment and Heritage (OEH) and Department of Primary Industries (Fishing and Aquaculture) (DPI). Details of the consultation carried out as part of the preparation of this FFMP are provided in Section 4.

Mitigation and management measures identified in this FFMP will be incorporated into site- or activity-specific Environmental Work Method Statements (EWMS). EWMSs will be developed and signed off by environment and management representatives prior to associated works, and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify the required environmental management actions for reference by Fulton Hogan personnel and contractors.

The review and document control processes for this FFMP are described in Section 1.6 and Chapter 10 of the CEMP.

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this FFMP is to describe how construction impacts on flora and fauna will be minimised and managed.

### 2.2 Objectives

The key objective of the FFMP is to ensure that impacts to flora and fauna are minimised. To achieve this objective, the following will be undertaken:

- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to flora and fauna within and adjacent to the Toolijooa Road Fill Works stage of the Project corridor;
- ensure measures are implemented to address the relevant CoA and SoC outlined in Table 3.1 and Table 3.2, and the management measures detailed in the EA (Table 7.1); and
- ensure measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this FFMP.

### 2.3 Targets

The following targets have been established by RMS for the management of flora and fauna impacts during the Toolijooa Road Fill Works stage of the Project:

- ensure full compliance with the relevant legislative requirements, CoA and SoC;
- no disturbance to flora and fauna outside the proposed construction footprint and associated access tracks;
- no increase in distribution of weeds currently existing within the Toolijooa Road Fill Works stage of the Project;
- no new weeds introduced to the Toolijooa Road Fill Works stage of the Project;
- no transfer of plant diseases or pathogens to or from the Toolijooa Road Fill Works stage of the Project;
- no net loss of significant habitat resources including hollow logs and tree nesting hollows, with materials cleared from the construction area re-used in adjacent areas where possible;
- effective rehabilitation / revegetation that ensures different successional stages of rehabilitation are achieved;
- no fauna mortality during construction;
- not facilitate spread of feral animals as a result of construction;
- no pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat; and
- minimise barriers to fauna movement.

## 3 Environmental requirements

### 3.1 Relevant legislation and guidelines

#### 3.1.1 Legislation

Legislation relevant to flora and fauna management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *National Parks and Wildlife Act 1974* (NPW Act);
- *NSW Threatened Species and Conservation Act 1995* (TSC Act);
- *Fisheries Management Act 1994* (FM Act);
- *Noxious Weeds Act 1993* (NW Act);
- *Pesticides Act 1999*;
- *Animal Research Act 1985*;
- *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act);
- *State Environmental Planning Policy 14 Coastal Wetlands* (SEPP 14); and
- *State Environmental Planning Policy 44 Koala Habitat Protection* (SEPP 44).

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

#### 3.1.2 Additional approvals, licences, permits and requirements

Refer to Appendix A1 of the CEMP.

#### 3.1.3 Guidelines

The main guidelines, specifications and policy documents relevant to this FFMP include:

- RMS QA Specification G36 – *Environmental Protection (Management System)*;
- RMS QA Specification G40 – *Clearing and Grubbing*;
- RMS QA Specification R178 – *Vegetation*;
- RMS QA Specification R179 – *Landscape Planting*;
- RMS *Environmental Direction No.25 - Management of Tannins from Vegetation Mulch* (January 2012);
- RMS Practice Note: *Clearing and Fauna Management – Pacific Highway Projects* (May 2012);
- RMS *Biodiversity Guidelines* (September 2011);
- NSW National Parks & Wildlife Service. 2001. *Policy for the Translocation of Threatened Fauna in NSW: Policy and Procedure Statement No. 9 Threatened Species Unit*, Hurstville NSW;
- DECCW. 2008. *Hygiene protocol for the control of disease in frogs*; and
- relevant recovery plans, priority action statements and best practice guidelines.



## 3.2 Minister's Conditions of Approval

The CoA relevant to this FFMP are listed in Table 3-1 below. A cross reference is also included to indicate where the condition is addressed in this FFMP or other Project management documents.

**Table 3-1 Conditions of Approval relevant to the FFMP**

CoA No.	Condition Requirements	Where addressed
CoA B36	As part of the Construction Environment Management Plan for the project required under condition B35, the Proponent shall prepare and implement the following sub plan(s):	
	(b) a <b>Construction Flora and Fauna Management Sub-plan</b> to detail how construction impacts on ecology will be minimised and managed. The sub-plan shall be developed in consultation with the OEH and DPI (Fishing and Aquaculture) and shall include, but not necessarily be limited to:	This FFMP Consultation summarised in FFMP S4
	(i) details of pre-construction surveys undertaken by a suitably qualified and experienced ecologist to verify the construction boundaries/ footprint of the project based on detailed design and to confirm the vegetation to be cleared as part of the project (including tree hollows, threatened flora and fauna species and riparian vegetation);	FFMP S6.3 FFMP App C – Pre-clearing Checklist FFMP App H – Pre-construction survey
	(ii) updated sensitive area/ vegetation maps based on (i) above and previous survey work;	FFMP App H – Pre-construction survey
(iii) details of general work practices and mitigation measures to be implemented during construction to minimise impacts on native fauna and native vegetation (particularly threatened species and EECs) not proposed to be cleared as part of the project, including, but not necessarily limited to:	FFMP Chapter 7 FFMP App C - Pre-clearing / Ground Disturbance Inspection checklist FFMP App D - Fauna Handling and Rescue Procedure FFMP App F - Unexpected Threatened Flora Species / EEC Find Procedure FFMP App G - Weed Management Strategy FFMP App H - Pre-Construction Survey SWMP LRMP Note: As the works site does not support native vegetation in the form of EEC's or threatened species, or threatened fauna habitat the following mitigation measures are not considered relevant to the Toolijooa Road Fill Works stage of the	
	<ul style="list-style-type: none"> <li>• fencing of sensitive areas,</li> <li>• a protocol for the removal and relocation of fauna during clearing,</li> <li>• engagement of a suitably qualified and experienced ecologist to identify locations where they would be present to oversee clearing activities and facilitate fauna rescues and re-location,</li> <li>• clearing timing with consideration to breeding periods,</li> <li>• measures for maintaining existing habitat features (such as bush rock and tree branches etc.),</li> <li>• seed harvesting and appropriate topsoil management,</li> <li>• construction worker education,</li> <li>• weed management (including controls to prevent the introduction or spread of</li> </ul>	

CoA No.	Condition Requirements	Where addressed
	<p><i>Phytophthora cinnamomi</i>),ORK</p> <ul style="list-style-type: none"> <li>erosion and sediment control and</li> <li>progressive re-vegetation;</li> </ul>	<p>Project:</p> <ul style="list-style-type: none"> <li>clearing timing with consideration to breeding periods,</li> <li>measures for maintaining existing habitat features (such as bush rock and tree branches etc.),</li> <li>seed harvesting.</li> </ul>
	(iv) specific procedures to deal with EEC/ threatened species anticipated to be encountered within the project corridor including re-location, translocation and/or management and protection measures;	No EECs and/or threatened species occur within the Toolijooa Road Fill Works stage (refer Staging Report) and therefore this component of the condition is not considered relevant.
	(v) a procedure for dealing with unexpected EEC/threatened species identified during construction including cessation of work and notification of the OEH, determination of appropriate mitigation measures in consultation with the OEH (including relevant re-location measures) and update of ecological monitoring and/ or biodiversity offset requirements consistent with conditions B7 and B8; and	FFMP App F Unexpected Threatened Flora Species / EEC Find Procedure
	(vi) mechanism for the monitoring, review and amendment of this sub-plan;	Chapter 9
C1	The Proponent shall employ feasible and reasonable measures <sup>1</sup> to minimise the clearing of native vegetation during the construction of the project.	FFMP S6.2 and S7 FFMP App H – Pre-construction surveys FFMP App C – Pre-clearing Checklist

Notes: <sup>1</sup> **“Feasible and reasonable”** is defined in the Project Approval as *“Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. **Feasible** relates to engineering considerations and what is practical to build. **Reasonable** relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements. Where requested by the Director General, the Proponent must provide evidence as to how feasible and reasonable measures were considered and taken into account.*

### 3.3 Statement of commitments

Relevant SoC are listed Table 3-2 below. This includes reference to required outcomes, the timing of when the commitment applies, relevant documents or sections of the environmental assessment influencing the outcome and implementation.

**Table 3-2 Statement of commitments relevant to this FFMP**

Outcome	Ref #	Commitment	Timing	Reference Document	FFMP Reference
Manage impacts on flora and fauna.	BD1	Areas of vegetation identified to be retained will be managed as environmentally sensitive areas.	Pre-construction	<i>RMS Biodiversity Guidelines</i> (RTA, 2011). Section 7.3 of the environmental assessment.	FFMP Chapter 7
	BD2	Pre-clearing fauna surveys, clearing procedures, including staged clearing where there are hollow trees, and methods to control noxious and environmental weeds and pests will be developed and implemented prior to clearing activities, in consultation with a suitably qualified and experienced ecologist.	Pre-construction and construction	<i>RMS Biodiversity Guidelines: Guide 1 – Pre-clearing process for fauna rescue associated with road works</i> (RTA, 2011). <i>RMS Biodiversity Guidelines: Guide 2 Exclusion zones (RTA 2011)</i> <i>RMS Biodiversity Guidelines: Guide 4 - Clearing of vegetation and removal of bushrock</i> (RTA, 2011) DEC (2004) <i>Threatened species survey and assessment: Guidelines for developments and activities (working draft)</i> . Section 7.3 of the environmental assessment.	FFMP App C – Pre-clearing Checklist FFMP App G – Weed Management Strategy FFMP Chapter 7
	BD3	Not relevant to the Toolijooa Road Fill Works stage.			
	BD4	Not relevant to the Toolijooa Road Fill Works stage.			
	BD5	Soil that has been stripped, stockpiled and/or reinstated as part of the construction works will be appropriately managed to maintain available seed bank.	Pre-construction and construction	<i>RMS QA Specification G40 Clearing and Grubbing</i> . <i>RMS QA Specification R178 Vegetation</i> . <i>RMS QA Specification R179 Landscape Planting</i> . Section 7.6 of the environmental assessment. Section 2.13 of the response to submissions.	FFMP Chapter 7

<b>Outcome</b>	<b>Ref #</b>	<b>Commitment</b>	<b>Timing</b>	<b>Reference Document</b>	<b>FFMP Reference</b>
Mitigate impacts on wildlife corridor and connectivity.	BD6	Not relevant to the Toolijooa Road Fill Works stage.			
	BD7	Not relevant to the Toolijooa Road Fill Works stage.			
Minimise impacts on fish and aquatic habitat.	BD8	Not relevant to the Toolijooa Road Fill Works stage.			

## **4 Consultation**

### **4.1 Consultation for the preparation of the FFMP**

In accordance with the requirements of CoA B36(b), this FFMP has been developed in consultation with OEH and DPI (Fishing and Aquaculture). A copy of this FFMP was provided to OEH and DPI. OEH and DPI both responded confirming that they have no comments on the FFMP. A summary of consultation undertaken during the preparation of this FFMP is provided in Appendix A2 of the CEMP.

## 5 Existing environment

Chapter 5 summarises existing flora and fauna within and adjacent to the Toolijooa Road Fill Works stage of the Project based on:

- information contained in Section 7.3, Appendix F and Appendix G of the EA; and
- information contained in the Pre-Construction Survey Report that was prepared by LesryK Environmental Consultants for the Toolijooa Road Fill Works stage in September 2013 (Appendix H).

The Toolijooa Road Fills Works stage, which is located at the extreme northern end of the Project comprises the existing road reserve and a rural agricultural property including a couple of old houses and associated structures e.g. farm sheds, garages, driveways etc. Vegetation cover within the Toolijooa Road Fills Works stage is comprised predominantly of garden beds, planted wind breaks, vegetable gardens, fruit trees and grazing paddocks dominated by exotic grass species, with the only native plants being scattered individual planted trees and shrubs.

Conservation reserves in the area include the Cambewarra Range Nature Reserve, the Seven Mile Beach National Park, the Barren Grounds Nature Reserve and the Saddleback Mountain Reserve. None of these reserves are in the proximity of, or would be directly impacted by the Toolijooa Road Fill Works stage of the Project.

### 5.1 Terrestrial Flora

The following native species were recorded within the Toolijooa Road Fill Works stage by LesryK Environmental Consultants:

- Tuckeroo (*Cupaniopsis anacardioides*) (x 9 individuals present);
- Deciduous Fig (*Ficus superba* var. *henneana*) (x 3 individuals present);
- Sweet Pittosporum (*Pittosporum undulatum*) (x 4 individuals present);
- Sydney Golden Wattle (*Acacia longifolia* var. *longifolia*) (x 1 individual present);
- Blackbutt (*Eucalyptus pilularis*) (x 1 individual present);
- Swamp Mahognay (*Eucalyptus robusta*) (x 1 individual present);
- Eucalypt (*Eucalyptus* sp.) (x 1 individual present);
- Bird's Nest Fern (*Asplenium australasicum*) (x 1 individual present);
- Mat Rush (*Lomandra longifolia*) (x 1 individual present); and
- Brush Box (*Lophostemon confertus*) (x 2 individuals present).

The location of these native trees and shrubs that will be cleared during the construction of the Toolijooa Road Fill Works stage, are discussed in the Pre-Construction Survey Report (Appendix H).

#### 5.1.1 Vegetation Communities

No native vegetation communities or Endangered Ecological Communities, as listed under the TSC Act or EPBC Act, were recorded in the Toolijooa Road Fill Works stage during the field surveys conducted as part of the Project EA or during the recent pre-construction field surveys.

### 5.1.2 Threatened or otherwise significant flora species

No threatened flora species, as listed under the TSC Act or EPBC Act, were recorded in the Toolijooa Road Fill Works stage during the field surveys conducted as part of the Project EA or during the recent pre-construction field surveys. The Toolijooa Road Fill Works stage of the Project is therefore not expected to impact on any threatened species listed under the TSC Act or EPBC Act.

### 5.1.3 Exotic Species

Eight exotic species that are listed as noxious weeds in the Shoalhaven local government area (LGA) were recorded in the Project area during the field surveys conducted as part of the Project EA, four of which are also listed as noxious in the Kiama LGA. Table 5-1 provides a list of the recorded species and the noxious weed class to which they belong. The Weed Management Strategy (Appendix G) provides details on the characteristics of and control requirements for each of these weed classes.

**Table 5-1 Noxious weeds recorded in the study area**

Weeds Species	Common Name	Weed Class
<i>Alternanthera philoxeroides</i> *	Alligator weed	2
<i>Ageratina riparia</i>	Mistflower	4
<i>Lantana camara</i> *	Lantana	4
<i>Ligustrum lucidum</i>	Large-leaved privet	4
<i>Ligustrum sinense</i>	Small-leaved privet	4
<i>Lycium ferocissimum</i> *	African boxthorn	4
<i>Rubus fruticosus</i> *	Blackberry complex	4
<i>Senecio madagascariensis</i>	Fireweed	4

\*Listed as noxious in Kiama LGA.

Alligator weed is a Class 2 noxious weed in the Shoalhaven and Kiama LGAs, and as such it must be eradicated when identified. The regulatory requirements for Class 4 noxious weeds is that the growth and spread of these weeds must be controlled according to the measures specified in a management plan published by the local control authority.

It is possible that these noxious weeds are present in the Toolijooa Road Fill Works stage of the Project.

## 5.2 Terrestrial Fauna

### 5.2.1 Threatened fauna

Nine threatened fauna species and six migratory species were recorded during the field surveys conducted as part of the Project EA, as listed in Table 5-2.

**Table 5-2 Threatened fauna & migratory species recorded in EA field survey**

Common name	Scientific name	EPBC Act	TSC Act	Occurrence Likelihood
<b>Threatened Fauna Species (recorded in EA field survey)</b>				
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	-	Vulnerable	High
Powerful Owl	<i>Ninox strenua</i>	-	Vulnerable	High

Common name	Scientific name	EPBC Act	TSC Act	Occurrence Likelihood
Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	-	Vulnerable	High
Eastern Freetail Bat	<i>Mormopterus norfolkensis</i>	-	Vulnerable	High
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	High
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	-	Vulnerable	High
Eastern False Pipistrelle	<i>Falsistrellus Tasmaniensis</i>	-	Vulnerable	High
Southern Myotis	<i>Myotis macropus</i>	-	Vulnerable	High
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	-	Vulnerable	High
<b>Migratory Species (recorded in EA field survey)</b>				
White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>			
Fork-tailed Swift	<i>Apus pacificus</i>			
Cattle Egret	<i>Ardea ibis</i>			
Black-faced Monarch	<i>Monarcha melanopsis</i>			
Rufous Fantail	<i>Rhipidura rufifrons</i>			
Australian Reed-warbler	<i>Acrocephalus stentoreus</i>			

### 5.2.2 Wildlife corridors

The Toolijooa Road Fill Works stage is not located within or in proximity to any of the wildlife corridors that were identified in the Project EA.

Creeks provide limited value as local wildlife corridors for some species. The Toolijooa Road Fill Works stage does not traverse or impact on a creek and/or associated riparian vegetation.

## 5.3 Terrestrial flora and fauna habitat

Potential terrestrial flora and fauna habitat within the Toolijooa Road Fill Works stage is limited to individual, scattered native and exotic trees and shrubs amongst exotic pastures and surrounding the existing dwellings and associated structures (sheds and garages). The Toolijooa Road Fill Works stage is therefore unlikely to support preferred habitat for those threatened fauna and migratory species listed in table 5-2.

The pre-construction field survey conducted by LesryK Environmental Consultants (September 2013) did not identify any bat species (or indicators of the presence of bats) roosting within the various abandoned buildings within the Toolijooa Road Fill Works stage.

The pre-construction field survey did not identify any tree hollows or riparian vegetation on site.



## 5.4 Aquatic Habitat

The Toolijooa Road Fill Works stage of the Project lies within the Crooked River catchment, however the Toolijooa Road Fill Works stage of the Project does not intersect any significant or ephemeral waterways in this catchment or impact on any aquatic habitat.

## 6 Environmental aspects and impacts

### 6.1 Construction activities

Key aspects of the Toolijooa Road Fill Works stage of the Project that could result in impacts to terrestrial and aquatic flora and fauna include:

- clearing of remaining scattered, individual native trees and shrubs;
- works upslope of an unnamed, non-perennial watercourse (tributary of the Crooked River);
- general earthworks, resulting in disturbance of soils, erosion and the mobilisation of sediment downslope and off site;
- vehicular movements; and
- open excavation works.

Refer also to the Environmental Aspects and Impacts Register included in Appendix A3 of the CEMP.

### 6.2 Ecological impacts

Potential impacts discussed in Section 7.3 of the EA that are relevant to the Toolijooa Road Fill Works stage of the Project include:

- vegetation clearance and terrestrial habitat loss;
- mortality of individuals;
- invasion of exotic species;
- reduction of water quality;
- alterations of natural flow regimes;
- cumulative impacts.

The EA concluded that the Project, which includes the Toolijooa Road Fill Works stage, is unlikely to result in significant impacts on threatened flora and fauna species within the area, provided the mitigation measures described in Chapter 7 are implemented.

The mitigation and management measures provided in Table 7-1 aim to minimise the above likely and potential impacts.

### 6.3 Pre-construction surveys

A pre-construction survey was undertaken by Deryk Engel and Stephen Bloomfield of LesryK Environmental Consultants in September 2013. Deryk holds an Honours degree in Environmental Science and has over 23 years professional ecological experience, while Stephen holds a degree in Environmental Science and has over 10 years experience in the environmental field.

A total of 24 individual native plants (as listed in Section 5.1) were recorded during the pre-construction survey.

The location and species of native trees and shrubs that will be cleared during the construction of the Toolijooa Road Fill Works stage, are discussed in the Pre-Construction Survey Report (Appendix H).

All native plants recorded on the site, with the exception of two figs, are considered to have been planted. The two figs, likely to be endemic, are relatively small and therefore are

potentially suitable for local relocation and incorporation into either the Foxground and Berry Bypass and/or the Gerringong upgrade project landscape works.

No threatened flora or fauna or EECs listed under the EPBC Act or TSC Act were recorded during the pre-construction survey, or are considered to occur, within the Toolijooa Road Fill Works site.

## **7 Environmental mitigation and management measures**

### **7.1 Flora and fauna mitigation and management measures**

A range of environmental requirements and control measures are identified in the various environmental documents, including the EA, Statement of Commitments, Conditions of Approval and other RMS documents. Mitigation and management measures will be implemented to avoid, minimise or manage impacts to biodiversity and to improve and/or maintain biodiversity. Specific measures and requirements to address impacts on flora and fauna are outlined in Table 7-1.

**Table 7-1 Flora and fauna management and mitigation measures**

<b>ID</b>	<b>Measure / Requirement</b>	<b>Reference</b>	<b>When to implement</b>	<b>Responsibility</b>	<b>Where addressed</b>
<b>GENERAL CONSTRUCTION IMPACTS ON FLORA AND FAUNA</b>					
FFMM1	Prepare a Flora and Fauna Management Plan, including weed management, and ensure that it is integrated with the landscape plan for the project.	CoA B36(b) EA Table 7-50	Pre-construction	Environmental Manager	This FFMP
FFMM2	Prepare a Landscape and Revegetation Management Plan (LRMP) detailing restoration, regeneration and rehabilitation of the site and areas of native vegetation in the vicinity of the project.	EA Table 7-50	Pre-construction	Environmental Manager	LRMP
FFMM3	A Project ecologist will be appointed prior to the commencement of construction.	EA Table 7-50	Pre-construction	Environmental Manager	LesryK Environmental Consultants have been appointed as the Ecologists for the Toolijooa Road Fill Works stage of the Project
FFMM4	In the event that threatened species or endangered ecological communities are unexpectedly identified during construction the Unexpected Threatened Species / EECs Procedure will be followed.	CoA B36(b)(v) EA Table 7-50	Construction	Environmental Manager	FFMP App F - Unexpected Threatened Species / EECs Procedure
FFMM5	Not used.				
<b>REMOVAL OF NATIVE VEGETATION AND INCREASED EDGE EFFECTS</b>					
FFMM6	Implement the Flora and Fauna Management Plan including all weed management measures.	CoA B36(b) EA Table 7-50	Pre-construction, construction, operation	Environmental Manager	FFMP App G - Weed Management Strategy
FFMM7	Clear vegetation in accordance with RMS <i>'Biodiversity Guidelines: Guide 1 – The Pre-clearing process'</i> and <i>'Guide 4 – Clearing of vegetation and removal of bushrock'</i> (RTA 2011).	CoA B36(b) EA Table 7-50	Construction	Project / Site Engineers Foreman Environmental Manager	FFMP App C - Pre-clearing checklist FFMP App H – Pre-Construction Survey
FFMM8	Ensure that locally indigenous species are used for rehabilitation and revegetation of habitat areas.	EA Table 7-50	Construction	Project / Site Engineers	LRMP

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
				Foreman Environmental Manager	
FFMM9	Seek opportunities to reduce the removal of native vegetation in the detailed design phase.  Where clearing would occur, the area would be fenced with highly visible temporary fencing to ensure that clearing does not extend beyond the area necessary, in accordance with <i>Guide 2 Exclusion zones</i> of the RMS <i>Biodiversity Guidelines</i> (RTA 2011).	EA Table 7-50 SoC BD6	Pre-construction	Project / Site Engineers  Foreman Environmental Manager	Detailed design FFMP App C - Pre-clearing checklist FFMP App H – Pre-Construction Survey
FFMM10	Ensure that ancillary facilities and stockpiles are sited on land that has been previously cleared or disturbed, and is 50 m away from waterways.	CoA B35(d) EA Table 7-50	Construction	Project / Site Engineers  Foreman Environmental Manager	CEMP S2.4 CEMP App A5
FFMM11 - 16	Not used.				
FFMM17	Progressively revegetate and landscape batters and other cleared areas as construction is completed.	EA Table 7-50	Construction	Project / Site Engineers  Foreman Environmental Manager	LRMP
<b>MORTALITY OF INDIVIDUALS</b>					
FFMM18	Not used (refer FFMM7).				
<b>FRAGMENTATION OF HABITAT AND LOSS OF CONNECTIVITY</b>					
FFMM19 - 23	Not used.				
<b>LOSS OF AQUATIC HABITATS</b>					
FFMM24 - 26	Not used.				
<b>LOSS OF FISH PASSAGE</b>					
FFMM27	Not used.				

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
<b>INVASION OF EXOTIC SPECIES: TERRESTRIAL</b>					
FFMM28	Control noxious and environmental weeds in the existing road corridor, construction areas and ancillary facilities during construction in accordance with RMS <i>Biodiversity Guidelines: Guide 6 - Weed management</i> and <i>Guide 10 - Aquatic habitats and riparian zones</i> (RTA, 2011). This would be achieved by: <ul style="list-style-type: none"> <li>Restricting the area of native vegetation disturbed during construction works.</li> <li>Restricting stockpiling to areas already cleared of vegetation.</li> <li>Controlling drainage that may contain weed seeds or high levels of nutrients.</li> <li>Using weed-free topsoil in landscaping and revegetating disturbed sites with locally indigenous species (local provenance). Revegetation using stockpiled soil would also include planting local native species to stabilise the soil as well as ongoing weed control.</li> <li>Monitoring and controlling weed populations that establish in disturbed areas.</li> </ul>	EA Table 7-50	Construction	Project / Site Engineers Foreman Environmental Manager Environmental Officer	FFMP App G - Weed Management Strategy FFMP App C - Pre-clearing checklist FFMP App H – Pre-Construction Survey SWMP App I - Stockpile Management Protocol LRMP
<b>INVASION OF EXOTIC SPECIES: AQUATIC</b>					
FFMM29	Train staff in the identification and disposal of alligator weed and inspect heavy machinery regularly to ensure that the species is not spread to new areas. This should be conducted in accordance with RMS <i>Biodiversity Guidelines: Guide 10 – Aquatic habitats and Riparian Zones</i> (RTA 2011)	EA Table 7-50	Pre-construction	Environmental Manager	FFMP S8.3 FFMP - App G Weed Management Strategy
FFMM30	Report positive identifications of alligator weed within the construction area to Kiama and Shoalhaven Council	EA Table 7-50	Construction	Environmental Manager	FFMP - App G Weed Management Strategy
<b>REDUCTION OF WATER QUALITY</b>					
FFMM31	Not used.				
FFMM32	Manage erosion and sedimentation impacts during	CoA B36(d)(iii)	Construction	RMS	SWMP

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
	construction in line with the erosion and sediment control plan and measures detailed in Section 8.1.4 of the EA. Conduct surface water quality monitoring of all water captured within sediment basins prior to its release, in accordance with the Erosion and Sediment Control Plan and SWMP.	EA Table 7-50		Environmental Officer	SWMP App B - Erosion and Sediment Control Plan
FFMM33	Implement management measures to minimise the potential impacts of ASS as proposed and detailed in Section 8.1.4 of the EA.	EA Table 7-50	Pre-construction Construction	Environmental Manager	SWMP SWMP – App G Acid Sulfate Material Management Sub-Plan
FFMM34	Manage any on-site waste to prevent leaching of contaminants.	EA Table 7-50	Construction	Superintendent	SWMP
FFMM35	Document procedures for the proper handling, transport, storage and disposal of hazardous substances and include in site inductions for staff. Site all refuelling areas at least 50 metres away from waterways and ensure the use of drip trays and the presence of spill kits.	EA Table 7-50	Pre-construction Construction	Environmental Manager	SWMP Emergency Preparedness and Response Plan and Contractor's EWMS for Spill Management and Response
<b>ALTERATION OF FLOW REGIME</b>					
FFMM36	Design transverse drainage structures to allow unrestricted passage of most natural flows and allow for changes in the natural flow regime as a result of climate change. This would be achieved by designing the Toolijooa Road Fill Works stage to provide flood immunity from the 100 year flood event and the 50 year flood event respectively.	EA Table 7-50	Pre-construction	Designer Environmental Manager	Detailed design
FFMM37 - 39	Not used.				
<b>REDUCTION IN WATER QUALITY</b>					
FFMM40 - 41	Not used.				
<b>MORTALITY OF INDIVIDUALS</b>					
FFMM42 - 44	Not used.				



ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
<b>FISH PASSAGE</b>					
FFMM45	Not used.				
<b>MONITORING IMPACTS DURING PRE-CONSTRUCTION, CONSTRUCTION AND OPERATIONAL PHASES</b>					
FFMM46	Not used.				
FFMM47	Ensure a qualified ecologist is present for staged habitat removal in accordance with the RMS' <i>Biodiversity Guidelines</i> (RTA 2011) and fauna rescue/relocation.	CoA B36(b)(i) SoC BD2 EA Table 7-50	Pre-construction	Environmental Manager Project Ecologist	LesryK Environmental Consultants have been appointed as the Ecologists for the Toolijooa Road Fill Works stage of the Project.  FFMP App C - Pre-clearing checklist FFMP App D - Fauna Handling and Rescue Procedure FFMP App E - Fauna Rescue Event Record FFMP App H - Pre-Construction Survey
FFMM48	Undertake monitoring of sediment and erosion control measures during construction. This would form part of the Erosion and Sediment Control Plan.	EA Table 7-50	Construction	Environmental Manager Environmental Officer	SWMP SWMP App B - Erosion and Sediment Control Plan
FFMM49	Undertake monitoring of edge effects and weed management measures as outlined in the Flora and Fauna Management Plan.	EA Table 7-50	Construction	Environmental Manager Environmental Officer	FFMP - App G Weed Management Strategy
FFMM50 - 54	Not used.				
<b>OTHER</b>					
FFMM55	Consider whether any of the 24 native trees and shrubs that require removal, are suitable for local relocation and incorporation into either the Foxground and Berry Bypass		Pre-construction	Environmental Manager	S6.3 FFMP App C - Pre-

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
	or Gerringong upgrade project landscape works. Particular consideration must be given to the two figs that are likely to be endemic.			Project Ecologist	clearing checklist FFMP App H - Pre-Construction Survey
FFMM56	Fauna that are found trapped in excavations or construction equipment or entangled in construction materials and/or are injured on site, are to be handled in accordance with the Fauna Handling and Rescue Procedure. Fauna rescued from site are to be recorded in the Fauna Rescue Event Record.		Construction	Environmental Manager Project Ecologist	FFMP App D - Fauna Handling and Rescue Procedure FFMP App E - Fauna Rescue Event Record
FFMM57	A site specific Clearing and Grubbing Work Method Statement will be prepared prior to the commencement of construction, in accordance with the <i>RMS QA Specification G40 Clearing and Grubbing</i> . The Clearing and Grubbing Work Method Statement is to include measures for the relocation of any native trees as discussed in FFMM55.		Pre-construction Construction	Environmental Manager Project Ecologist	Clearing and Grubbing Work Method Statement (to be prepared)

## **8 Compliance management**

### **8.1 Roles and responsibilities**

The Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 7 of this FFMP.

### **8.2 Training**

All employees, contractors and utility staff working on site will undergo site induction training relating to flora and fauna management issues. The induction training will address elements related to flora and fauna management including:

- the requirements of this FFMP;
- relevant legislation;
- specific species likely to be affected by the construction works and how these species can be recognised;
- stockpile location and management measures;
- fauna rescue requirements;
- weed control measures;
- general flora and fauna management measures;
- Unexpected Threatened Flora Species / EEC Find Procedure;
- ecological monitoring requirements, and
- specific responsibilities for the protection of flora and fauna.

Further details regarding staff induction and training are outlined in Chapter 5 of the CEMP.

### **8.3 Monitoring and inspections**

General requirements and responsibilities in relation to monitoring and inspections are documented in Section 8.2 of the CEMP and within the Compliance Tracking Program.

Specific requirements for the monitoring of weeds are documented in the Weed Management Strategy (Appendix G). The Environmental Manager will undertake monthly site inspections to monitor weed infestation throughout the construction period. The presence of any weeds and the necessary management actions will be noted on environmental inspection checklists.

### **8.4 Auditing**

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, Project Approval and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.3 of the CEMP.

### **8.5 Reporting**

Reporting requirements and responsibilities are documented in Section 8.3 and Section 8.5 of the CEMP. There are specific reporting requirements associated with additional survey work and monitoring including:

- Results of pre-clearing surveys (refer Appendix H - Pre-Construction Survey Report)

- Report positive identifications of alligator weed within the construction area to Kiama and Shoalhaven Council

## **9 Review and improvement**

### **9.1 Continuous improvement**

Continuous improvement of this FFMP will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- identify areas of opportunity for improvement of environmental management and performance;
- determine the cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- verify the effectiveness of the corrective and preventative actions;
- document any changes in procedures resulting from process improvement; and
- make comparisons with objectives and targets.

### **9.2 FFMP update and amendment**

The processes described in Chapter 8 and Chapter 9 of the CEMP may result in the need to update or revise this FFMP. This will occur as needed. Any revisions to the FFMP will be in accordance with the process outlined in Section 1.6 of the CEMP.

A copy of the updated FFMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

**Appendix A**  
Not used

**Appendix B**  
Not used

## **Appendix C**

### Pre-clearing / Ground Disturbance Inspection checklist



# Pre-Clearing / Ground Disturbance Inspection Checklist

**Project:** Princes Highway Upgrade – Foxground and Berry bypass

**Project No:**

**Requested By:**

**Permit / Lot Number:**

**Vegetation Clearing Start Date:**

**Expected Completion Date:**

## VEGETATION CLEARING LOCATIONS – ATTACH DRAWINGS / SKETCHES IF NECESSARY

Ch. From	Ch. To	Carriageway	Location	Comments

This section to be completed by Project Ecologist and Environmental Officer

**Has the vegetation to be cleared been clearly delineated?**

Yes

No

**All trees / vegetation to be retained identified by survey and exclusion areas fenced off?**

Yes

No

**State how identified:**

**Have relevant fauna rescue organisation (Wildlife Rescue South Coast) been contacted and advised of the proposed clearing to ensure adequate resources available?**

Yes

No

**Have habitat trees been identified and appropriately marked by the Project Ecologist and has the 48-hour wait period for habitat trees elapsed?**

Yes

No

N/A

**State how identified:**

**Any specific targeted surveys required in this work area?**  
(Refer to Ecological Monitoring Program)

Yes

No

**Where required, state how survey was completed, including results?**

<b>Has weed management been undertaken?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<b>Is the Project Ecologist present?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Are any animals present?</b> (If Yes, relocation required)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Are any active nests present?</b> (If Yes, relocation required)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Have checks for animals occurred at the appropriate times?</b> (Dawn, dusk etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Have relevant workers been toolboxed on limit of clearing, fauna handling procedures and any other issues?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>If soil disturbance is to occur, has a PESCP Plan been created and have these controls been installed?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Are the proposed works covered by an existing Approval?</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<b>Which document covers the works?</b>			

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**Comments:**

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**HOLD POINT: If any of the above matters have not been suitably addressed, the Environmental Manager is to ensure work does not commence until relevant action has been taken.**

**APPROVALS**

**Inspection completed by Project Ecologist:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
 Ecologist Signature Required

**Approval by Environmental Officer / Environmental Manager:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
 EO / EM Signature Required

**Appendix D**  
Fauna Handling and Rescue Procedure

## Purpose

This procedure explains the actions to be undertaken in the event fauna (including injured, shocked, juvenile or other animal) are discovered on the project site that require handling or rescue during vegetation and soil clearance and ongoing construction activities.

## Scope

This procedure is applicable to all native and introduced species that are found on the project site.

## Procedure

If wildlife is discovered on the project site during site construction activities that may harm the animal or pose risk to site personnel, the following steps will be taken.

1. Stop all work in the vicinity of the fauna and immediately notify project Superintendent who is then to notify the Environmental Manager or Project Ecologist if the latter is present onsite.
2. Preferably allow fauna to leave an area without intervention.
3. Use a licensed fauna ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling.
4. Where necessary, to minimise stress to native fauna and/or remove the risk of further injury before a licensed fauna handler arrives onsite, the Environmental Officer shall:
  - (a) Cover larger animals with a towel or blanket and place in a cardboard box and/or hessian bag;
  - (b) Place smaller animals in a cotton bag, tied at the top;
  - (c) Keep the animal quiet, warm, ventilated and in a dark location away from noisy construction activities; and
  - (d) Aquatic fauna to be placed in plastic aquaria or plastic bag with sufficient amount of water. Frogs would be transported without water or debris in recognition of the risk of transporting disease and the minimal transport time.

Note 1. Some animals require particular handling (e.g. venomous reptiles, raptors) and should only be handled by appropriately qualified personnel i.e. Project Ecologist or FAWNA / WIRES representative(s)

Note 2. If handling bats, the handler must be vaccinated against the Australian Bat Lyssavirus (ABL) which is a form of rabies.

Note 3. Any frog handling would be undertaken in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008). This protocol recommends onsite hygiene precautions be undertaken to minimise the transfer of disease between and within wild frog populations. Measures recommended include:

- i. Thoroughly cleaning/disinfecting footwear and equipment when moving from one site to another;
- ii. Where necessary in high risk areas, spraying/flushing vehicle tyres with a disinfecting solution;
- iii. Cleaning/disinfecting hands between collecting samples/frogs (preference would be given to using bags, rather than bare hands to handle frogs); and
- iv. Limiting one frog or tadpole to a bag. Bags should not be reused.

5. If the animal cannot be handled (i.e. venomous reptiles);
  - (a) Exclude all personnel from the vicinity with fencing and/or signage; and
  - (b) The exact location of the animals is to be recorded and provided to the Project Ecologist or appropriate rescue agency (i.e. FAWNA / WIRES).
6. Call the appropriate rescue agency immediately and follow any advice provided by the agency. Once the rescue agency arrives at the site, they are responsible for the animal. Any decisions regarding the care of the animal will be made by the rescue agency. The relevant fauna rescue services and local veterinary surgeries contact details are as follow:

Agency / business	Contact Number
Project Ecologist – LesryK Environmental Consultants	0408 258 129
Wildlife Rescue South Coast	0418 427 214
RSPCA (Nowra)	(02) 4429 3410
Veterinary Services Gerringong Veterinary Hospital	(02) 4234 1317

In the event the rescue service and/or local veterinary service cannot be contacted, the injured animal will be delivered to the relevant agency as soon as practically possible.

7. If the fauna species is identified as a threatened species that is not a species identified in the FFMP, the Environmental Officer or Environmental Manager must:
  - (a) Immediately cease all work likely to affect the threatened species;
  - (b) If the fauna is injured call Wildlife Rescue South Coast 0418 427 214.
  - (c) The Environmental Manager shall contact the RMS Representative to inform of the situation.
  - (d) The Environmental Manger shall then contact the following stakeholders, in this order, to determine the appropriate corrective actions and additional safeguards to be undertaken:
    - i. Project Ecologist (0408 258 129)
    - ii. EPA (131 555)
    - iii. Environmental Representative
    - iv. Others as instructed by the RMS Representative or EPA

The adequacy of existing safeguards is to be reviewed in consultation with the above stakeholders.
8. Environmental Manager to record find in Fauna Rescue Event Record sheet (Appendix E of this FFM) and the RMS Environmental Incident Report where required following consultation with the RMS Representative. All relevant characteristics of the fauna find should be recorded to the extent practicable (i.e. visual signs of behaviour; habitat; health signs; sex, time date, weather etc.).
9. Following consultation with all relevant stakeholders, the Environmental Manager shall implement any corrective actions and additional safeguards.
10. Following confirmation by the Environmental Manager that all appropriate safeguards have been implemented, construction works shall recommence.
  - (a) Relocation of fauna along the footprint will be undertaken by the Project Ecologist or wildlife rescuer and will be recorded on the Weekly Environmental Inspection Checklist. If the animal is not injured or stressed, it may be released nearby in an

area that is not to be disturbed by the project construction works, in accordance with the following procedures:

- (b) Sites identified as suitable release points by the Project Ecologist or wildlife rescuer;
- (c) Release site will contain similar habitat and occur as close to the original capture location as possible;
- (d) If the species is nocturnal, release will be carried out at dusk; and
- (e) Release would generally not be undertaken during periods of heavy rainfall.

The Project Ecologist will follow the relevant steps detailed below:

1. Surveys will be undertaken in accordance with the two stage clearing process.
  - (a) During Stage 1 (under-scrubbing and non-habitat tree removal) all fauna that can be physically captured during targeted works (i.e. active searches) will be relocated into areas of suitable habitat adjacent to the Project site (i.e. normally adjacent to the clearing footprint). The species, number, sex, age, class and general health of each individual is to be recorded for later reporting. The handling procedures are described below.
  - (b) During Stage 2 (habitat tree removal at least 24 hours after Stage 1) all fauna captured will be relocated into areas of suitable habitat adjacent to the Project site. The species, number, sex, age, class and general health of each individual is to be recorded for later reporting. The handling procedures are described below.
2. To minimise stress to native fauna and/or remove the risk of further injury the Project Ecologist shall:
  - (a) Cover larger animals with a towel or blanket and place in a cardboard box and/or hessian bag;
  - (b) Place smaller animals in a cotton bag, tied at the top;
  - (c) Place frogs/tadpoles in a plastic bag with a small amount of water and/or vegetation;
  - (d) Fish and other aquatic life (i.e. turtles) place in plastic aquaria or plastic container with sufficient water; and
  - (e) For terrestrial fauna keep the animal in a quiet, warm, ventilated and dark place away from noisy construction activities.
  - (f) For aquatic fauna species ensure sufficient amount of water and ensure adequate aeration;

Note 1. Some animals require particular handling (e.g. venomous reptiles, raptors) and should only be handled by appropriately qualified personnel, i.e. Project Ecologist or FAWNA / WIRES representative(s)

Note 2. If handling bats, the handler must be vaccinated against the Australian Bat Lyssavirus (ABL) which is a form of rabies.

Note 3. Any frog handling would be undertaken in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008).

3. Habitat trees are to be felled carefully using equipment that allows habitat trees to be lowered to the ground with minimal impact (e.g. claw extension).
4. In the event an animal is injured the following fauna rescue services and local veterinary surgeries contact details are as follows:

Agency / business	Contact Number
Project Ecologist – LesryK Environmental Consultants	0408 258 129
Wildlife Rescue South Coast	0418 427 214
RSPCA (Nowra)	(02) 4429 3410

5. If the fauna species is identified as a threatened species that is not a species identified in the FFMP, notify the Environmental Officer or Environmental Manager who then must:
  - (a) Immediately cease all work likely to affect the threatened species;
  - (b) If the fauna is injured call Wildlife Rescue South Coast 0418 427 214.
  - (c) The Environmental Manager shall contact the RMS Representative to inform of the situation.
  - (d) The Environmental Manger shall then contact the following stakeholders, to determine the appropriate corrective actions and additional safeguards to be undertaken:
    - i. EPA (131 555)
    - ii. Environmental Representative
    - iii. Others as instructed by RMS Representative or EPA
  - (e) Environmental Manager to record find in RMS Environmental Incident Report
  - (f) Following consultation with all relevant stakeholders, the Environmental Manager shall implement any corrective actions and additional safeguards.
  - (g) Following confirmation by the Environmental Manager that all appropriate safeguards have been implemented, construction works shall recommence.
  
6. Relocation of fauna captured during the clearing and associated works will generally take place in areas of suitable habitat immediately adjacent to the Project site taking into account:
  - (a) The release site contains similar habitat and occurs as close to the original area as possible;
  - (b) If the species is nocturnal, release will normally be carried out at dusk;
  - (c) Release would generally not be undertaken during periods of heavy rainfall except for aquatic fauna; and
  - (d) Non-native fauna will not be translocated and will be euthanised.

If the animal has been placed into care due to injury, age (i.e. young) or stress, upon its rehabilitation it will be released in an area that is not to be disturbed by the project construction works, at the discretion of the project ecologist taking the above into account. The Project Ecologist will record and provide the capture and relocation data in the post clearing report.

**Appendix E**  
Fauna Rescue Event Record



Item	Detail
Date fauna located	
Time fauna located	
Weather (temperature, wind direction and strength, cloud cover, precipitation)	
Location and habitat (i.e. chainage, habitat (in tree hollow, under stockpile, in open grass, near culvert etc.)	
Fauna type (e.g. possum, bird, snake etc)	
Species (if known)	
Visual signs of behaviour	
General health signs	
Sex of animal	
Is the fauna injured? (yes or no)	
<b>If the fauna is injured</b> complete this section	
What time was the fauna specialist called?	
What time did the fauna specialist arrive?	
Fauna specialist name and contact	
What was the outcome of calling the fauna specialist?	
<b>If the fauna is not injured</b> complete this section	
Where was the fauna relocated? NB only a qualified wildlife handler is to relocate fauna.	
Name and qualification of fauna handler	
Any other comments:	

Note: Fauna specialist - Fauna spotter/ catcher, Project Ecologist, fauna carer/ snake catcher or similar (e.g. vet surgery).

Completed by:

Date:     /     /

Related sub-plan:     Flora and Fauna Management Sub Plan

**File in Fauna records**

## **Appendix F**

Unexpected Threatened Flora Species / EEC Find  
Procedure

## 1. Purpose

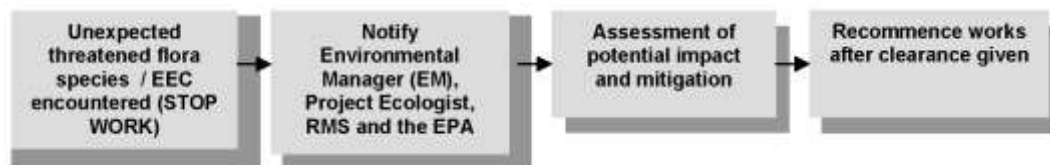
This procedure details the actions to be taken when a threatened species / EEC is unexpectedly encountered during excavation / construction activities.

## 2. Induction / Training

Where required, personnel will be inducted on the identification of potential threatened species / EEC occurring on site and the relevant actions for them with regards to this procedure during the Project Induction, Site Inductions and regular Toolbox Talks.

## 3. Scope

This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened flora species. Where threatened fauna is unexpectedly encountered, refer to the **Fauna Handling and Rescue Procedure (Appendix D of this FFMP)**.



Refer to Figure 4.1 for Unexpected Threatened Flora Species / EEC Find Procedure flow chart.

## 4. Procedure

### 1. Threatened flora species / EEC unexpectedly encountered during excavation/construction activities

If a threatened flora species / EEC is unexpectedly encountered during excavation / construction activities:

- STOP ALL WORK in the vicinity of the find

Immediately notify the Environmental Manager (EM) or Environmental Officer (EO) who will notify the Project Ecologist, ER, RMS Representative and OEH (refer to Contact details on page iii of the CEMP). The Director General must also be notified as soon as practicable and within 24 hours after the occurrence of the incident.

### 2. Assessment of Impact

An assessment is to be undertaken by the EM and the Project Ecologist to determine the likely impact to the threatened flora species / EEC and appropriate management options, including relevant re-location measures, developed in consultation with RMS and OEH.

### 3. Approvals

Obtain any relevant licences, permits or approvals required if the species / EEC is likely to be significantly impacted.

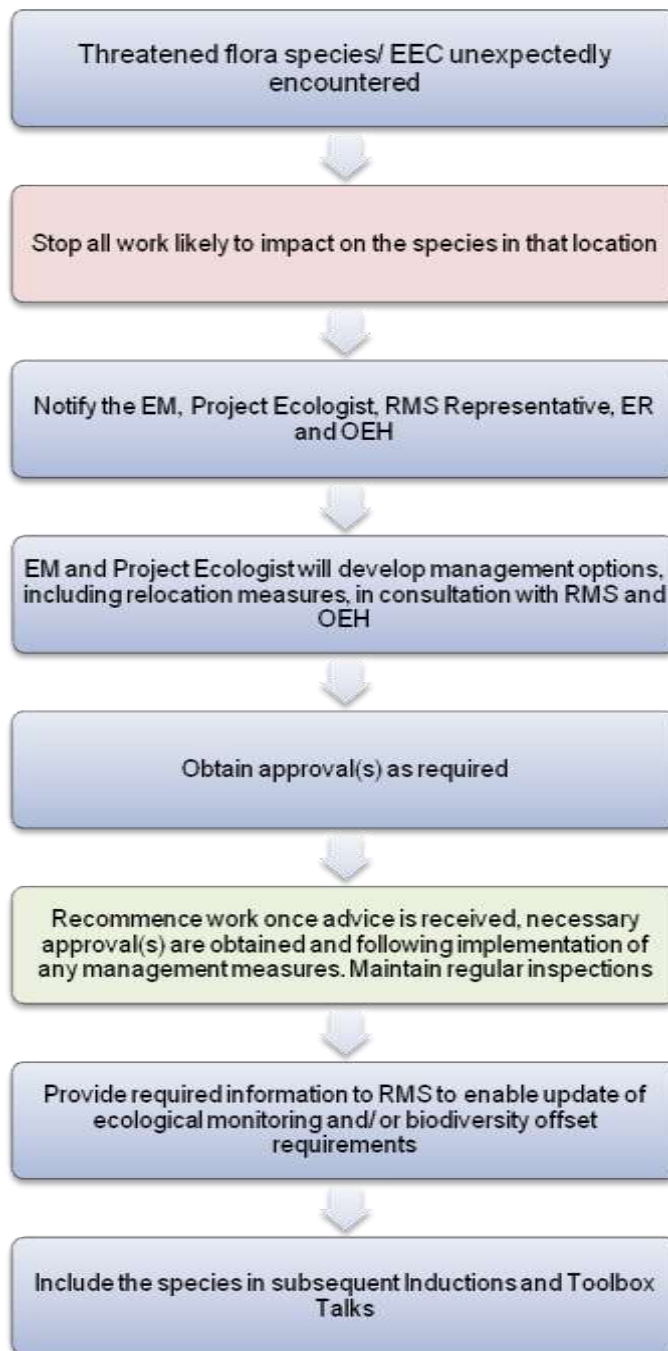
### 4. Resumption of Works

Works will recommence once necessary advice has been sought and approval obtained if required.

Include threatened flora species / EEC in subsequent Project Inductions and Toolbox Talks.

Provide information to RMS to enable update of ecological monitoring and/ or biodiversity offset requirements consistent with conditions B7 and B8

**Figure 4.1 Unexpected Threatened Flora Species / EEC Find Procedure Flow Chart**



**Appendix G**  
Weed Management Strategy

## FFMP Appendix G: Weed Management Strategy

### 1. Purpose

This strategy details weed<sup>1</sup> management and control practices to be implemented throughout the construction phase of the Toolijooa Road Fill Works stage of the Project to minimise the threat to remnant vegetation, farmland and waterways within the local area.

### 2. Scope

Weed management and control will be implemented to control weed infestation and deter the introduction and/or spread of all weed species during construction activities. Weed control will have a strong focus on the:

- Inspection of machinery;
- Inspection of materials brought to site especially topsoil, turf and mulch;
- Removal of all weeds prior to clearing, in order to reduce the potential magnitude of any future weed infestation;
- Appropriate disposal of noxious weeds (especially those that are seeding);
- Restricting the area of native vegetation disturbed during construction works;
- Restricting stockpiling to areas already cleared of vegetation;
- Controlling drainage that may contain weed seeds or high levels of nutrients;
- Using weed-free topsoil in landscaping and revegetating disturbed sites with locally indigenous species (local provenance). Revegetation using stockpiled soil would also include planting local native species to stabilise the soil as well as ongoing weed control;
- Monitoring and controlling weed populations that establish in disturbed areas.

The full list of noxious and other weed species in the Kiama municipal area and their classification is available from the NSW Department of Primary Industry's Noxious Weeds website [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au).

Management of noxious weeds will be in accordance with:

- Section 9 of the Noxious Weeds Act 1993;
- RMS Biodiversity Guidelines: Guide 6 - Weed management; and
- Guide 10 - Aquatic habitats and riparian zones (RTA, 2011).

Weed management within the Toolijooa Road Fill Works site will consist of initial removal of all vegetative cover on the site (including weeds) and ongoing monitoring and maintenance to ensure effective control of any new weed infestation that occurs.

This strategy must be read in conjunction with the Landscape and Vegetation Management Sub Plan.

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<sup>1</sup> Weed species means all non-indigenous plant species without protection under the CEMP, including those listed by the relevant local government authority as noxious categories W1, W2, W3, or W4 under the Noxious Weeds Act 1993. Noxious weeds include invasive grasses such as *Chloris gayana* (Rhodes Grass), *Phalaris* spp., *Eragrostis curvula* complex (African Lovegrass), *Andropogon virginicus* (Whisky Grass) and *Nassella trichotoma* (Serrated Tussock).

### 3. Induction and Training

All site personnel and subcontractors will be inducted in the management procedures for weeds, clearing and grubbing, and the existence of any noxious weeds and associated requirements under the *Noxious Weeds Act 1993*. This training will occur on site during the Project induction and as required in toolbox talks. Further details regarding staff induction and training are outlined in Chapter 8 of the Flora and Fauna Management Sub Plan and Chapter 5 of the CEMP.

Where work is scheduled in an area that contains weeds, personnel will be advised of this in toolbox talks. The controls that are required to minimise weed spread will be implemented prior to clearing and grubbing or ground disturbance.

All site personnel and subcontractors will also be trained in:

- The identification and disposal of alligator weed and the requirement to inspect heavy machinery regularly to ensure that the species is not spread to new areas; and
- Controls to prevent the introduction or spread of *Phytophthora cinnamomi* (root rot).

All site personnel will be shown the limits of clearing and will be made aware of the importance of any vegetation of significant value.

### 4. Classes of Noxious Weeds

The *Noxious Weeds Act 1993* sets out the regulatory framework for controlling noxious weeds in NSW. Table 1 details the weed control classes that may be applied by a weed control order.

*Table 1 Classes of Noxious Weeds*

Class	Characteristics	Example Control Requirements
<b>Class 1:</b> State Prohibited Weeds	Plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also "notifiable" and a range of restrictions on their sale and movement exist.
<b>Class 2:</b> Regionally Prohibited Weeds	Plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also "notifiable" and a range of restrictions on their sale and movement exist.
<b>Class 3:</b> Regionally Controlled Weeds	Plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.	The plant must be fully and continuously suppressed and destroyed.
<b>Class 4:</b> Locally Controlled Weeds	Plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.
<b>Class 5:</b> Restricted Plants	Plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.	There are no requirements to control existing plants of Class 5 weeds. However, the weeds are "notifiable" and a range of restrictions on their sale and movement exists.

Source: (adapted from [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au))

Four exotic species that are listed as noxious weeds in the Kiama local government area (LGA) were recorded in the Project area during the field surveys conducted as part of the Project EA. Table 2 provides a list of the recorded species and the noxious weed class to which they belong. It

is possible that these noxious weeds are present in the Toolijooa Road Fill Works stage of the Project.

*Table 2 Weed species recorded in the Project area listed as noxious in the Kiama LGA*

Scientific name	Common name	Weed class
<i>Alternanthera philoxeroides</i>	Alligator weed	2
<i>Lantana camara</i>	Lantana	4
<i>Lycium ferocissimum</i>	African boxthorn	4
<i>Rubus fruticosus</i>	Blackberry complex	4

Alligator weed is a Class 2 noxious weed in the Kiama LGA and as such it must be eradicated when identified. The regulatory requirements for Class 4 noxious weeds is that the growth and spread of these weeds must be controlled according to the measures specified in a management plan published by the local control authority.




## 5. Weed Control Procedure


The following procedure will be implemented to control weed infestations during construction:

- All weeds present within the project footprint will be treated and/or removed prior to clearing and grubbing or introduction of topsoil to the area.
- The Project Ecologist together with the Environmental Manager will undertake a joint weed inspection of the site:
  - prior to clearing and grubbing works
  - prior to drainage works or change in drainage that may facilitate the distribution of weed seeds or high levels of nutrients
  - when a potential weed infestation has been identified, and
  - before they go to flower and seed.
- The project Ecologist will advise the project team on the most appropriate weed treatment methodology and timing for each area of works.
- Best practice methods for management of the noxious weeds that may occur on the Toolijooa Road Fill Works site are detailed in Table 3.



**Table 3 Removal techniques for noxious weeds**

Weed Species	Class	Photograph	Removal Technique
African Boxthorn ( <i>Lycium ferocissimum</i> )	4		<p>The most cost effective way of controlling mature bushes forming thickets is to physically remove the top growth and as many of the roots as possible. The removed plant material should then be burnt. Removal of the roots is much easier and more effective when the soil is moist.</p> <p>It is important to destroy all plant material after physical removal because:</p> <ul style="list-style-type: none"> <li>• dead branches still pose a problem because of their thorns and the fact that they can harbour vermin;</li> <li>• unripened fruit on cut branches can still ripen and produce seed; and</li> <li>• broken root fragments may sucker and produce new growth.</li> </ul>
Alligator Weed ( <i>Alternanthera philoxeroides</i> )	2		<p>An Alligator weed control manual has been developed by NSW Department of Primary Industries (DPI) and should be followed for removal of this species. The manual contains information on identification, management strategies, containment and prevention of spread procedures and control techniques. An electronic copy of the manual can be downloaded from the DPI website (<a href="http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/publications/alligator-weed-control-manual">http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/publications/alligator-weed-control-manual</a>). A free hard copy of the Alligator weed control manual can be obtained by calling 1800 028 374. A hard copy of this manual should be kept onsite for reference.</p>
Blackberry complex ( <i>Rubus fruticosus</i> )	4		<p>Herbicides are the most reliable method for achieving local eradication of blackberry. For best results they should be used in combination with other control methods.</p> <p>Glyphosate is recommended for small infestations that are easy to check and re-treat and areas where other herbicides cannot be used, such as in or near watercourses.</p> <p>Physical control alone is rarely successful because of the root structure of blackberry. These techniques are best used in combination with herbicides. The various methods of physical control are:</p> <ul style="list-style-type: none"> <li>• hand removal of top growth and digging up of roots - this method may be suitable for small and isolated infestations. Combining hand removal with cut stump herbicide application gives better results</li> <li>• mechanical grubbing and scalping - this method can be successful if the hoe or root rake completely removes the plant, including all roots</li> <li>• cultivation of the ground - because blackberry can reproduce vegetatively as well as sucker, cultivation can simply spread blackberry. However this method may be suitable if it is carried out frequently enough</li> <li>• using earthmoving equipment or slashing - this method is unlikely to remove root material and may even promote growth but can be useful to gain initial access to heavy infestations for further treatments.</li> </ul>

Weed Species	Class	Photograph	Removal Technique
Lantana ( <i>Lantana camara</i> )	4		<p>Cut and paint (use for small to medium sized woody weeds up to 10cm basal diameter):</p> <ul style="list-style-type: none"> <li>• Make a horizontal cut as close to the ground as possible.</li> <li>• Immediately apply herbicide to the exposed flat stump surface.</li> <li>• If plants resprout, cut and paint the shoots after sufficient regrowth has occurred.</li> </ul> <p>Stem injection (for use on larger shrubs or trees above 10cm basal diameter and in inaccessible sites where removal is a problem):</p> <ul style="list-style-type: none"> <li>• At the base of the tree drill holes at 45 degree angle into the sapwood at 5cm intervals.</li> <li>• Immediately fill each hole with herbicide.</li> <li>• Repeat the process at 5cm intervals around the tree.</li> </ul> <p>Hand weeding (for seedlings):</p> <ul style="list-style-type: none"> <li>• Gently remove any seeds or fruit and place in a bag.</li> <li>• Grasp stem at ground level.</li> <li>• Rock plant backward and forwards to loosen roots and pull out gently.</li> <li>• Carefully tap the roots to dislodge any soil and replace soil and pat down.</li> <li>• Place seedling in bag.</li> </ul>

Source: (adapted from [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au))

1. The Environmental Manager will ensure that a record of pesticide application is kept and public notifications made in accordance with relevant legislation and the RMS QA Specification G36, where pesticides are to be used in areas that could be accessed by members of the public.
2. Any spraying of weeds will comply with the Pesticide Use Procedure (refer below) and be carried out with care to avoid damage to adjacent native vegetation and to prevent overspray entering waterways or adjacent property.
3. The Environmental Manager will ensure that a follow-up inspection is undertaken of identified weed infestation sites to ensure treatment was successful.
4. Site specific vehicle movement plans will be prepared for each worksite that contains noxious weeds. The vehicle movement plans will be incorporated into Progressive Erosion and Sediment Control Plans and include identification of vehicles, plant, equipment, turning and parking areas and any vehicle,
5. To prevent the spread of weeds throughout the construction site and surrounding area the movement of contaminated plant and equipment will be monitored by Foreman.
6. The plant and equipment will be checked and cleaned before leaving the worksite that contains noxious weeds.
7. Records of all construction plant screening checks will be recorded on the Mobile Plant Inspection Checklist and monitored by the Foremen.
8. Where noxious weed areas are disturbed by the construction activities, weeds and topsoil potentially containing weed propagules will be removed and disposed of in accordance with the requirements of the [Illawarra District Noxious Weeds Authority](#).

9. Any weeds physically removed (particularly those bearing seeds) will be disposed of appropriately at a licensed landfill in accordance with the *Noxious Weeds Act 1993*.

## 6. *Phytophthora cinnamomi*

Phytophthora root rot, a form of 'dieback', is a disease that affects many native plants and ecosystems, important crops and horticultural plants in Australia and throughout the world. In Australia, the disease infects an especially large range of mainly woody perennial plant species and is also a major threat to some rare and endangered species.

Controls to prevent the introduction or spread of *Phytophthora cinnamomi* can be found at <http://www.environment.gov.au/biodiversity/invasive/diseases/phytophthora-cinnamomi.html>. The Environment Manager must familiarise themselves with these controls and ensure that the rest of the project team are educated on the implementation of these controls through appropriate training/inductions.

## 7. Ongoing Management, Monitoring and Reporting

The Environmental Manager will undertake monthly site inspections to monitor weed infestation throughout the construction period. The presence of any weeds and the necessary management actions will be noted on environmental inspection checklists.

Positive identifications of alligator weed within the construction area will be reported to Kiama Council.

## 8. Pesticide Use Procedure

Pesticides must be used in accordance with the *Pesticides Act 1999*, other relevant legislation, label directions and any relevant industry codes of practice. The Pesticides Application Record Sheet included in Appendix A must be completed by Environmental Manager within 24 hours of applying the pesticide and a copy submitted to RMS's Representative and the Project Verifier.

There is an exemption from completing the Pesticides Application Records Sheet where both of the following are satisfied:

- The pesticide is only applied by hand or by using hand-held equipment.
- If applied outdoors on any single occasion in quantities of no more than 5 litres/5 kilograms of concentrated product or 20 litres/20 kilograms of the ready-to-use product, or if applied indoors in quantities of no more than 1 litre/1 kilogram of concentrated product or 5 litres/5 kilograms of the ready-to-use product.

All personnel managing and using pesticides must receive appropriate training prior to commencing work. Only pesticides registered for use near water may be used near any waterways.

Public notification of pesticide use must be in accordance with Public Notification of Pesticide Use included in Appendix A whenever pesticides are used adjacent to, or across the road from a public place or private property:

- Mechanical means of pest control (such as mowing or slashing) must be used where feasible; or
- Hand-held application of pesticides is required where mechanical means of pest control are not feasible.

Avoid applying pesticides:

- On hot days when plants are stressed
- After seed has set
- Within 24 hours of rain or when rain is imminent, and
- When winds will cause drift of pesticides into non-target areas.

## Revision History

Rev	Revised By	Reviewed & Approved By	Date	Description/Summary of Changes
0	I. Kliger	Steven Glover	16/10/2013	For RMS Review
1	I. Kliger	Steven Glover	31/10/2013	For ER Review

**Appendix H**  
Pre-Construction Survey

Mr Neville Hattingh  
Director  
Element Environment  
PO Box 1563  
**Warriwood NSW 2102**

22 January 2014

Dear Neville,

**Pre-Construction Survey: Toolijooa Road Fill Works stage of the Foxground and Berry Bypass Project.**

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**Introduction**

A pre-construction survey was undertaken of the Toolijooa Road Fill Works site by Deryk Engel and Stephen Bloomfield of LesryK Environmental Consultants on 11 September 2013 in accordance with the Ministers Condition of Approval B36(b)(i), which states:

*“details of pre-construction surveys undertaken by a suitably qualified and experienced ecologist to verify the construction boundaries/footprint of the project based on detailed design and to confirm the vegetation to be cleared as part of the project (including tree hollows, threatened flora and fauna species and riparian vegetation)”;*

Deryk holds an Honours degree in Environmental Science and has over 23 years professional ecological experience, while Stephen holds a degree in Environmental Science and has over 10 years experience in the environmental field.

The survey covered the Toolijooa Road Fill Works stage of the Foxground and Berry Bypass Project (refer to Area 1 in Attachment 1). The Toolijooa Road Fill Works site is located to the south west of the Toolijooa Road - Princes Highway intersection, within a section of the Foxground and Berry Bypass project.

**Survey Methodology and Findings**

To achieve these objectives, foot traverses were conducted across the proposed Toolijooa Road Fill Works site. The investigation commenced at 9.00am, the weather at that time being strong winds, 40% cloud cover and temperatures in the order of 15 degrees.

*Flora*

The proposed Toolijooa Road Fill Works site is comprised of two residential dwellings and up to five sheds of varying sizes surrounded by landscaped driveways, garden beds, planted wind breaks, vegetable gardens, fruit trees and grazing paddocks (refer to Attachment 1 and 2).

The study area is dominated by non-native pasture grasses and horticulturally introduced exotic plants. No native vegetation communities including riparian vegetation were identified within the site.

The following native species were recorded within the proposed Toolijooa Road Fill Works stage:

- Tuckeroo (*Cupaniopsis anacardioides*) (x 9 individuals present);
- Deciduous Fig (*Ficus superba* var. *henneana*) (x 3 individuals present);
- Sweet Pittosporum (*Pittosporum undulatum*) (x 4 individuals present);
- Sydney Golden Wattle (*Acacia longifolia* var. *longifolia*) (x 1 individual present);
- Blackbutt (*Eucalyptus pilularis*) (x 1 individual present);
- Swamp Mahognay (*Eucalyptus robusta*) (x 1 individual present);
- Eucalypt (*Eucalyptus* sp.) (x 1 individual present);
- Bird's Nest Fern (*Asplenium australasicum*) (x 1 individual present);
- Mat Rush (*Lomandra longifolia*) (x 1 individual present); and
- Brush Box (*Lophostemon confertus*) (x 2 individuals present).

It is noted that Brush Box is not an endemic species, this plant originating in north-east NSW and coastal Queensland. It is a native species that has been widely planted outside of its natural distribution range.

Whilst the remaining species are native, given their locations within the grounds of the surveyed properties, with the exception of two of the figs, all are considered to have been planted (for example, the six Tuckeroos occur as a single line of plants adjacent to a fence, these trees obviously being planted as a part of a wind break - Attachment 2, Plate 1).

The two figs are considered to be endemic native trees. The locations of the two figs are identified on Attachment 1.

Given the nature of figs, and the relatively small size of the two plants present, it may be possible to use an excavator and collect each individual. These plants could be relocated locally and incorporated into the Foxground and Berry Bypass project landscape works.

#### *Fauna habitat*

During the survey, the presence of potential habitat for threatened fauna species was investigated. The old, vacated buildings on the property, which are to be demolished during the construction of the Toolijooa Road Fill Works stage, were inspected for the presence of roosting bats / microbats or for indicators that bats / microbats inhabit these built structures. No bats / microbats or their presence was detected during the survey.

No tree hollows were identified during the survey.

No other potential habitat was identified on site for threatened fauna and/or migratory species identified in the Terrestrial Fauna and Flora Assessment for the Foxground and Berry Bypass Project (Biosis, 2012).

#### **Conclusion**

The study determined that:

- Only two endemic native plants are present within the Toolijooa Road Fill Works stage, these both being figs;
- The remainder of the native plants recorded are all planted, either within garden beds, as isolated individuals or as part of windbreaks;
- No native vegetation communities are present within the Toolijooa Road Fill Works stage;
- No threatened flora or fauna or EECs listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or NSW *Threatened Species Conservation Act 1995* were recorded, or considered to occur, within the Toolijooa Road Fill Works site.

If you require any further information on this survey report of the proposed Toolijooa Road Fill Works stage, please contact the under signed on either (02) 9523 2016 or (0408) 25 8129.

Yours sincerely,



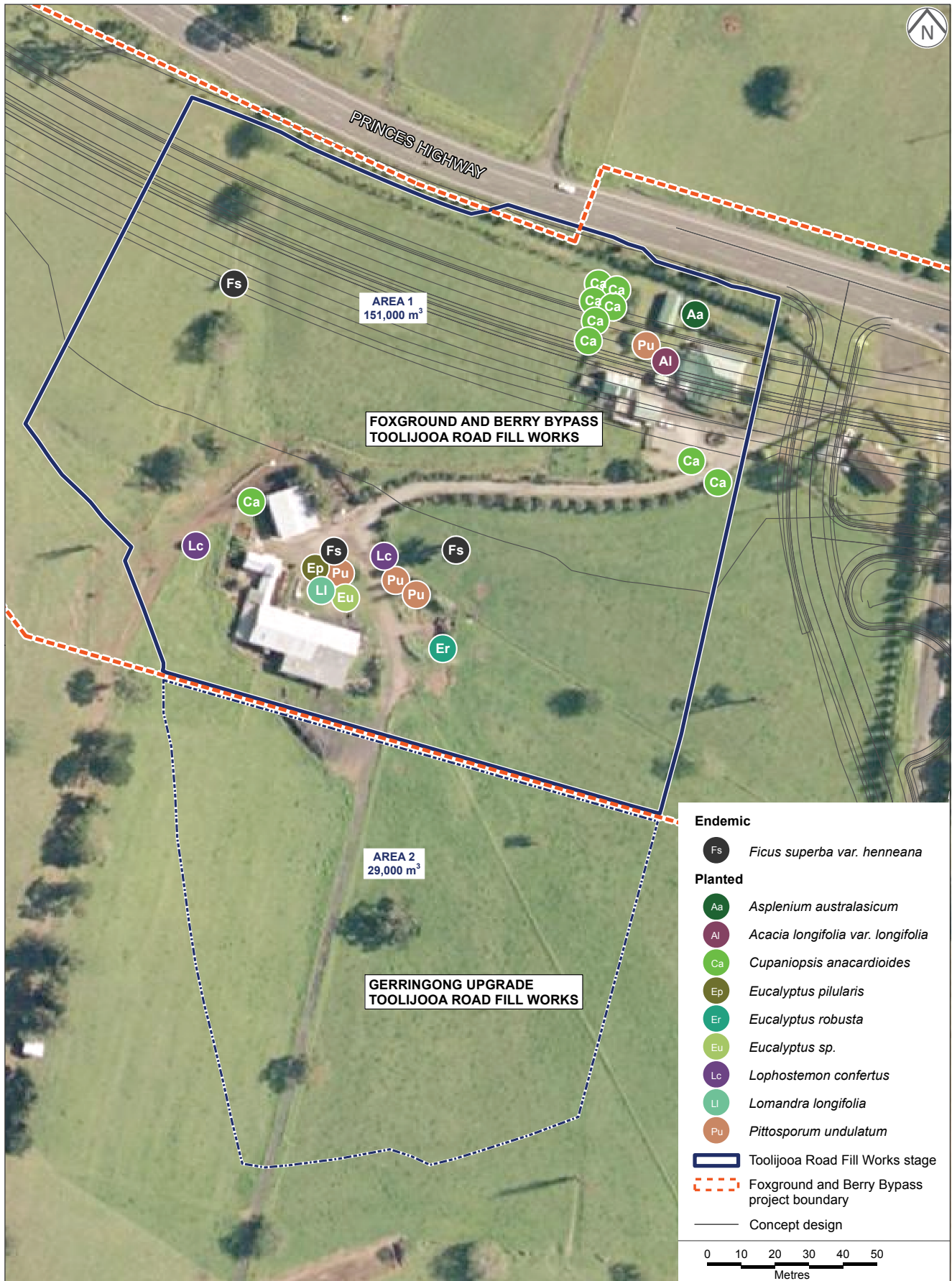
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# LOCATION OF NATIVE SPECIES (BOTH PLANTED AND ENDEMIC) RECORDED

Toolijooa Road Fill Works Project

## ATTACHMENT 1



DISCLAIMER: The information in this document is for general information only. It is not intended to be used as a substitute for professional advice. The user of this document is advised to consult a qualified professional for advice on the specific facts and circumstances of their case. The user of this document is advised to consult a qualified professional for advice on the specific facts and circumstances of their case.

**Attachment 2:** Photographic record of area investigated.

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**Plate 1:** Line of planted Tuckeroo's.



**Plate 2:** Landscaped garden bed composed of both native and exotic species.





**Plate 3:** Planted Sweet Pittosporum.



**Plate 4:** Planted Tuckeroo near shed and vegetable patch. Exotic fruit trees also present.

**Appendix I**  
Not used