

Appendix B3

Flora and Fauna Management Sub-plan

M4-M5 Link Mainline Tunnels

July 2020

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Appendix E – Weed Management Protocol

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Glossary/ Abbreviations

Abbreviations	Expanded text
BC Act	<i>Biodiversity Conservation Act 2016</i>
BS Act	<i>Biosecurity Act 2015</i>
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment 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>
GDE	Groundwater Dependent Ecosystem
HBT	Hollow Bearing Tree
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NW Act	<i>Noxious Weeds Act 1993 (repealed)</i>
OEH	NSW Office of Environment and Heritage
REMM	Revised Environmental Management Measures
Roads and Maritime	NSW Roads and Maritime Services
SMC	Sydney Motorway Corporation
TEC	Threatened Ecological Community
TSC Act	<i>Threatened Species Conservation Act 1995 (repealed)</i>

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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 M4-M5 Link Mainline Tunnels (the Project).

This FFMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the WestConnex M4-M5 Link Environmental Impact Statement (EIS), the revised environmental management measures (REMM) listed in the WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report (SPIR), the WestConnex M4-M5 Link Mainline Tunnel Modification report (September 2018) and all applicable guidance and legislation.

1.2 Project background

An environmental impact statement (EIS) (AECOM 2017) assessed the impacts of construction and operation of the Project on flora and fauna, within Chapter 18 and the Biodiversity Assessment Report (Biodiversity Technical Paper S).

The EIS identified the potential for minor impacts on flora and fauna during construction typically associated with demolition of buildings and ground disturbance. However, it concluded any potential impacts could be managed by standard mitigation and management measures.

Please refer to Section 1.3 of the CEMP for Project Description.

1.3 Scope of the Sub-Plan

The scope of this Plan is to describe how Lendlease Samsung Bouygues Joint Venture (LSBJV) propose to manage and protect flora and fauna during construction of the Project. Operational flora and fauna and operation measures do not fall within the scope of this Plan and therefore are not included within the processes contained within this Plan.

1.4 Environmental management systems overview

The environmental management system overview is described in Section 1.5 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how LSBJV proposes to manage and protect flora and fauna during construction of the Project.

2.2 Objectives

The key objective of the FFMP is to ensure all CoA, REMM and licence/permit requirements relevant to flora and fauna are described, scheduled and assigned responsibility as outlined in:

- The EIS prepared for the WestConnex M4-M5 Link
- The SPIR prepared for WestConnex M4-M5 Link
- The Modification report for WestConnex M4-M5 Link Mainline Tunnel (September 2018)
- Conditions of Approval granted to the project on 17 April 2018 and as modified on 25 February 2019
- Roads and Maritime QA Specifications G36 and G40
- The Project's Environment Protection Licence (EPL)
- All relevant legislation and other requirements described in Section 3.1 of this Plan.

2.3 Environmental performance outcomes and targets

The desired environmental performance outcomes for biodiversity, as outlined in the EIS, requires the design of the Project to consider all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity. Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of Project construction and operation.

The targets presented in Table 2-1 have been established for the management of flora and fauna during construction of the Project. The Project has also established key performance indicators (KPIs) for these targets. These have been derived from the following sources:

- EIS Appendix A
- Conditions of Approval granted to the project on 17 April 2018
- Roads and Maritime QA Specifications G36 and G40.

Table 2-1 KPIs for flora and fauna

Target / KPI number	Target	KPI	Records	Source
1	Ensure full compliance with the relevant legislative requirements, CoA and REMM	No repeat non-conformances	LLE703A Environmental Inspection Checklist / audits	CoA A1

Target / KPI number	Target	KPI	Records	Source
2	No disturbance to flora and fauna outside the proposed Project footprint	At all times	Sensitive Area Plans Pre-Clearing Permit Vegetation Clearing EWMS	CoA A1 G40
3	No increase in the distribution of weeds currently existing within the Project footprint	At all times	LLE703A Environmental Inspection Checklist Weed Management Protocol	Best practice
4	No new weeds introduced into the Project areas	At all times	LLE703A Environmental Inspection Checklist Weed Management Protocol	Best practice
5	All fauna species encountered during construction are handled in accordance with the Project's Fauna Handling and Rescue Procedure	At all times	Fauna Handling and Rescue Procedure	G36
6	Minimise impact to aquatic biodiversity values	At all times	Table 6-2 Soil and Surface Water Management Plan (SSWMP)	EIS Appendix A
7	Minimise removal of high retention value trees	At all times	Table 6-2 Section 6.1 Section 6.2	EIS Appendix A

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)
- *Biodiversity Conservation Act 2016* (BC Act)
- *National Parks and Wildlife Act 1974* (NPW Act) – Note: The plant and animal provisions have now been repealed by the BC Act
- *Threatened Species Conservation Act 1995* (TSC Act) – Note: The TSC Act has now been repealed by the BC Act
- *Native Vegetation Act 2003* (NV Act) – Note: The NV Act has now been repealed by the BC Act
- *Fisheries Management Act 1994* (FM Act)
- *Biosecurity Act 2015* (BS Act)
- *Noxious Weeds Act 1993* (NW Act) – Note: The NW Act has now been repealed by the BS Act
- *Pesticides Act 1999*
- *Animal Research Act 1985*
- *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act).

All legislation relevant to this FFMP is 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 Plan include:

- Australian Standard AS4373-2007 Pruning of amenity trees
- Australian Standard AS4970-2009 Protection of Trees on development sites
- NSW WorkCover Code of Practice for the Amenity Tree Industry (1998)
- DECCW. 2008. Hygiene protocol for the control of disease in frogs.
- Department of Primary Industries 'Policy and Guidelines for Fish Habitat Conservation and Management (DPI 2013)
- Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings – November 2003;
- Roads and Maritime QA Specification G36 – Environmental Protection (Management System).
- Roads and Maritime QA Specification G40– Clearing and Grubbing.
- Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RMS Projects (September 2011).

3.2 Ministers Conditions of Approval

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

Table 3-1 Minister’s Conditions of Approval

CoA No.	Condition Requirements	Document Reference	How Addressed			
C4	The following CEMP Sub-plans must be prepared in consultation with the relevant authorities identified for each CEMP Sub-plan and be consistent with the CEMP referred to in the EIS.	This plan Section 3.4	This Flora and Fauna Management Sub-plan has been prepared in accordance with this condition and describes how LSBJV propose to manage impacts to flora and fauna during construction of the Project.			
	<table border="1"> <thead> <tr> <th></th> <th>Required CEMP Sub-plan</th> <th>Relevant authority(s) and council(s) to be consulted for each CEMP Sub-plan</th> </tr> </thead> <tbody> <tr> <td>(c)</td> <td>Flora and fauna</td> <td>OEH and relevant council(s)</td> </tr> </tbody> </table>				Required CEMP Sub-plan	Relevant authority(s) and council(s) to be consulted for each CEMP Sub-plan
	Required CEMP Sub-plan	Relevant authority(s) and council(s) to be consulted for each CEMP Sub-plan				
(c)	Flora and fauna	OEH and relevant council(s)				
C5	The CEMP Sub-plans must state how:					
	(a) the environmental performance outcomes identified in the EIS and SPIR as modified by these conditions will be achieved;	Section 2.3	This Sub-plan was prepared in accordance with the environmental performance outcomes identified in the EIS and SPIR and is evidenced primarily in Section 2.3 and Table 2-1.			
	(b) the mitigation measures identified in the EIS and SPIR as modified by these conditions will be implemented	Table 6-2	The implementation of flora and fauna management and mitigation measures identified in the EIS and SPIR are listed in Table 6-2.			
	(c) the relevant terms of this approval will be complied with; and	Section 3.2	Details regarding how LSBJV propose to comply with the relevant terms of approval are listed in this Table and in Appendix A.			

CoA No.	Condition Requirements	Document Reference	How Addressed
	(d) issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed.	Table 6-2 Environmental Risk Assessment Workshop (Section 3.2.1 of CEMP)	Flora and fauna issues requiring management during construction of the Project have been identified through the EIS, SPIR and Environmental Risk Assessment Workshop. These issues including cumulative impacts have been detailed in Appendix A2 of the CEMP. Environmental risk analysis will be ongoing and regularly reviewed in accordance with Section 3.9 to Section 3.13 of the CEMP to ensure effective management of impacts to flora and fauna. Mitigation and management measures for these issues are listed in Table 6-2, Appendix A and Appendix A2 of the CEMP.
C6	The CEMP Sub-plans must be endorsed by the ER and then submitted to the Secretary for approval no later than one (1) month prior to the commencement of the construction activities to which they apply.	Refer to Section 2.2 of the CEMP	This FFMP (Revision 01) has been endorsed by the Lead ER (Letter ref: 17021-LT-ED-003_0, dated 14 August 2018).
C7	Any of the CEMP Sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP.	Refer to Section 2.2 of the CEMP	This Sub-plan has been submitted for approval to DPE prior to the final submission of the CEMP for DPE approval.

CoA No.	Condition Requirements	Document Reference	How Addressed
C8	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Secretary. The CEMP and CEMP Sub-plans, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to commence until the relevant CEMP and CEMP Sub-plans have been endorsed by the ER and approved by the Secretary.	Refer to Section 2.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by DPE. The CEMP and CEMP Sub-plans will be implemented for the duration of construction.

Refer to Appendix A for all other CoA relevant to the development of this Plan.

3.3 Revised Environmental Management Measures

Refer to Appendix A for all REMMs relevant to the development of this Plan.

3.4 Consultation

This plan was provided to NSW Office of Environment and Heritage (OEH), City of Sydney Council and Inner West Council in accordance with CoA C4 (c). Refer to Section 2 of the CEMP for consultation requirements relating to the CEMP and all sub-plans.

Table 3-2 below summarises the key issues raised by the authorities above during consultation in accordance with CoA C4 (c), and where these are addressed in the FFMP.

Table 3-2 Key issues raised by authorities during consultation

Stakeholder	Issue raised	FFMP reference
City of Sydney Council	Management of threatened species including bats during construction	Section 6.1 Section 6.3 Section 6.4 Table 6-2 Appendix C – Unexpected Threatened Flora / EEC Procedure
City of Sydney Council Inner West Council	Weed management during construction	Section 6.5 Table 6-2 Appendix E – Weed Management Protocol

Ongoing consultation with relevant councils and other stakeholders, including any unique local receivers, may be undertaken for particular issues pertaining to the Project's impact on flora and fauna. Community feedback and complaints relating to flora and fauna will be dealt with in accordance with the Community Communication Strategy and Complaints Management System.

4 Existing Environment

The following sections summarise existing flora and fauna within and adjacent to the Project area including species, communities and habitats. The key reference documents for this section are the EIS Biodiversity Chapter (Chapter 18) and the Biodiversity Assessment Report (Biodiversity Technical Paper S).

The Project boundary and relevant ecological data is shown on the Sensitive Area Plans included in Appendix A5 of the CEMP.

4.1 Environmental aspects

4.1.1 Threatened ecological communities

No threatened ecological communities (TEC) were recorded within the project footprint.

TECs listed in NSW under the TSC Act previously mapped as being within around two kilometres of the project footprint are listed below:

- *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions* (TSC Act listing: Endangered)
- *Sydney Turpentine Ironbark Forest* (TSC Act listing: Endangered)
- *Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions* (TSC Act listing: Endangered).

Commonwealth listed EPBC Act listed TECs previously mapped as being within around two kilometres of the project footprint are listed below:

- *Subtropical and Temperate Coastal Saltmarsh* (EPBC act listing: Vulnerable)
- *Turpentine Ironbark Forest in the Sydney Basin Bioregion* (EPBC act listing: Critically endangered).

The location of these TEC's in relation to the project is shown on the Sensitive Area Plans included at Appendix A5 of the CEMP.

4.1.2 Threatened or otherwise significant flora species

No threatened terrestrial flora were considered as having the potential to occur within the Project footprint, or were recorded during EIS surveys.

4.1.3 Threatened fauna

The presence of threatened fauna species is not anticipated within the M4-M5 Link Mainline Tunnels Project footprint. However, this would be confirmed during pre-construction surveys carried out by the Project Ecologist (refer to Section 6.1).

During development of the EIS, two threatened fauna species, the Eastern Bentwing-bat and Yellow-bellied Sheath-tail-bat were recorded during targeted surveys and the Grey-headed Flying-fox was assumed to be present adjacent to the project footprint.

No migratory species were considered likely to occur within the project footprint, due to the lack of suitable habitat and highly urbanised environment.

Threatened fauna species confirmed during the EIS surveys and those with a high likelihood of occurrence adjacent to the project footprint are listed in Table 4-1.

Table 4-1 Threatened fauna

Common name	Scientific name	EPBC Act	TSC Act	Occurrence likelihood
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	High
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	-	Vulnerable	Recorded
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	-	Vulnerable	Recorded

4.1.4 Aquatic biodiversity

Riparian corridors of three waterways occur within or nearby the project footprint; Whites Creek (first order stream), Rozelle Bay (estuarine area) and Iron Cove (second order stream).

Riparian vegetation in the Project footprint is mapped as urban exotic and native cover, and represents planted and landscaped native and exotic species. The parts of Whites Creek and Hawthorne Canal riparian corridor that occur in the Project footprint are highly modified environments, consisting of concrete channels with vertical walls and a concrete base. This riparian vegetation does not contribute to the ecological functioning of the waterways, provides little ecological value and is of limited habitat for fauna species.

Rozelle Bay, Iron Cove, Alexandra Canal and Hawthorne Canal are mapped as key fish habitats by the New South Wales Department of Primary Industries (DPI). Notwithstanding, the EIS concluded it is unlikely that there would be valuable or specific aquatic habitat for threatened aquatic/estuarine species (including fish, sharks, rays, aquatic mammals and birds), populations or communities listed under the FM Act, TSC Act, EPBC Act present within the study area.

4.1.5 Groundwater Dependent Ecosystems

Section 4.4 of the EIS Biodiversity Technical paper states that the most likely Groundwater Dependent Ecosystem (GDE) types in the Sydney region are terrestrial vegetation communities with deep roots that use groundwater, wetlands and river baseflow systems. Long term dewatering caused by tunnel drainage could lower the water table, reducing the amount of groundwater available for shallow rooted plants. The minimum depth of the water table underlying the majority of the Project is about two metres below ground surface and therefore existing plants are unlikely to be completely dependent on groundwater.

No priority GDEs were identified in the Project footprint and therefore the Project is considered unlikely to impact on GDEs.

4.1.6 Weed species

Weeds are abundant in the project area, as in most metropolitan areas, with some areas supporting weed infestations. Weeds identified during the EIS field surveys are summarised in Table 4-2.

Table 4-2: Class 3, Class 4 and Class 5 noxious and environmental weed species recorded during EIS in the project area

Common name	Scientific name	Class of weeds for Inner West and City of Sydney LGA	Weed of National Significance
Madeira Vine	<i>Anredera cordifolia</i>	-	X
Bridal Creeper	<i>Asparagus asparagoides</i>	5	X
Spiny Burr Grass	<i>Cenchrus echinatus</i>	5	
Green Cestrum	<i>Cestrum parqui</i>	3	
Pampas Grass	<i>Cortaderia selloana</i>	4	
Lantana	<i>Lantana camara</i>	4	X
Broad-leaved Privet	<i>Ligustrum lucidum</i>	4	
Small-leaved Privet	<i>Ligustrum sinense</i>	4	
Oxalis	<i>Oxalis sp.</i>	5	
Pellitory	<i>Parietaria Judaica</i>	4	
Castor Oil Plant	<i>Ricinus communis</i>	4	
Blackberry	<i>Rubus fruticosus</i>	4	X

Notes: Noxious weeds classes as defined under the NW Act (repealed):

- Class 3: The plant must be fully continuously suppressed and destroyed
- Class 4: The growth of the plant must be managed in a manner that reduces its numbers, spread and incidence and continuously inhibits its reproduction
- Class 5: The requirements in the NW Act for a notifiable weed must be complied with.

5 Environmental aspects and impacts

5.1 Construction activities

Key aspects of the Project that could result in impacts to terrestrial and aquatic flora and fauna include:

- Clearing of vegetation
- Demolition of potential bat roosts
- Noise and vibration impacts
- Dust impacts
- Lighting impacts and overshadowing
- Tunnel work and groundwater drawdown
- Construction traffic and movement of construction machinery and plant
- Impacts to water quality due to sediment runoff and deposition, polluted road runoff, high velocity runoff/discharge or uncontrolled release of construction water
- Use of chemicals / fuels (potential for spills)
- Inadequate control of weeds and pathogens
- Transport of soils, water and other materials on and off-site and between sites.

Refer also the Aspects and Impact Register included in Appendix A2 of the CEMP.

5.2 Ecological impacts

The Project footprint and surrounding area is largely disturbed and considered to have little ecological value. As such, the Project's anticipated ecological impact is minimal. Likely and/or potential impacts associated with the Project are discussed in Chapter 18 of the EIS and include:

- Removal of trees at the Parramatta Road East and Parramatta Road West sites. The total number of trees to be removed or retained, will be confirmed during pre-construction surveys, prior to site establishment
- Direct and indirect impacts to fauna, including injury and mortality
- Indirect impacts on protected fauna, including disturbance, injury or mortality
- Impacts on unexpected threatened species
- Spread of weeds
- Spread of feral animals
- Introduction of pathogens
- Physical, chemical and biological changes to aquatic environments

Notwithstanding, mitigation and management measures provided in Table 6-2 aim to minimise the above likely and potential impacts on the threatened fauna species identified in Table 4-1.

In the absence of appropriate mitigation measures, there is the potential for impacts on threatened fauna species with the potential to occur within the Project footprint.

6 Environmental mitigation and management measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EIS, SPIR, Conditions of Approval and other Roads and Maritime documents. Specific management measures to address these requirements and impacts on biodiversity are outlined in Table 6-2.

6.1 Pre-construction surveys

In accordance with Roads and Maritime G40 Section 2.4, pre-clearing/demolition/construction surveys will be carried out by the Project Ecologist to confirm the vegetation to be cleared as part of the Project, identify the presence and location of any habitat features (including tree hollows and/or potential bat roosts) and identify any unexpected threatened flora and fauna species.

Initially, areas requiring a pre-clearing/demolition/construction survey would be identified by the Environment & Sustainability Manager (EM) or their delegate, in consultation with the Project Engineer or Foreman. Prior to any vegetation clearing or demolition, as included in the Environmental Work Method Statements (EWMS), the Environment & Sustainability Manager or their delegate would accompany the Project Ecologist to site to carry out a meander survey, inspecting the area for the presence of endangered or threatened species, or habitat features. Limits of clearing and environmentally sensitive areas would be delineated and demarcated in accordance with the Fencing and Signage Protocol (refer to Appendix F). Any subsequent relocation of species would be carried out under the guidance of the Project Ecologist, which would be documented in the Project Ecologist's pre-clearing report, along with recommended management measures.

In accordance with CoA E175, pre-clearing/demolition/construction inspections for microbats will be carried out. Surveys will be undertaken by an experienced bat ecologist and will involve diurnal inspections of the nominated sites to assess the potential for structures to support roosting bats.

Microbat surveys will also record any potential habitat features that may require further targeted inspection, including any evidence of microbats and/or microbat use. Microbat surveys may also include dusk surveys to check for emerging bats, carried out for a minimum of one hour following sunset using ultrasonic bat detectors and spotlights at locations nominated by the ecologist.

All surveys would be carried out during favourable weather conditions and cover the period of roosting. Table 6-1 outlines the roosting behaviour or threatened microbat species recorded adjacent to the Project footprint during the EIS surveys.

Table 6-1 Roosting behaviour of recorded threatened microbat species

Common name	Scientific name	Roosting behaviour
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	Mating occurs in May to June. Females congregate in October into maternity colonies to give birth in December to Mid-January. Mothers return to winter roosts in March, with the maternity roosts deserted by April. Roost structures include caves and cave like structures (culverts, cellars etc).
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	Roosts in tree hollows and buildings in treeless areas. Mating occurs in August and young are born between December and March.

A microbat habitat assessment and presence/absence survey report will be produced documenting the findings of the survey.

In the event that microbats or evidence of roosting are identified within the M4-M5 Link Mainline Tunnels Project area during pre-construction surveys, LSBJV will prepare a Microbat Management Strategy in accordance with CoA E176. The strategy will detail short and long-term measures to avoid, minimise and mitigate impacts to identified species.

Pre-construction surveys will also detail the extent and type of noxious and priority weeds present within the Project footprint and ensure that any previously unidentified noxious and priority weeds are incorporated into the Weed Management Protocol (refer to Appendix E). Weed distributions will also be shown on the Sensitive Area Plans (Appendix A5 of the CEMP).

Sensitive Area Plans and vegetation maps will be updated if required by the above surveys.

6.2 Pre-Clearing Permit

Prior to commencement of any vegetation clearance, approval will be sought from the Environment & Sustainability Manager or delegate. Prior to clearing, hold-point release will be sought with WestConnex Transurban in accordance section 2.4 of Roads and Maritime QA Specification G40. No works will be carried out until an approved Pre-Clearing Permit (refer to Appendix B) is in place, and toolboxed to the relevant work crews on site.

6.3 Unexpected threatened species finds

In the event that a newly discovered threatened species or Endangered Ecological Communities are unexpectedly encountered during construction, the Unexpected Threatened Flora / EEC Procedure will be followed (refer to Appendix C).

6.4 Fauna Handling and Rescue Procedure

Any displaced or injured fauna encountered during the Project, would be managed in accordance with the M4-M5 Link Mainline Tunnels Fauna Handling and Rescue Procedure (refer to Appendix D).

6.5 Weed Management Protocol

Weeds within the construction footprint would be managed in accordance with the Weed Management Protocol for the Project (refer to Appendix E).

6.6 Rehabilitation and landscaping

Rehabilitation and landscaping will be progressive, with the first stage involving sterile cover crops to stabilise disturbed construction areas for erosion and sediment control and weed control and management. The Urban Design and Landscape Plan (UDLP) will provide details of compensatory planting for trees removed by the Project, landscaping, potential reuse of cleared vegetation, native plant species, locations and densities.

In accordance with CoA E177, where trees are removed, the Project will provide a net increase in the number of replacement trees planted. Location of replacement trees will be determined in consultation with the relevant council. In accordance with CoA E178, replacement trees are to have a minimum pot size of 75 litres, except where the plantings are consistent with the pot sizes specified in a relevant authority's strategy for vegetation management, street planting or open space landscaping, or as agreed by the relevant council.

In accordance with E179, LSBJV will prepare a report which details the type, size, number and location of replacement trees. The report will demonstrate how any replacement plantings with a

pot size of less than 75 litres are consistent with the requirements of Condition E178. The report will be submitted to the Secretary for information one month prior to operation.

Table 6-2 Flora and fauna management and mitigation measures

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
GENERAL						
FF1	Training will be provided to relevant Project personnel, including relevant sub-contractors on flora and fauna requirements from this plan through inductions, toolboxes and targeted training.	Training Materials	Prior to construction	Environmental Coordinator	Best practice	Training records
FF2	Any work required outside the construction footprint will be referred to the Environment & Sustainability Manager for advice on further assessment and approval requirements.	Project induction Sensitive Area Plans Early Works and Ground Disturbance Permit (Appendix B) Fencing and Signage Protocol (Appendix F) EWMS	Construction	All staff	CoA E174 Best practice	Consistency Assessments (if required)
VEGETATION CLEARING, PROTECTION AND MANAGEMENT						
FF3	LSBJV will consider the retention of vegetation in the design of the Project's construction and ancillary facilities, with the aim of	Ecologist's pre-clearing survey report	Construction	Area Manager Environment & Sustainability Manager	CoA E174	Pre-Clearing Permit

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	<p>minimising disturbance and reducing impacts to flora and fauna species and ecological communities to the greatest extent practicable.</p>	<p>Design of LSBJV's ancillary facilities</p>				<p>Ecologist's pre-clearing survey report</p>
<p>FF4</p>	<p>Clearing will be carried out in accordance with the process described in Guide 4 of the Roads and Maritime <i>Biodiversity Guidelines</i>. A Project specific EWMS will be developed for vegetation clearing activities.</p> <p>This EWMS will detail a two-stage clearing process that will be implemented in all areas supporting identified fauna habitat such as hollow bearing trees or microbat roosts. This process will include but not be limited to:</p> <ul style="list-style-type: none"> • Non-habitat trees will be removed before habitat trees, allowing fauna an opportunity to move from the habitat trees • Habitat trees will be retained for a minimum of one night after initial clearing, unless the Project Ecologist 	<p>Roads and Maritime Guidance</p> <p>EWMS</p> <p>This Plan</p>	<p>Prior to construction</p>	<p>Environment & Sustainability Manager</p>	<p>CoA E174 G36 G40</p>	<p>Pre-Clearing Permit</p> <p>Vegetation Clearing EWMS</p> <p>Ecologist's pre-clearing survey report</p>

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	<p>determines the tree can be removed immediately after initial clearing safely</p> <ul style="list-style-type: none"> • In the event that a hazardous habitat tree is identified (a risk to the safety of workers and/or flora and fauna), an assessment will be carried out to identify any need for removal of the habitat tree prior to the minimum requirements stipulated above. This assessment will be carried out with the Project Ecologist, the clearing contractor, LSBJV Environment & Sustainability Manager, LSBJV Safety Manager and the ER. If the tree is deemed a hazard to safety the following actions may be taken: <ul style="list-style-type: none"> ◦ Removal of the tree immediately (if there is low risk to injury of wildlife during felling) ◦ Removal of the tree within 24hrs of initial clearing if there is a high 					

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	<p>potential for significant fauna occupation</p> <ul style="list-style-type: none"> ◦ Establishment of an exclusion zone around the tree, and felling 24hrs after initial clearing (if there is a high potential for significant fauna occupation and a high risk of injury to fauna during felling). <p>Dead or hazardous trees identified on the clearing boundary or with the potential to cause construction and/or operational safety concerns will be subject to an assessment for removal. If the tree is deemed too unsafe to remain it will be felled following the initial clearing front in accordance with approved clearing methodologies. If the tree is identified as a habitat tree and compensatory habitat assessments (i.e. additional nest boxes) will be investigated and implemented where required.</p>					

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF5	Clear delineation of Project footprint shall be established prior to construction to minimise impacts on adjacent vegetation. Exclusion zones would be identified to protect against accidental vegetation damage.	Fencing and Signage Protocol (Appendix F)	Prior to construction	Environment & Sustainability Manager Project Manager	REMM B5 G36 G40	Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists
FF6	All personnel involved in clearing operations will be tool boxed on the requirements of the Vegetation Clearing EWMS, including their roles and responsibilities.	EWMS	Prior to construction Construction	Foreman Environmental Coordinator	REMM B5 Vegetation Clearing EWMS	Induction Records EWMS Toolbox Records
FF7	An appropriately qualified Project Ecologist will be appointed prior to the commencement of construction.	Project Ecologist	Prior to construction	Environment & Sustainability Manager	Best practice	Pre-Clearing Survey Reports
FF8	Pre-clearing surveys will be carried out by the Project Ecologist to identify or confirm the location of: <ul style="list-style-type: none"> Threatened flora and provide guidance Threatened fauna and provide guidance on 	Project Ecologist	Prior to construction	Project Ecologist Environment & Sustainability Manager	REMM B1 G40	Pre-Clearing Survey Reports

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	<p>subsequent relocation if required, in accordance with Appendix D</p> <ul style="list-style-type: none"> • Hollow bearing trees or nest bearing trees • Any trees which may be retained • Pathogens and provide subsequent guidance on mitigation measures to be implemented • Noxious and priority weeds present within the Project area. 					
FF9	<p>Tree removal, pruning and maintenance work will be carried out by an arborist with a minimum AQF Level 3 qualification in accordance with AS 4373-2007 Pruning of Amenity Trees and the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998) and advice provided by an arborist with a minimum AQF Level 5 qualification in arboriculture (or equivalent).</p>	<p>Vegetation Clearing Work Crew Project Arborist</p>	<p>Prior to construction Construction</p>	<p>Project / Site Engineers Foreman / Leading Hand Environmental Coordinator</p>	<p>REMM B8</p>	<p>Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists</p>

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF10	During clearing operations, protective fencing to mark the limits of clearing (i.e. 'no-go' areas) surrounding the construction footprint will be installed. The limits of clearing will be marked in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RMS Projects.	Fencing and Signage Protocol (Appendix F)	Construction	Survey Manager Engineer	CoA E174 REMM B5 G36 G40	Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists
FF11	Any damage to no-go zone fencing or signage must be reported to the site supervisor or Environmental Coordinator immediately.		Construction	Foreman Environmental Coordinator	Best practice	Daily Pre-Start Inspections Environmental Inspection Checklists
FF12	HBT would be cleared using controlled felling techniques, where possible and in consultation with the Project Ecologist.	Vegetation Clearing Work Crew Project Ecologist	Construction	Foreman Project Ecologist	G36 Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RMS Projects	Post-Clearing Reports
FF13	Felled HBT will be inspected for wildlife by the Project Ecologist or wildlife handler who will	Project Ecologist	Construction	Foreman Project Ecologist	G36	Post-Clearing Reports

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	provide guidance on subsequent relocation or alternative management measures if required.				Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RMS Projects	
FF14	Where works have the potential to impact upon the root zone of trees located outside of the clearing limits, protection of these trees will be carried out in consultation with a suitably qualified arborist. Tree management protocols and tree management plans will be developed (in accordance with the requirements of AS 4970-2009) for these trees.	Project Ecologist Project Arborist	Prior to construction Construction	Foreman Environmental Coordinator Project Ecologist	REMM B7	Pre-Clearing Survey Reports
FF15	Equipment storage, vehicle parking and stockpile areas are to be located in cleared areas and not within drip zones of trees that are located outside of the clearing limits.		Prior to construction Construction	Foreman Environmental Coordinator	REMM B5 REMM B7 G40	Daily Pre-Start Inspections Environmental Inspection Checklists
FAUNA MANAGEMENT						

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF16	<p>Prior to removing/clearing any vegetation, or demolition of structures identified as potential roosting sites for microbats, pre-clearing/demolition inspections will be carried out.</p> <p>The inspections, and any subsequent relocation of species and associated management/offset measures will be conducted by the Project Ecologist.</p> <p>Surveys for the presence of microbat roosting will be carried out to cover the period of roosting, as recommended by the Project Ecologist.</p>	Project Ecologist	Construction	Foreman Project Ecologist	CoA E175	Pre-Clearing Survey Reports
FF17	A Microbat Management Strategy will be prepared if the results of the pre-clearing/demolition inspections (refer to FF14) identify the presence of microbats within the Project footprint. If required, the measures identified in the Microbat Management Strategy shall be implemented for the Project.	Microbat Management Strategy	Prior to construction Construction	Project Ecologist Environment & Sustainability Manager	CoA E176	Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF18	Any displaced or injured fauna encountered during the Project, would be managed in accordance with the M4-M5 Link Mainline Tunnels Fauna Handling and Rescue Procedure (Appendix D of this FFMP).	Fauna Handling and Rescue Procedure Project Ecologist	Prior to construction Construction	Foreman Project Ecologist Environmental Coordinator	FFMP Appendix D G36	Project Ecologist Reports
NOISE, VIBRATION, LIGHT AND DUST						
FF19	Ensure environmental controls to minimise noise, vibration, light and dust are in place at all compound sites, particularly compounds operating on a 24-hour basis.	Site Plans	Construction	Environmental Coordinator Foreman	Best practice	Environmental Inspection Checklists Environmental Audit Checklists
PESTS AND DISEASES						
FF20	Weeds within the construction footprint would be managed in accordance with the Weed Management Protocol (Appendix E of this FFMP). This includes management prior to vegetation clearing and during construction, disposal of cleared weed material to a facility licenced to receive green waste	Weed Management Protocol	Prior to construction Construction	Environmental Coordinator	G40 FFMP Appendix E	Environmental Inspection Checklists Environmental Audit Checklists

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	or managed in accordance with local council requirements, and monitoring weed growth within and directly adjacent to Project areas.					Waste Tracking Sheets
FF21	Weeds outside of hoardings would also be managed in accordance with the Weed Management Protocol (Appendix E of this FFMP)	Weed Management Protocol	Prior to construction Construction	Environmental Coordinator	G40 FFMP Appendix E	Environmental Inspection Checklists Environmental Audit Checklists Waste Tracking Sheets
FF22	Machinery will be checked to ensure free from mud and vegetation prior to entering the Project construction sites to prevent the spread of weeds or pathogens. Equipment not found in a clean state will not be permitted to be used on site.		Construction	Foreman Plant Manager	Best practice	Plant Inspection Checklists
REHABILITATION						
FF23	At the completion of construction, complementary landscaping using endemic species (as first preference) and	UDLP	Post-construction	Environment & Sustainability Manager	CoA E174	UDLP As-Built Drawings

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	locally native species will be carried out.			Project Manager		Independent Certification
FF24	<p>The Project will be designed to retain as many trees as possible. Where trees are to be removed, the Project must provide a net increase in the number of replacement trees.</p> <p>Replacement trees will be planted within, and on public land up to 500 metres from the Project boundary.</p> <p>Replacement tree plantings can be undertaken beyond 500 metres on public land within the local government areas to which the Project approval applies if no more plantings are practicable within and up to 500 metres from the Project boundary.</p> <p>The location of the trees will be determined in consultation with the relevant council.</p>	<p>Design of LSBJV's ancillary facilities</p> <p>Fencing and Signage Protocol (Appendix F)</p>	Post-construction	<p>Environment & Sustainability Manager</p> <p>Project Manager</p>	CoA E177	<p>UDLP</p> <p>As-Built Drawings</p> <p>Independent Certification</p>
FF25	Replacement trees will have a minimum pot size of 75 litres except where the plantings are consistent with the pot sizes		Post-construction	Environment & Sustainability Manager	CoA E178	<p>UDLP</p> <p>As-Built Drawings</p>

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	specified in a relevant authority's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant council.			Project Manager		Independent Certification
FF26	<p>LSBJV will submit to the Secretary a report which details the type, size number and location of replacement trees.</p> <p>The report will demonstrate how any replacement plantings with a pot size less than 75 litres are consistent with the requirements of CoA E178. This report will be submitted to the Secretary one month prior to operation.</p>		Construction	Environment & Sustainability Manager	CoA E179	UDLP As-Built Drawings
FF27	As many trees as possible will be retained during construction. In the event that tree removal cannot be avoided, a tree replacement strategy will be prepared. Replacement trees will be included in the relevant UDLP. Opportunities for the provision of replacement trees outside the Project boundary		Post-construction	Environment & Sustainability Manager Project Manager	REMM B6	UDLP As-Built Drawings Independent Certification

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
	will be investigated in consultation with local councils.					
AQUATIC MANAGEMENT						
FF28	Construction Water Treatment Plants will be designed in accordance with ANZECC 2000 water quality guidelines	WTP Design	Prior to construction	Environment & Sustainability Manager Project Manager	REMM B1 REMM SW10	As-Built Report
FF29	Ensure soil and water management measures are implemented and maintained in accordance with the Construction Soil and Surface Water Management Plan (SSWMP)	Soil Conservationist	Prior to construction Construction	Environment & Sustainability Manager	Best practice	Progressive Erosion and Sediment Control Plans (PESCP) SSWMP Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists
MAINTENANCE DURING CONSTRUCTION						

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF30	Revegetation/rehabilitation areas will be monitored during construction for performance and weed invasion during weekly site inspections, and any other inspections or audits carried out as part of CEMP requirements. The performance of revegetation and presence of weed infestations would be reported as part of the inspection process, and include actions to be carried out to manage performance.		Construction	Environmental Coordinator Foreman	Best practice FFMP Appendix E	Daily Pre-Start Inspections Environmental Inspection Checklists Environmental Audit Checklists

7 Compliance management

7.1 Roles and responsibilities

The LSBJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this Plan.

7.2 Training

All personnel, including employees, contractors, sub-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:

- Existence and requirements of this sub-plan
- Relevant legislation
- Specific species likely to be affected by the construction work and how these species can be recognised
- Fauna rescue requirements
- Weed control measures
- General flora and fauna management measures
- Specific responsibilities for the protection of flora and fauna.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

7.3 Monitoring and inspections

Inspections of sensitive areas and activities with the potential to impact flora and fauna will occur for the duration of the Project.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 3.9.1 and 3.9.2 of the CEMP.

7.4 Auditing

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

Audit requirements are detailed in Section 3.9.3 of the CEMP.

7.5 Reporting

Reporting requirements and responsibilities are documented in Section 3.9.5 of the CEMP. There are specific reporting requirements associated with additional survey work and monitoring including the results of pre-clearing surveys.

8 Review and improvement

8.1 Continuous improvement

Continuous improvement of this plan 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
- Make comparisons with objectives and targets.

8.2 FFMP update and amendment

The processes described in Section 3.9 to Section 3.13 of the CEMP may result in the need to update or revise this Plan.

Any revisions to the FFMP will be in accordance with the process outlined in Section 1.5 of the CEMP.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to 3.11.2 of the CEMP.

Appendix A – Other Conditions of Approval and Revised Environmental Management Measures relevant to this plan

Other Conditions of Approval relevant to the development of this Plan

CoA No.	Condition Requirements	Document Reference
E174	The clearing of native vegetation must be minimised with the objective of reducing impacts to any threatened species, populations and ecological communities to the greatest extent practicable. Impacted vegetation must be rehabilitated with endemic species (in the first instance) and locally native species to the greatest extent practicable.	Table 6-2 – FF2 Table 6-2 – FF3 Table 6-2 – FF4 Table 6-2 – FF10 Table 6-2 – FF23
E175	Prior to removing/clearing any vegetation, or demolition of structures identified as potential roosting sites for microbats, pre-clearing/demolition inspections for microbats and threatened species must be carried out. The inspections, and any subsequent relocation of species and associated management/offset measures, must be carried out under the guidance of a suitably qualified and experienced ecologist. Surveys for the presence of microbat roosting must be undertaken to cover the period of roosting, under guidance of a suitably qualified and experienced ecologist. Survey methodologies must be incorporated into the Construction Flora and Fauna Management Sub-plan required under Condition C4 and Site Establishment Management Plan required under Condition C22, as relevant.	Section 6.1 Table 6-2 – FF16
E176	The Proponent must prepare a Microbat Management Strategy in the case that microbats or evidence of roosting are identified during pre-clearing/demolition surveys. The strategy must detail short- and long-term measures to avoid, minimise and mitigate impacts to these species.	Section 6.1 Table 6-2 – FF17
E177	The CSSI must be designed to retain as many trees as possible. Where trees are to be removed, the Proponent must provide a net increase in the number of replacement trees. Replacement trees must be planted within, and on public land up to 500 metres from the CSSI boundary. Replacement tree plantings can be undertaken beyond 500 metres on public land within the local government areas to which the CSSI approval applies if no more plantings are practicable within and up to 500 metres from the CSSI boundary. The location of the trees must be determined in consultation with the relevant authority(s).	Section 6.6 Table 6-2 – FF24

CoA No.	Condition Requirements	Document Reference
E178	Replacement trees are to have a minimum pot size of 75 litres except where the plantings are consistent with the pot sizes specified in a relevant authority's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant authority(s).	Section 6.6 Table 6-2 – FF25
E179	The Proponent must submit to the Secretary a report which details the type, size, number and location of replacement trees. The report must demonstrate how any replacement plantings with a pot size less than 75 litres are consistent with the requirements of Condition E178. The report must be submitted to the Secretary one (1) month prior to operation.	Section 6.6 Table 6-2 – FF26

Revised Environmental Mitigation Measures relevant to the development of this Plan

Outcome	Ref #	Commitment	Timing	FFMP Reference
Impact on biodiversity values	REMM B1	<p>A Construction Flora and Fauna Management Plan (CFFMP) will be developed and implemented during construction. The CFFMP will include the following:</p> <ul style="list-style-type: none"> • Identification of guidelines relevant to construction, the matters they apply to and what is required to ensure compliance • Pre-disturbance inspection requirements to identify features of biodiversity conservation significance and select appropriate management measures and environmental controls • Management measures and environmental controls to be implemented before and during construction including: <ul style="list-style-type: none"> ◦ An unexpected threatened species finds procedure 	Construction	<p>This plan</p> <p>Section 6.1</p> <p>Section 6.2</p> <p>Section 6.4</p> <p>Table 6-2 – FF8</p> <p>Table 6-2 – FF28</p> <p>Appendix B</p> <p>Appendix C</p> <p>Appendix D</p> <p>Appendix E</p>

Outcome	Ref #	Commitment	Timing	FFMP Reference
		<ul style="list-style-type: none"> ◦ Section 3.3.2 Standard precautions and mitigation measures of the <i>Policy and Guidelines for Fish Habitat Conservation and Management Update 2013</i> (DPI-Fisheries 2013) ◦ Tree assessment and management protocols consistent with AS 4970-2009 Protection of trees on development sites ◦ Weed management protocols. <p>The plan will include management measures outlined in Appendix S (Technical paper: Biodiversity) and from any additional assessments carried out during detailed design and project delivery as relevant."</p>		
Loss of trees	REMM B5	<p>The CFFMP will include measures to manage potential impacts on trees. Measures will include:</p> <ul style="list-style-type: none"> • The establishment of tree protection zones • Ground protection measures for trees to be retained 	Construction	<p>Table 6-2 - FF5 Table 6-2 - FF6 Table 6-2 - FF10 Table 6-2 - FF15 Appendix B</p>
Loss of trees	REMM B6	<p>As many trees as possible will be retained during construction. In the event that tree removal cannot be avoided, a tree replacement strategy will be prepared. Replacement trees will be included in the relevant UDLP. Opportunities for the provision of replacement trees outside the project boundary will be investigated in consultation with local councils.</p>	Construction	<p>Table 6-2 - FF27 M4-M5 Link Mainline Tunnels UDLP</p>
Loss of trees	REMM B7	<p>The CFFMP will include tree management protocols and provision for the development of tree management plans (in</p>	Construction	Table 6-2 - FF14

Outcome	Ref #	Commitment	Timing	FFMP Reference
		accordance with the requirements of AS 4970-2009) where required for specific trees. Protection of trees on development sites will be carried out in consultation with an arborist with a minimum Australian Qualifications Framework (AQF) Level 5 qualification in arboriculture for each tree proposed for retention where works associated with the project have the potential to impact on the tree root zone.		Table 6-2 - FF15
Loss of trees	REMM B8	Tree removal, pruning and maintenance work will be carried out by an arborist with a minimum AQF Level 3 qualification in accordance with AS 4373-2007 Pruning of Amenity Trees and the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998) and advice provided by an arborist with a minimum AQF Level 5 qualification in arboriculture (or equivalent).	Construction	Table 6-2 - FF9
Loss of trees	REMM OB9	The UDLP will include compensatory planting for trees removed by the project. The plan will include: <ul style="list-style-type: none"> • A tree replacement strategy • Species recommendations for the landscape design to consider, including foraging trees for the Grey-headed Flying-fox • Relevant project specific rehabilitation and revegetation measures associated with the M4 East and New M5 projects, where there is an overlap in use of project footprint. 	Operation	M4-M5 Link Mainline Tunnels UDLP

Appendix B –Pre-Clearing Permit



M4-M5 Link Mainline Tunnels Pre-Clearing Permit

This Pre-Clearing Permit must be completed and approved by the Environmental Manager at least **2 weeks prior** to the commencement of any clearing operations onsite. "Clearing" for the purpose of this permit is defined as any impact to vegetation (including trees, shrubs and grasses).

*Note: G40 Hold point must be submitted to RMS for release at least **7 days prior** to proposed clearing*

Permit No: 1	Permit Date:				
Proposed Commencement Date:	Proposed Completion Date:				
Description of Proposed Clearing:					
Description of Site/Location:					
Plant and Machinery to be used:					
Engineer Responsible for Works:					
Foreman Responsible for Works:					
Environmental Coordinator Responsible for Works:					
# Compliance Checks	Yes No N/A Comments				
Section 1: Planning & Approvals – Environmental Staff to Complete					
1.	Is the proposed vegetation clearing approved within the Project Approval or equivalent approval document? Works are within the construction boundary?				
2.	Has a Clearing & Grubbing Plan been prepared for the proposed works?				
3.	Have pre-clearing surveys and inspections been undertaken by the Project Ecologist to identify any habitat features, threatened species or weeds?				
4.	Has an inspection been conducted by a level 5 Arborist to identify unsound trees and provide advice on clearing and protection of trees?				
5.	Does the Site ESCP detail required ERSED controls for clearing operations?				
6.	Has the G40 hold point been released? Approval Attached?				
Name	Position	Signature	Date		
Personnel Applying for Permit:					
Preliminary Approval of Permit:					
Grant Sainsbery	Environment & Sustainability Manager				



#	Compliance Checks	Yes	No	N/A	Comments		
Section 2: Prior to Clearing – Environmental Staff to Complete							
	Will tree removal, pruning and maintenance be carried out by a Level 3 arborist following advice from an inspection by a Level 5 arborist?						
	Have clearing limits been delineated in accordance with the Fencing and Signage Protocol? (Attachment 3)						
	Has a site walk been completed with the Foreman, Engineer, Environmental Crd and Clearing Contractors to ensure that the extent of clearing is understood?						
	Do works have the potential to impact upon the root zone of trees located outside of the clearing limits? If so, has protection of these trees been carried out in consultation with an arborist?						
	Have all personnel (including sub-contractors) involved in operations been toolboxed on the Clearing & Grubbing Plan and EWMS?						
	Have weeds and exotics been identified and marked with pink tape or similar to be managed separately?						
	Are all equipment, vehicles and stockpiles located in cleared areas and outside of delineated tree drip zones?						
	All required ERSED controls installed prior to clearing in accordance with the ESCP?						
Detail any requirements (additional to those in the EWMS) that personnel must be made aware of prior to commencing works:							
<ul style="list-style-type: none"> • 							
Name		Position		Signature		Date	
Permit Approved by:							



#	Compliance Checks	Yes	No	N/A	Comments
Section 3: Complete after Clearing – Environmental Staff to Complete					
1.	Was any fauna displaced/captured/injured during clearing activities? If yes, was the Fauna Handling and Rescue Procedure followed and the Project Ecologist contacted?				
2.	If required, has post-clearing delineation fencing and signage been installed to protect retained vegetation?				
3.	Have holes from clearing been backfilled to a compaction level consistent with adjacent land?				
4.	Have noxious weeds and exotics been removed and disposed of separately at an appropriately licenced facility in accordance with the Weed Management Protocol?				
5.	Are ERSED controls maintained or re-installed post-clearing in accordance with the ESCP?				

Clearing Summary (to inform tree replacement requirements)*		
Number	Tree Type / Species	Comments

* To inform tree replacement strategy, tree is defined in Australian Standard – 4373-2007 as 'A long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks.

Please return this completed Pre-Clearing Permit to the Environment Team.






Attachment 1 –Works location Map



Attachment 2 – Pre-Clearing Ecologist Report



Attachment 3 – Fencing and Signage Protocol

FENCING AND SIGNAGE PROTOCOL		
	<p>Pre-clearing limits (established prior to clearing)</p>	<p>Must be installed prior to commencement of clearing.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p>
<p>Spray-painted white "H"</p>	<p>Pre-clearing identification of critical habitat vegetation</p>	<p>Marked by the Project Ecologist within limits prior to the commencement of clearing.</p> <p>Identifies critical habitat including hollow bearing trees and potential hollow bearing trees, trees containing nests, bush rocks and hollow logs.</p>
	<p>Post-clearing limits (replaces pre-clearing limits)</p>	<p>'Post-clearing limits' replace 'pre-clearing limits' to improve the long-term integrity of the delineation.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p>
	<p>Protected environmental sensitive area (replaces pre-clearing limits in high risk environmentally sensitive areas)</p>	<p>Identifies high risk environmentally sensitive areas onsite including heritage sites, threatened species and endangered ecological communities.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p> <p>Contact environmental officer when working in vicinity of protected environmentally sensitive area.</p>

Appendix C – Unexpected Threatened Flora / EEC Procedure

Unexpected Threatened Flora / EEC Procedure

Flora and Fauna Management Sub-plan

M4-M5 Link Mainline Tunnels

August 2018

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Document control

Revision	Date	Description
A	13 June 2018	Draft for internal review
B	19 June 2018	Draft for internal review
C	22 June 2018	Draft for Agency review
D	16 July 2018	Revised draft in response to Agency comments
E	1 August 2018	Revised draft in response to SMC, RMS and ER review
01	14 August 2018	For DPE review
02	28 August 2018	For DPE approval

Distribution of controlled copies

Copy number	Issued to	Version

1 Purpose

This procedure details the actions to be taken when any unexpected threatened flora species and/or Endangered Ecological Community (EEC) is unexpectedly encountered during excavation / construction activities.

2 Induction / Training

Personnel involved in any aspect of activities that have a risk of discovering new threatened species or EECs, such as clearing, will be trained in the requirements of this procedure. Training will include inductions, toolbox talks, pre-starts and targeted training as required.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

3 Scope

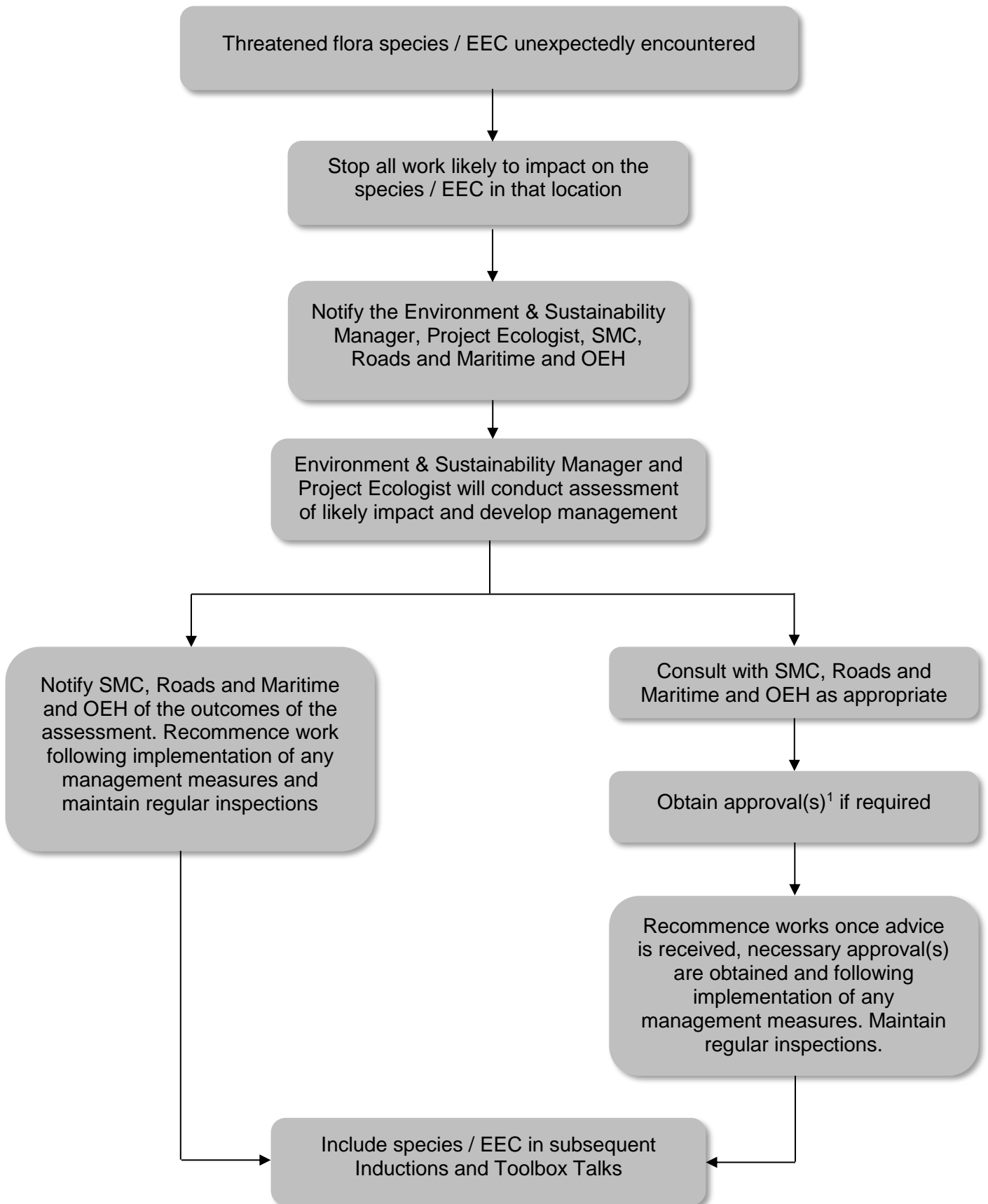
This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened flora species during the project.

(Where threatened fauna is unexpectedly encountered, refer to the Fauna Handling and Rescue Procedure – Appendix C of the Flora and Fauna Management Sub-plan (FFMP)).

4 Procedure

See Figure 1 over page.

Figure 1. Unexpected Threatened Flora Species / EEC Find Procedure Flow Chart



#Note: The Commonwealth Department of Environment is to be consulted if the flora species encountered is listed under the EPBC Act.

1 Approvals may include, but may not be limited to, approval under the EPBC Act, approval of a Consistency Assessment, and/or Project modification from DP&E. It should be noted that consultation with RMS and OEH shall identify the applicable approvals required for the impacts identified.

Appendix D – Fauna Handling and Rescue Procedure

Fauna Handling and Rescue Procedure

Flora and Fauna Management Sub-plan

M4-M5 Link Mainline Tunnels

August 2018

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Document control

Revision	Date	Description
A	13 June 2018	Draft for internal review
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1 Purpose

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

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

2 Induction / Training

Personnel involved in any aspect of fauna handling or rescue, or those activities where this may be required, will be trained in the requirements of this procedure. Training will include inductions, toolbox talks, pre-starts and targeted training as required.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

3 Scope

This procedure is applicable to all activities that may lead to fauna handling or rescue, such as construction or demolition activities, on the project.

4 Procedure

4.1 Discovery of fauna on Project Site during Construction Activities

If fauna is discovered on the project site during site construction activities and there is a risk these activities 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 Superintendent who is then to notify the Environment & Sustainability Manager or Project Ecologist, if the latter is present onsite
2. Preferably allow fauna to leave the area without intervention
3. If immediately available, use a licensed fauna ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling.
4. If no ecologist or wildlife carer is available on site and the animal is able to be handled safely, 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. If time permits, call ecologist or fauna rescue for advice
 - b. Cover larger animals with a towel or blanket and place in a cardboard box and/or canvas bag
 - c. Place smaller animals in a cotton bag, tied at the top
 - d. Keep the animal in a quiet, cool, ventilated and dark located away from noisy construction activities

- e. Aquatic fauna are to be placed in plastic aquaria or a plastic bag with sufficient amount of water. Frogs will be transported in moistened plastic bags (1 frog/bag) with a small amount of leaf litter. The translocation of frogs shall be in accordance with the Hygiene Protocol for the Control of Disease in Frogs (see below).

Notes on fauna handling:

- 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 WIRES representative(s).
- Note 2. If handling bats, the handler must be vaccinated against the Australian Bat Lyssavirus (ABL – a form of rabies).
- Note 3. Any frog handling will be carried out in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008). This protocol recommends onsite hygiene precautions be carried out 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)
 - 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
 - b. Record the exact location of the animal/s and provide to the Project Ecologist or appropriate rescue agency (i.e WIRES).
- 6. If not already done, 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 follows:

Agency/business	Contact Number
EMM Consulting – Project Ecologists	(02) 9493 9500
WIRES (to be called if Project Ecologist is not available)	1300 094 737
Mascot Veterinary Hospital	(02) 9317 3337
Five Dock Veterinary Hospital	(02) 9713 7364

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 practicably 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 Environment & Sustainability Manager must:
 - a. Immediately cease all work likely to affect the threatened species
 - b. The Environment & Sustainability Manager shall contact the SMC and Roads and Maritime representatives and inform of the situation.

- c. The Environment & Sustainability Manager shall then contact the following stakeholders, in this order, to determine the appropriate corrective actions and additional safeguards to be carried out:
 - Project Ecologist
 - OEH (131 555)
 - Environmental Representative (ER)
 - Others as instructed by the ER or OEH.

The adequacy of existing safeguards will be reviewed in consultation with the above stakeholders.

8. Environment & Sustainability Manager to record find using the Environmental Incident Reporting process where required following consultation with the SMC and Roads and Maritime representatives. All relevant characteristics of the fauna find should be recorded to the extent practicable (i.e. visual signs of behaviour, habitat, health signs, time date, weather etc).
9. Following consultation with all relevant stakeholders, the Environment & Sustainability Manager shall implement any corrective actions and additional safeguards.
10. Following confirmation by the Environment & Sustainability Manager that all appropriate safeguards have been implemented, construction works shall recommence.
11. Relocation of fauna adjacent to the footprint will be carried out where possible by the Project Ecologist or wildlife rescuer and will be recorded during clearing as part of the ecologists clearing report or on the Weekly Environmental Inspection Checklist for non-clearing activities. 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:
 - a. Sites identified as suitable release points by the Project Ecologist or wildlife rescuer
 - b. Release site will contain similar habitat and occur as close to the original capture location as possible
 - c. If the species is nocturnal, release will be carried out at dusk
 - d. Release would generally not be carried out during periods of heavy rainfall
 - e. Hollow-dependent species, particularly those with dependent young, shall be release into a temporary nest box.
12. All relevant project documentation would be updated to display the new findings and subsequent management measures required. This would include such documents as Flora and Fauna Management Plan (and associated documents) and Sensitive Area Plans (Appendix A6 of the Construction Environmental Management Plan (CEMP)).

4.2 Project Ecologist responsibilities for fauna handling and rescue

The Project Ecologist will follow the relevant steps detailed below:

1. Surveys and rescue will be carried out in accordance with the two stage clearing process:
 - a. During the first stage of clearing (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). Any empty nests or hollows will be relocated or destroyed to prevent fauna returning prior to stage two clearing
 - b. During the second stage of clearing (habitat tree removal at least 24 hours after the first stage of clearing) all fauna captured will be relocated into areas of suitable habitat adjacent to the project site. To minimise stress to native fauna and/or remove the risk of further injury the Project Ecologist shall handle fauna in accordance with Section 5.1(4).
2. Relocation of fauna captured during the clearing and associated works will generally take place in accordance with Section 5.1(11).
3. The Project Ecologist will record and provide the capture and relocation data in the post clearing report. Data will include the species, number and general health of each individual.
4. In the event an animal is injured the fauna services and local veterinary surgeries contact details are detailed in 5.1(6) above.
5. In the event rescue service and/or local veterinary service cannot be contacted or non-native fauna are captured, the most appropriate euthanasia will be administered by the Project Ecologist (i.e. cervical dislocation for small vertebrates, ice slurry for introduced fish). This is to occur in accordance with applicable guidelines and legislative requirements.
6. If the fauna species is identified as a threatened species that is not a species identified in the FFMP, notify the Environmental Officer or Environment & Sustainability Manager who will follow steps 5.1(7) to 5.1(11).

Appendix E – Weed Management Protocol

Weed Management Protocol

Flora and Fauna Management Sub-plan

M4-M5 Link Mainline Tunnels

August 2018

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1 Purpose

This procedure details the weed management and control practices to be implemented throughout the construction phase of the project, to minimise the threat to remnant vegetation within the project area and other remnant vegetation in the local area.

2 Induction / Training

All project personnel are to be inducted on the existence of this procedure during the Project Induction and in more detail as required in Site Inductions and regular Toolbox Talks.

All personnel managing and using pesticides will received appropriate training prior to commencing work.

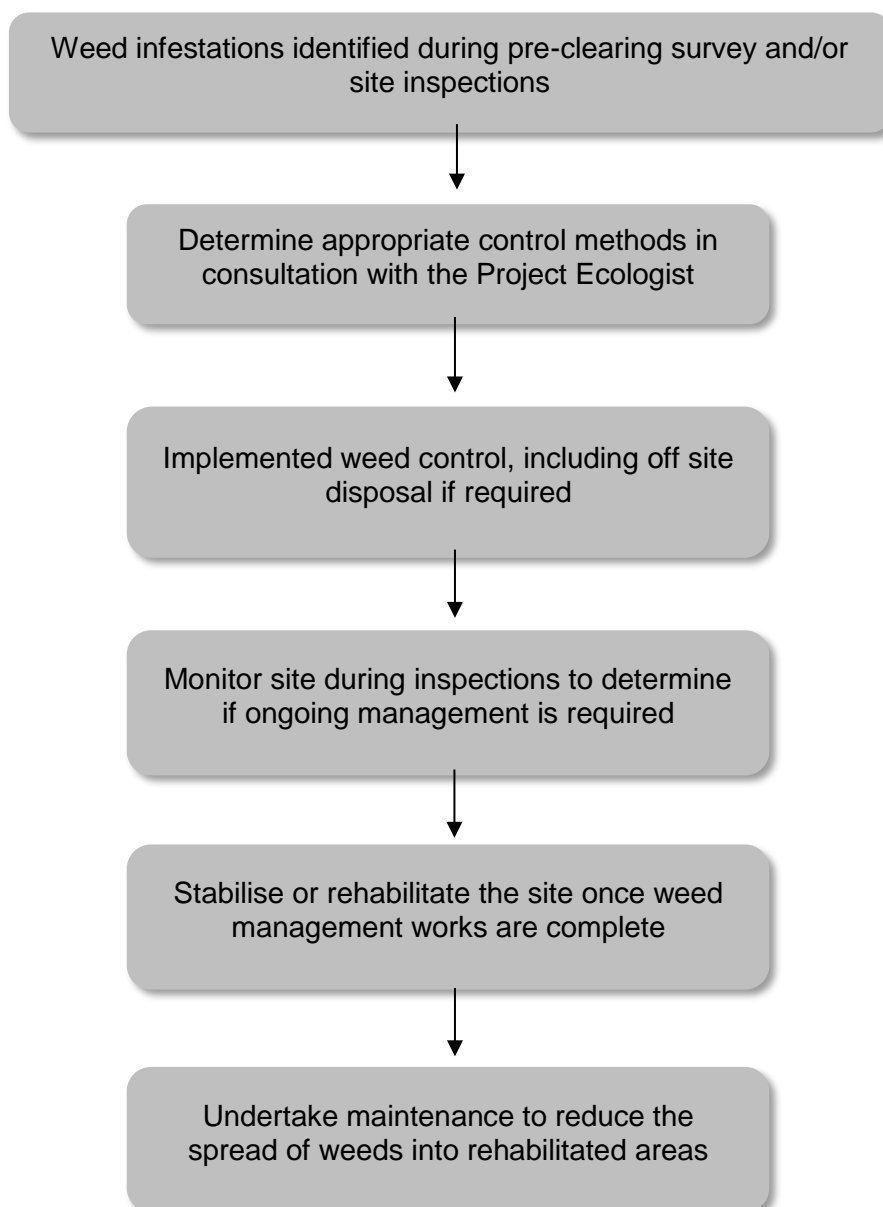
Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

3 Scope

The project footprint consists of areas which are highly modified due to urban development, and other areas supporting disturbed native vegetation and weeds. Vegetation, including weeds and exotics, would be cleared to facilitate construction of the project. Therefore, this procedure focuses on weed control prior to vegetation clearance, weed management during clearing, and progressive weed control throughout the construction phase.

Weed management within the project site will be developed in consultation with the Project Ecologist to ensure the most appropriate methods are developed.

The flow chart below outlines the weed management process.



4 Procedure

1. Pre-clearing surveys undertaken by the Project Ecologist would identify critical weeds requiring specific management, such as large infestations and/or priority weeds, prior to and during vegetation clearing.
2. Critical weeds, in particular priority weeds, would be identified and mapped within a pre-clearing report, which would also outline appropriate control methods for specific areas and weed species. No specific treatment is proposed for common weed species that do not pose a threat to areas of remnant native vegetation.
3. Public notification of pesticide use must be in accordance with Roads and Maritime Specification G36 Annexure G36/H.
4. Weed control would ideally be undertaken where possible prior to the development of seed, which generally occurs during the summer period. Where this is not possible seeds should be removed from plants wherever practicable, and contained prior to disposal.
 - Control methods include hand removal, herbicide application, and mechanical removal. Weeds requiring hand or mechanical removal, including contaminated topsoil, would require disposal by encapsulation (deep burying) or to an approved waste management facility
 - When pesticides are to be used adjacent to, or across the road from a 'sensitive place'
 - Carry out mechanical means of pest control (such as mowing or slashing) where feasible; or
 - Carry out hand-held application of pesticides where mechanical means of pest control are not feasible.
 - Only pesticides registered for use near water may be used near water
 - Avoid applying pesticides;
 - On hot days when plants are stressed
 - After the seed has set
 - Within 24 hours of rain or when rain is imminent
 - When winds will cause drift of pesticides into non-target areas.
 - Any machinery arriving to site would be inspected to ensure they are free of soil or vegetative matter. Machinery involved in weed management activities would be thoroughly cleaned to remove any plant material or soil, prior to the commencement of construction.
5. A Records Sheet will be completed within 24 hours of applying pesticide and a copy submitted to the Environment & Sustainability Manager and SMC and Roads and Maritime representatives.

You are exempt from completing the Records Sheet, when all of the following are satisfied;




 - The pesticide is, or part of a product that is widely available to the general public at retail outlets
 - 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 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.
6. The project area would be continually monitored for weed invasion during weekly site inspections, and any other inspections or audits undertaken as part of CEMP requirements. The presence of weed infestations would be reported as part of the inspection process, and





include actions to be undertaken to manage these infestations. This includes weeds outside of hoardings.





7. Following weed removal, any exposed areas would be stabilised any/or rehabilitated to reduce erosion, and minimise the potential for further weed invasion.
8. As with Point 4, rehabilitated sites would be monitored during inspections, with weed management to be undertaken if required to manage any new infestations.


5 Identified weeds

The table below outlines weeds which have been previously identified during investigations associated with the project EIS, and may be present on site.




Scientific Name	Common Name	<i>Greater Sydney Regional Strategic Weed Management Plan 2017-2022</i> classification	Photo
<i>Anredera cordifolia</i>	Madeira Vine	State Priority weed (Asset Protection)	
<i>Asparagus asparagoides</i>	Bridal Creeper	State Priority weed (Asset Protection)	
<i>Lantana camara</i>	Lantana	State Priority Weed (Asset Protection)	

Scientific Name	Common Name	Greater Sydney Regional Strategic Weed Management Plan 2017-2022 classification	Photo
<i>Rubus fruticosus</i>	Blackberry	State Priority Weed (Asset Protection)	
<i>Cestrum parqui</i>	Green Cestrum	Regional Priority Weed (Asset Protection)	
<i>Cenchrus echinatus</i>	Spiny Burr Grass	Other weeds of regional concern	
<i>Ligustrum lucidum</i>	Broad-leaved Privet	Other weeds of regional concern	

Scientific Name	Common Name	Greater Sydney Regional Strategic Weed Management Plan 2017-2022 classification	Photo
<i>Ligustrum sinense</i>	Small-leaved Privet	Other weeds of regional concern	
<i>Parietaria judaica</i>	Pellitory	Other weeds of regional concern	
<i>Cortaderia selloana</i>	Pampas Grass	Weed classified by Inner West and City of Sydney LGAs under the Noxious Weeds Act 1993 (repealed), identified during the EIS process.	
<i>Oxalis sp.</i>	Oxalis	Weed classified by Inner West and City of Sydney LGAs under the Noxious Weeds Act 1993 (repealed), identified during the EIS process.	

Scientific Name	Common Name	Greater Sydney Regional Strategic Weed Management Plan 2017-2022 classification	Photo
<i>Ricinus communis</i>	Castor Oil Plant	Weed classified by Inner West and City of Sydney LGAs under the Noxious Weeds Act 1993 (repealed), identified during the EIS process.	

Appendix F – Fencing and Signage Protocol

FENCING AND SIGNAGE PROTOCOL		
	<p>Pre-clearing limits (established prior to clearing)</p>	<p>Must be installed prior to commencement of clearing.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p>
<p>Spray-painted white “H”</p>	<p>Pre-clearing identification of critical habitat vegetation</p>	<p>Marked by the Project Ecologist within limits prior to the commencement of clearing.</p> <p>Identifies critical habitat including hollow bearing trees and potential hollow bearing trees, trees containing nests, bush rocks and hollow logs.</p>
	<p>Post-clearing limits (replaces pre-clearing limits)</p>	<p>‘Post-clearing limits’ replace ‘pre-clearing limits’ to improve the long-term integrity of the delineation.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p>
	<p>Protected environmental sensitive area (replaces pre-clearing limits in high risk environmentally sensitive areas)</p>	<p>Identifies high risk environmentally sensitive areas onsite including heritage sites, threatened species and endangered ecological communities.</p> <p>Do not access, clear, store material, store plant or store equipment outside of delineated area.</p> <p>Contact Environmental Coordinator when working in vicinity of protected environmentally sensitive area.</p>