APPENDIX B2

Flora and Fauna Management Plan

The Northern Road Upgrade - Stage 3 North Project

MARCH 2017

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Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
DPI	Department of Primary Industries (Fishing and Aquaculture)
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EWMS	Environmental Work Method Statements
FFMP	Flora and Fauna Management Plan
FM Act	*Fisheries Management Act 1994*
NPW Act	*National Parks and Wildlife Act 1974*
NW Act	*Noxious Weeds Act 1993*
OEH	Office of Environment and Heritage
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
TSC Act	*Threatened Species and Conservation Act 1995*

1 Introduction

1.1 Context

This Flora and Fauna Management Plan (FFMP) forms part of the Construction Environmental Management Plan (CEMP) for The Northern Road Upgrade - Stage 3 North Project (the Project).

This FFMP has been prepared to address the requirements of the Review of Environmental Factors (REF), the Roads and Maritime Services (RMS) G38 and G40 specification requirements, SWTC Appendix 4 and all applicable legislation.

1.2 Background

The REF assessed the impacts of construction and operation of the Project on flora and fauna.

As part of REF development, a detailed flora and fauna assessment was prepared and included in the REF as Appendix F – Biodiversity Assessment.

The REF proposed the implementation of the environmental safeguards, including further survey and monitoring.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the CEMP.

The FFMP is part of the Lendlease environmental management framework for the Project, as described in *Section 4.1 of the CEMP*. In accordance with REF Environmental Safeguard (ES) B1, this Plan has been developed to include:

- Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas (Refer Sensitive Area Plans, Appendix A5 to CEMP);
- Requirements set out in the Landscape Guideline (RTA, 2008);
- Pre-clearing survey requirements;
- Procedures for unexpected threatened species finds and fauna handling;
- Procedures addressing relevant matters specified in the Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013); and
- Protocols to manage weeds and pathogens.

Environmental mitigation measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS) and the Project Sensitive Area Plans.

EWMS 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, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by Lendlease personnel and contractors.

The review and document control processes for this Plan are described in *Chapter 9 of the CEMP*.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how construction impacts on biodiversity 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 Project corridor;
- Ensure measures are implemented to address the relevant REF requirements; and
- Ensure measures are implemented to comply with all relevant legislation and other requirements as described in *Section 3.1 of this Plan*.

2.3 Targets

The following targets have been established for the management of flora and fauna impacts during the Project:

- Ensure full compliance with the relevant legislative requirements;
- No disturbance to flora and fauna outside the approved construction footprint and associated access tracks and site compounds, unless directed by Roads and Maritime Services to remove unsound tree's;
- No increase in distribution of weeds currently existing within the Project areas;
- No new weeds introduced to the Project areas;
- No transfer of plant diseases or pathogens to or from the Project work areas;
- 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 where applicable;
- No fauna mortality during construction;
- Avoid spread of feral animals as a result of construction;
- No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat within the design capabilities of protection measures, such as sediment basins and spill containment systems; and
- Minimise barriers to fauna movement and fish passage.

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);
- *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); and
- *Native Vegetation Act 2003 (NSW).*

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 Plan include:

- RMS QA Specification G36 – Environmental Protection (Management System);
- RMS QA Specification G40– Clearing and Grubbing;
- RMS QA Specification R176 – Native Seed Collection;
- 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 *Biodiversity Guidelines* (September 2011);
- RMS *Landscape Guideline* (RTA, 2008);
- *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI Fisheries, 2013);
- *Fish Passage Requirements for Waterway Crossings* (Fairfull & Witheridge 2003);
- 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;
- Australian Network for Plant Conservation. 2004. *Guidelines for the Translocation of Threatened Plants in Australia*, 2nd Edition; and

- Relevant recovery plans, priority action statements and best practice guidelines.

3.2 REF Environmental Safeguards

The REF Environmental Safeguards (ES) 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 REF Environmental Safeguards relevant to the FFMP

ES No.	Condition Requirements	Document Reference
B1	A Flora and Fauna Management Plan will be prepared in accordance with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas; • Requirements set out in the Landscape Guideline (RTA, 2008); • Pre-clearing survey requirements; • Procedures for unexpected threatened species finds and fauna handling; • Procedures addressing relevant matters specified in the Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013); and • Protocols to manage weeds and pathogens.	*Sensitive Area Plans (SAP's)* *Urban Design Plan (UDP)* *Section 7.3* *Appendix D of this Plan* *Section 4.1.5 of this Plan.* *Appendix B of this Plan*
B2	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	*Design*
B3	An experienced ecologist will be engaged to undertake the preclearing processes for the proposal and inform the Flora and Fauna Management Plan as required, including the following activities: • In the weeks prior to commencement of clearing (or demolition in the case of bridges and culverts): – Confirm the locations of previously identified biodiversity features (including bridges and culverts as potential habitat for microbats, and hollow bearing trees); and	*Section 7.3*

ES No.	Condition Requirements	Document Reference
	– Identify any fauna that have the potential to be disturbed, injured or killed as a result of clearing activities. • In the 24-hour period prior to commencement of clearing (or demolishing structures in the case of bridges and culverts), licensed wildlife carers and/or ecologists should: – Capture and/or remove and relocate (to previously identified suitable locations) fauna that have the potential to be disturbed, injured or killed as a result of clearing activities; and – Inform clearing contractors of any changes to the sequence of clearing because of fauna present if required.	
B4	An ecologist will be engaged to develop and assist in the implementation of a nest box strategy to mitigate impacts from the removal of hollow bearing trees, including nest box monitoring requirements during construction.	*NBPoM*
B5	All personnel working on site will receive training to ensure awareness of requirements of the Flora and Fauna Management Plan and relevant statutory responsibilities. Site specific training will be given to personnel when working in the vicinity of areas of identified biodiversity value that are to be protected.	*Section 7.2*
B6	Best practice methods for aquatic habitat management will be implemented during detailed design and construction including but not limited to: • Design of culverts in accordance with Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge 2003); • Minimise instream and riparian disturbance; and • Develop and implement a water quality monitoring program during construction in and around waterways.	*Section 3.1.3, SW29 of SWMP* *Progressive Erosion and Sediment Control Plans* *Appendix A of SWMP*
B7	Consistent with the Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects, and any specific requirements of the approved Flora and Fauna Management Plan, locally indigenous plant species will be used during rehabilitation and revegetation.	*Revegetation Management Plan (RMP)*
B8	Any soil or other materials imported to the site for use in restoration or rehabilitation will be certified free from weeds and pathogens, or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.	*Appendix B of this Plan*

ES No.	Condition Requirements	Document Reference
B9	Consistent with any specific requirements of the approved Flora and Fauna Management Plan, a post-construction monitoring program will be implemented to assess effective implementation of the safeguards and mitigation measures, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements to support the protection of native flora and fauna.	*Section 7.3*

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 are the REF and Appendix F – Biodiversity Assessment. 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 Endangered ecological communities

Two threatened ecological communities (TECs) listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) are present in the study area:

- Cumberland Plain Woodland in the Sydney Basin Bioregion (listed as critically endangered); and
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (listed as endangered).

The REF did identify the presence of some Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, however as this vegetation is present in manmade dams used for stormwater control in otherwise dry areas it does not qualify as the TEC.

The location of these TECs in relation to the Project is shown on the Sensitive Area Plans included at Appendix A5 of the CEMP.

No Commonwealth EPBC Act listed endangered ecological communities (EECs) were identified in the study area.

4.1.2 Threatened or otherwise significant plant species

No threatened flora species were recorded in the study area during the field survey. Furthermore, the habitats in the study area are not considered optimal for any of the threatened flora species due to the degraded nature of the vegetation, mowing and/or grazing regimes, disturbance to the soil, and dominance of exotic species. Overall, threatened flora species are considered to have a low likelihood of occurrence or are unlikely to occur (Jacobs 2016).

4.1.3 Fauna habitats

Natural fauna habitats in the locality have been largely removed and/or modified for residential development and road infrastructure. Although somewhat isolated and fragmented, habitat in the study area includes:

- Remnant or regrowth grassy and shrubby woodland;
- Riparian and aquatic habitats;
- Planted native species mix; and
- Cleared and modified agricultural and residential landscapes.

The habitat values for fauna in the study area are generally limited. The vegetation is mostly composed of young native landscape plantings and the ground layer is heavily grazed or mown. As such, the overall condition of fauna habitat is considered poor, where only species that can tolerate human disturbance or thrive on human presence survive.

The habitats in the study area provide shelter, breeding and foraging resources for several common frog, reptile and bird species, and is likely to provide habitat for common mammals such as the Common Brushtail Possum. No Cumberland Plain Land Snails were found in the study area and this species is not expected to occur due to the absence of leaf litter and bark that would provide sheltering opportunities and the roadside mowing regime that would kill any snail that were present. There is generally an absence of structural maturity and only occasional tree hollows were present which reduced the value of the habitat as sheltering or refuge areas for larger birds or hollow dependent mammals.

Small fragments of remnant and regrowth vegetation are dispersed among the M4 revegetation. The vegetation in this area is dense and generally dominated by exotic grasses such as *Chloris gayana* in the ground layer. The dense midstorey is likely to provide suitable habitat for small birds that require dense cover. Some sheltering habitat is provided for reptiles and invertebrates through extensive rubbish dumping and dense grasses. The overall habitat condition is considered poor.

Hollow-bearing trees

Hollow bearing trees were sparse with three hollow bearing trees present in Plot 4, two hollow bearing trees in Plot 2, and one hollow bearing tree in Plot 3 (see Biodiversity Assessment Appendix F of REF). The lack of hollow-bearing trees within the study area is a symptom of the young age cohort of trees. The majority of the vegetation along the M4 Motorway corridor has been planted after construction of the M4 Motorway and the majority of trees lack habitat features such as hollows.

Culverts

A series of seven box culverts are present under the Glenmore Parkway where the road crosses an unnamed creek and tributary of Surveyors Creek. These culverts may be suitable as roosting habitat for bats such as the Southern Myotis and/or the Eastern Bentwing-bat that are known from the locality. The box culverts would receive airflow and potentially strong winds and the temperature inside is likely to fluctuate with outside temperatures. Optimal dark conditions are not present within the culverts with bright daylight entering from both sides. The culvert walls are smooth concrete and joints are sealed well with no gaps are present. Any bats would have to roost in the angle created by the wall/ roof joint. For these reasons the box culverts are not considered optimal as roosting habitat for cave-dwelling bat species, but may be used on occasion.

M4 Motorway Bridge

The bridge on The Northern Road that crosses the M4 Motorway was not inspected during the field surveys due to safety issues regarding traffic and the slope of the road cutting. However, review of available photography, bridge design features, and location provides some evidence on the likelihood of the bridge being used as a roost for bats.

The bridge is primarily composed of concrete, which provides good thermal mass. The bridge is not shaded and is exposed to full sun for the majority of the day. These features may make the bridge suitable as a bat roost due to the retained warmth of the concrete that would provide a buffer from outside temperature fluctuations. The bridge is also a suitable height from the ground meaning that predation rates on bats would be reduced.

As a close inspection of the bridge could not be undertaken, there may potentially be drainage holes or bird nests under the bridge that bats may use as a roost site. Bats may also use any gaps between girders. However, the bridge over the M4 Motorway is quite open being raised high off the ground and subject to considerable traffic flow, activity, wind, light and noise from vehicles using The Northern Road on top and the M4 Motorway below. It is well recognised that bats exhibit avoidance behaviour of large roadways.

Due to the location of the bridge above the M4 Motorway and the traffic on the bridge along The Northern Road, the bridge is subject to considerable traffic noise, lighting and wind impacts. Due to the traffic noise, and as bats are known to avoid major roads, the bridge is considered to have a low likelihood of providing habitat for roosting bats.

4.1.4 Threatened fauna

The biodiversity assessment included in the REF states that 53 threatened fauna species have been previously recorded in the locality.
No threatened fauna species were identified during the field survey.

4.1.5 Aquatic fauna

The Project lies within the Lower Nepean River Management Zone of the Hawkesbury and Lower Nepean Rivers Water Source. The catchment is relatively flat with gently undulating hills. The proposal directly traverses an eastern tributary of Surveyors Creek which flows to Peach Tree Creek and ultimately drains to the Nepean River at Penrith. There are a number of other unmapped, unnamed minor drainage lines/gullies.

Consultation with DPI Fisheries NSW (Carla Ganassin) during the preparation of this management plan confirmed the absence of key fish habitat within the project works area on 09/02/2017. The record of this is kept in the consultation manager.

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 native vegetation (including habitat);
- Works around and within watercourses;
- Noise, vibration and light impacts;
- Disturbance of soils, consequential erosion and the mobilisation of sediment; and
- Use of chemicals / fuels (potential for spills).

Refer also to the Aspects and Impacts Register included in *Appendix A2 of the CEMP*.

5.2 Ecological impacts

Likely and/or potential impacts associated with Project are discussed in section 6.3 of the REF and include:

- Direct and indirect impacts to fauna;
- Loss of habitat;
- Fragmentation of habitats and wildlife corridors;
- Barrier effects on wildlife and riparian corridors (such as the erosion of genetic stock, impacts on home ranges, territorial disputes, increased competition etc);
- Spread of weeds and plant diseases;
- Spread of feral animals;

- Physical, chemical and biological changes to aquatic environments, wetlands etc;
- Edge effects (such as weed invasion, pests and disease); and
- Disturbance to aquatic and riparian habitats potentially resulting in contamination and siltation of waterways.

The mitigation and management measures provided in Table 6-1 aim to minimise the above impacts.

6 Environmental mitigation and management measures

6.1 Flora and fauna mitigation and management measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the REF and other RMS documents. Specific measures and requirements to address impacts on flora and fauna are outlined in Table 6-1.

6.2 Biodiversity offsets

Biodiversity offsets are proposed as required by the REF. These are documented separately in the Biodiversity Offset Strategy and remain the responsibility of Roads and Maritime Services.

Table 6-1 Flora and fauna management and mitigation measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
GENERAL					
B1	*A Flora and Fauna Management Plan will be prepared in accordance with Roads and Maritime's Biodiversity Guidelines:* *Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to:* *- Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas;* *- Requirements set out in the Landscape Guideline (RTA, 2008);* *- Pre-clearing survey requirements;* *- Procedures for unexpected threatened species finds and fauna handling;* *- Procedures addressing relevant matters specified in the Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013); and* *- Protocols to manage weeds and pathogens.*	*This document*	*Construction* *Pre-construction*	*Environment Manager*	*REF B1*
B2	*Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.*		*Design*	*Project / Site Engineers* *Environment Manager*	*REF B2*
B3	*An experienced ecologist will be engaged to undertake the preclearing processes for the proposal and inform the Flora and Fauna Management Plan as required, including the following activities:*	*Ecologist*	*Construction*	*Environment Manager*	*REF B3*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	• *In the weeks prior to commencement of clearing (or demolition in the case of bridges and culverts):* *- Confirm the locations of previously identified biodiversity features (including bridges and culverts as potential habitat for microbats, and hollow bearing trees);* *- Clearly mark-up key habitat features such as coarse woody debris and bush rock for relocation outside project boundary; and* *- Identify any fauna that have the potential to be disturbed, injured or killed as a result of clearing activities.* • *In the 24-hour period prior to commencement of clearing (or demolishing structures in the case of bridges and culverts), licensed wildlife carers and/or ecologists should:* *- Capture and/or remove and relocate (to previously identified suitable locations) fauna that have the potential to be disturbed, injured or killed as a result of clearing activities; and* *- Inform clearing contractors of any changes to the sequence of clearing because of fauna present if required.*				
B4	*An ecologist will be engaged to develop and assist in the implementation of a nest box strategy to mitigate impacts from the removal of hollow bearing trees, including nest box monitoring requirements during construction.*	*Ecologist*	*Construction*	*Environment Manager*	*REF B4*
B5	*All personnel working on site will receive training to ensure awareness of requirements of the Flora and Fauna Management Plan and relevant statutory responsibilities. Site specific training will be given to personnel when working in the vicinity*	*Training Resources*	*Pre-Construction* *Construction* *Operation*	*Environment Manager*	*REF B5*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	of areas of identified biodiversity value that are to be protected.				
B6	*Best practice methods for aquatic habitat management will be implemented during detailed design and construction including but not limited to:* • *Design of culverts in accordance with Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge 2003);* • *Minimise instream and riparian disturbance; and* • *Develop and implement a water quality monitoring program during construction in and around waterways.*		*Pre-construction* *Construction*	*Project / Site Engineers* *Forman / Leading Hands* *Environment Manager*	*Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge 2003)* *REF B6*
B7	*Consistent with the Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects, and any specific requirements of the approved Flora and Fauna Management Plan, locally indigenous plant species will be used during rehabilitation and revegetation.*		*Construction*	*Project / Site Engineers* *Forman / Leading Hands* *Environment Manager*	*REF B7*
B8	*A Weed and Pathogen Management Plan has been prepared for the Project (Appendix B) and will be implemented during construction. The plan is consistent with the RMS Biodiversity Guidelines and other applicable local government legislation.* *Any soil or other materials imported to the site for use in restoration or rehabilitation will be certified free from weeds and pathogens, or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.*	*Weed and Pathogen Management Plan* *EWMS*	*Pre-construction* *Construction*	*Environment Manager*	*REF B8* *G36* *Good Practice*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B9	*Consistent with any specific requirements of the approved Flora and Fauna Management Plan, a post-construction monitoring program will be implemented to assess effective implementation of the safeguards and mitigation measures, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements to support the protection of native flora and fauna.*	*Ecologist*	*Construction*	*Project / Site Engineers* *Forman / Leading Hands* *Environment Manager*	*REF B9*
B10	*Any works required outside the construction footprint verified in accordance with REF will be referred to the Environment Manager for advice on further assessment and approval requirements in accordance with Section 7.3 of this Plan and Section 3.7 of the CEMP.*	*REF*	*Prior to commencing any construction work*	*Project / Site Engineers* *Forman / Leading Hands* *Environment Manager*	*Good Practice*
B11	*In the event that threatened species or EECs are unexpectedly identified during construction the Unexpected Threatened Species /EECs Finds Procedure will be followed.*	*Unexpected threatened species/EEC Finds Procedure*	*As required*	*Environment Manager*	*Good Practice*
B12	*The limits of clearing are to be clearly marked on all relevant work plans and protective fencing erected to mark these limits (i.e. 'no-go' areas). Fencing installed prior to vegetation clearing activities occurring. The limits of clearing will be marked in accordance with Guide 2 of the Roads and Maritime Biodiversity Guidelines.*	*RMS Biodiversity Guidelines*	*Prior to clearing*	*Environment Manager*	*Good Practice*
B13	*An activity specific EWMS will be prepared for Clearing, Grubbing and Mulching activities to ensure the mitigation measures from the FFMP are applied to onsite activities. The EWMS will meet the requirements of RMS D&C G40 and RMS publication "RMS Biodiversity Guidelines: Protecting and Managing Biodiversity on RMS Projects"*	*EWMS*	*Construction*	*Environment Manager/ Project Engineer*	*EWMS Clearing Grubbing and Mulching*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B14	*To minimise the risk to fauna encountered during clearing and general project works, a Fauna handling and rescue strategy has been developed for the project (Appendix F).*	*RMS Biodiversity Guidelines*	*Construction*	*Environment Manager/Foreman*	*SWTC Appendix 4 Good Practice*
B15	*A two-stage clearing procedure will be implemented on the project, with non- habitat trees removed at least 48 hours before habitat trees unless otherwise agreed to with OEH and DPI Fisheries. All habitat trees will be felled under the supervision of the project ecologist and left for a short period of time (determined by the Project Ecologist) to give any fauna the chance to escape.*	*EWMS*	*Clearing*	*Environment Manager/Foreman/Project Ecologist*	*SWTC Appendix 4 Good Practice*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B16	*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 under taken to identify any need for removal of the habitat tree prior to the minimum requirements stipulated in B15 above.* *This assessment will be undertaken with the Project Ecologist, the Clearing contractor, Lendlease Environmental Manager, Lendlease Safety Manager and a designated RMS Representative. If the tree is deemed a hazard to safety the following actions may be taken:* • *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 potential for significant fauna occupation; and* • *Establishment of an exclusion zone around the tree, and felling 48hrs after initial clearing (if there is a high potential for significant fauna occupation and a high risk of injury to fauna during felling).* *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 to 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.*	*EWMS*	*Clearing*	*RMS/Lendlease/Project Ecologist/Foreman*	*Good Practice*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B17	*Contact details for the suitably qualified expert, local NPWS officers, FAWNA, RSPCA, and local veterinary hospitals will be made available at the main site compound and should be attached to clearing permits for Clearing and Grubbing. These documents will be held by supervisory personnel at all locations where clearing is being undertaken, to enable quick contact in the event of a fauna rescue. In the event of an incident involving injured flora or fauna, the Environmental Incident Classification and Reporting procedure will be followed.*	*EWMS* *Appendix A6 of CEMP*	*Clearing and Earthworks/Demolition*	*Environment Manager/Foreman*	*Good Practice*
B18	*To ensure vegetation that is retained throughout construction is protected, a Working around trees guideline has been prepared for the project and will be implemented during construction (Appendix E). Consistent with RMS G40 the following measures will be implemented:* • *Protective fencing around trees to be retained clear of the canopy line;* • *Ensuring no vehicles are parked, and no material is stockpiled within the canopy line of trees to be retained;* • *Avoiding excavation and placing of fill near retained trees without the advice of the project ecologist; and* • *Routing haul roads and access tracks clear of the canopy.*	*Working around trees guideline*	*Construction*	*Environment Manager/Foreman*	*Good Practice* *G40*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B19	*Existing trees, grasses and other ground cover will be retained within 15m of rivers, creeks and watercourses and in all drainage lines until immediately before construction commences. With the exception of the construction of an access track and temporary crossing compliant with RMS G38.* *Trees felled in this area will be done manually, leaving stump and root ball intact until immediately prior to construction commencing.*	*EWMS and ESCP*	*Clearing*	*Environment Manager/Foreman*	*Blue Book* *G40* *G38* *Good Practice*
B20	*In the event that pre-clearing assessments identify the presence of roosting bats in the structures, a Bat Management Plan (Appendix A) will be prepared in consultation with the Project Ecologist.*	*RMS Biodiversity Guidelines*	*On discovery of roosting bats*	*Environment Manager*	*SWTC Appendix 4*
B21	*Trees, plants and other vegetation adjacent to the project will be preserved, and all precautions necessary to protect adjacent flora from damage or injury will be implemented.*	*RMS Biodiversity Guidelines*	*Construction*	*Foreman* *Environment Manager*	*G36*
B22	*The length of trenches or excavations left open overnight will be minimised. All trenches and excavations will be inspected in the morning for fauna prior to commencing works.*		*Construction*	*Foreman* *Environment Manager*	*LLE709*
B23	*If required, an arborist will be engaged to provide advice on remnant health and provide ongoing advice.*		*Construction*	*Environment Manager*	*Good Practice*
B24	*Where applicable, washing procedures to prevent the spread of pests, weeds and diseases will be implemented*		*Construction*	*Environment Manager*	*Good Practice*
B25	*Vegetation clearing will be restricted where possible to the minimum required*		*Construction*	*Environment Manager*	*Good Practice*

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
B26	*In the event of fauna entering adjacent properties to the project, suitably qualified personnel such as the project ecologist will facilitate the handling and relocation.*		*Construction*	*Environment Manager*	*Good Practice*

7 Compliance management

7.1 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 *Section 6* of this Plan.

7.2 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:

- Existence and requirements of this Plan;
- Relevant legislation;
- Specific species likely to be affected by the construction works and how these species can be recognised;
- Mulch stockpile location and management measures;
- Fauna rescue requirements;
- Weed control measures;
- General flora and fauna management measures; 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.

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.

A detailed list of the flora and fauna monitoring requirements is give below in Table 7-1.

Table 7-1 Flora and fauna monitoring

No.	Item	Description	Timing	Attendees
1	*Pre-construction ecological surveys*	*- Identification, marking and GPS recording of all hollow bearing trees, potential hollow bearing trees and all other fauna containing habitat trees, including trees with nests, dreys and termitaria likely to be occupied by fauna* *- Inspect all bridges, culverts and associated structures that are to be demolished or removed for the presence of native fauna, including fauna such as bats that may be present in gaps in structures or scuppers* *- Confirmation of mapped vegetation distribution and classification* *- Mapping (GPS) and identification of environmental and noxious weeds* *- Aquatic assessment of tributary to Surveyors Creek and Glenmore Parkway, including assessment of the presence/absence of alligator weed.*	*7 days prior to commencement of clearing*	*Ecologist*
2	*Pre-clearing surveys*	*- Capture and/or remove and relocate (to previously identified suitable locations) fauna that have the potential to be disturbed, injured or killed as a result of clearing activities* *- Inform clearing contractors of any changes to the sequence of clearing because of fauna present if required* *- Identify suitable offsite relocation options for captured fauna in consultation with Community and Stakeholder Manager*	*24 hours prior to clearing vegetation*	*Ecologist* *Environment Manager*
3	*Next box monitoring*	*Monitor nest boxes regularly in accordance with Nest Box Plan of Management*	*When required by NBPoM*	*Ecologist*
4	*'No-go' zone monitoring*	*Ongoing monitoring of 'no-go zones' and other retained vegetation or aquatic habitat will be undertaken through weekly inspection checklist (Refer to Appx A8 of CEMP)*	*Weekly*	*Environment Manager / Environment Officer*
5	*Revegetation monitoring*	*Revegetation monitoring will be conducted in accordance with the Revegetation Management Plan*	*When required by RMP*	*Environment Manager*
6	*Post-construction monitoring*	*Consistent with any specific requirements of the approved Flora and Fauna Management Plan, a post-construction monitoring program will be implemented to*	*Post-construction*	*Project / Site Engineers*

	assess effective implementation of the safeguards and mitigation measures, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements to support the protection of native flora and fauna.	*Forman / Leading Hands* *Environment Manager*

Further requirements and responsibilities in relation to monitoring and inspections are documented in *Section 8 of the CEMP*.

7.4 Auditing

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

Audit requirements are detailed in *Section 8.3 of the CEMP*.

7.5 Reporting

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

- *Results of pre-clearing surveys;* and
- *Nest Box Installation and Monitoring (Nest Box Plan of Management).*

The results of pre-clearing surveys will be provided to RMS through the Monthly Environmental Performance Report at the completion of clearing activities.

Nest Box Monitoring Reports will be completed as per the recommendations of the Project Ecologist and as detailed within the Nest Box Plan of Management.

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; and
- Make comparisons with objectives and targets.

8.2 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 Plan. 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 plan 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
Microbat Management Strategy (place holder)

Appendix B
Weed and Pathogen Management Plan

Appendix C
Pre-clearing Permit

Appendix D

Unexpected Threatened Species/EEC Finds Procedure

Appendix E
Working Around Trees Guideline

Appendix F
Fauna Handling and Rescue Procedure

Appendix B - Weed and pathogen management plan

February 2017

Document control

File name	Weed and Pathogen Management Plan - Rev1.doc
Report name	Weed and pathogen management plan
Revision number	1

Revision history

Revision	Date	Description	Approval
0	December 2016	Initial Draft	
1	February 2017	Review before RMS submission	

Table of Contents

Appendices

1 Introduction

There are no restrictions on the distribution/circulation of this Plan within the North Road – Stage 3 North Project.

Pathogen and weed infestation and spread resulting from fauna handling, vegetation clearing, soil disturbance, erosion and sediment control, vehicle movement, inadequate rehabilitation/ revegetation of disturbed areas and inappropriate topsoil management has been identified as a risk associated with on the TNR3N Project.

This Plan provides detail for the management of pathogens, and both noxious and environmental weeds. Noxious weeds are species declared noxious under the NSW *Noxious Weeds Act 1993*, whilst environmental weeds are generally introduced species that threaten the integrity of natural habitats. Noxious weeds are those plants that are required by law to be controlled.

The Biodiversity Assessment prepared for the Review of Environmental Factors recorded 86 plant species across the six floristic plots of which 48 (55 per cent) were exotic species. There were five weeds declared as noxious in the Local Control Authority area of Hawkesbury River County Council.

Although no pathogens were identified during surveys, mitigation measures to prevent the spread or introduction of pathogens during construction will be detailed within further below.

This Plan has been prepared to identify the presence and management of pathogens and key weed species and their distribution across the site and to outline the processes required to control and prevent the spread of weeds during the Project.

2 Aims/Objectives

The aims/objectives of this management plan are as follows:

- Identify the pathogens and key weed species and their distribution across the project site;
- Prevent the introduction and spread of weeds and pathogens throughout the construction of the project;
- Ensure noxious weeds identified within the construction footprint are managed in accordance with the *NSW Noxious Weeds Act 1993*;
- Establish an inspection and reporting framework for noxious weeds and pathogens; and
- Establish performance criteria for the management of weeds and pathogens throughout the duration of the construction of the project.

3 Induction / Training

All persons entering the project construction zone are responsible for ensuring their activities do not contribute to the spread of pathogens and weeds both on and off the site.

All construction personnel are to be inducted on the existence of pathogens and noxious weeds on site during the Project induction and as required in toolbox talks. This will include the identification of noxious weed species and the details of the controls required to minimise weed and pathogen spread.

Additional toolbox talks will be prepared and delivered with the input of Environmental Coordinators, Foreman, Engineers and the Environment Manager should the monitoring undertaken in accordance with Management Action 5 identify emerging weed issues on-site.

4 Scope

This weed and pathogen management plan details control practices to be implemented throughout the construction phase of the project to minimise the threat to remnant vegetation and fauna within the local area. It has been developed to meet the environmental safeguards identified in the REF as they relate to weed and pathogen management for the Project. These requirements are detailed further in the Flora and Fauna Management Plan.

5 Weeds and pathogens in the project area

5.1 Noxious weeds

Noxious weeds will be recorded during pre-construction surveys conducted by the project ecologist, with the location and density of infestation recorded and incorporated into management measures required for clearing activities. The following weeds recorded within the project boundary during the REF assessment (this table will be updated following the discovery of additional noxious weeds during pre-clearing surveys and/or general construction activities).

Noxious Weed	Class	Legal Requirements
African Olive Olea europaea subsp. cuspidata	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
Asparagus Fern Asparagus aethiopicus	4	The plant must not be sold, propagated or knowingly distributed.
Fireweed Senecio madagascariensis	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction
Mother of Millions Bryophyllum species	3	The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed.
Small-leaved Privet Ligustrum sinense	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

6 Weed control classes

The study area includes Class 3 and 4 noxious weeds. The control requirements for each of these classes include:

Class 3 are plants that pose a potentially serious threat to primary production or the environment of a region 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.

Class 4 noxious weeds are plants that pose a potentially serious 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 of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.

7 Management actions for noxious weed control

There are a series of management actions to be undertaken to avoid the spread of noxious weeds during construction, these are outlined below and summarised in Table 7-1:

7.1.1 Management Action 1 - Ensuring only clean plant is brought to site

To control the import of weeds on the Project site from external sources, relevant engineers, site foremen and environmental staff must be diligent in ensuring that plant and equipment is free of soil / weeds prior to being brought to site.

The following process for all plant and equipment brought to site during construction will be followed.

- **Step 1** – Relevant engineers / maintenance personnel will ensure that sub-contractors and plant hire companies are notified of the requirement to ensure only clean plant and equipment are supplied or brought to site and that failure to do so may result in machinery being sent back.
- **Step 2** – Relevant engineers / maintenance personnel will ensure that all plant and equipment brought to site free of soil and weeds prior to being used on site, and this is recorded on the Plant Clean Down Checklist (Appendix 3) or the LLE902 Plant On-boarding Form (Appendix 4). Completed Plant Clean Down Checklist are to be returned to the Environment Manager (EM) LLE902 forms will be held by the Safety Manager.
- **Step 3** – If the plant or equipment is not free of soil and weeds, the Engineer / Foreman / EM will be notified and it will either be sent back to its place of origin or cleaned on site, with special care to ensure that dirt cleaned off is captured and disposed of where it cannot be spread to surrounding areas.
- **Step 4** – The EM/Environmental Coordinator (EC) will undertake a random inspection of plant and machinery to ensure that soil / weeds are not being transported onto site.

7.1.2 Management Action 2 - Prevention of weed spread on site

To control the potential for spread of weeds on the site the following process is to be implemented:

- **Step 1** – Placement of stockpiles, infrastructure and buildings on cleared land away from areas of native vegetation and trees.
- **Step 2** – Verification of weed free status of any stockpiled soil by the Environment Coordinator and project weed management contractor. Stockpiled topsoil identified as containing a major weed bank are to be stockpiled separately following stripping.
- **Step 3** – Installation and maintenance of appropriate sediment and erosion controls within 24 hours of, and prior to rainfall events to prevent the free movement of weed seeds.
- **Step 4** – Identification of priority areas prior to construction where light vehicle movement poses a high risk of spreading noxious weeds within and outside the alignment.
    - Within these areas light vehicle access routes (i.e. cleared tracks or roads) should be delineated and vehicle movement restricted to those routes.
    - If light vehicles traverse non designated tracks or roads then tyres, bull bars and side steps should be checked for weed seeds, or vegetative parts prior to leaving the site.
    - Any seeds or vegetative material should be removed prior to leaving the site.
    - Where identified as a high risk area, wash down facilities will be installed to clean machinery and vehicles affected by weeds.
- **Step 5** – Inspection of boots, clothing, equipment and plant and cleaning / wash down when moving from an identified high risk area to weed free locations on site.
- **Step 6** – Topsoil containing a noxious weed seedbank from earthworks conducted in a high and medium risk weed infestation area (as determined by the Project Ecologist) shall be buried underneath clean fill. Where material cannot be buried, it will be treated by the weed management contractor, and or disposed of at an offsite licensed waste management facility.

7.1.3 Management Action 3 - Prevention of weed spread from salvaged and re-used topsoil

Salvage and re-use of topsoil from weed infested areas is the main means by which weeds are introduced and spread along highway construction projects. Salvage of topsoil from weed-free forest areas during clearing, followed by storage and application to roadsides/batters will result in revegetation with native flora from the topsoil seedbank, rather than with weeds. This ‘natural’ process of revegetation will also greatly reduce the cost of landscaping and hydro seeding.

- **Step 1** – identify areas of weed-free topsoil (i.e. forest areas free of weeds) by ground survey (to be completed during pre-construction surveys).
- **Step 2** – identify topsoil storage sites at suitable intervals along the road corridor prior to commencement of clearing in the work area.
- **Step 3** – identify sites prior to commencement of clearing in the work area where topsoil is to be salvaged from; strip and transport topsoil to storage sites after vegetation clearing.
- **Step 4** –Place topsoil in low piles of any length or width. Length or width may change to avoid additional clearing and/or response to site conditions.
- **Step 5** – following completion of earthworks, transport and spread topsoil; leave the bottom 10cm of stockpile if on cleared land or other land likely to contain weed seed
- **Step 6** - hydro seed with fast growing Jap Millet (summer) or Rye Grass (winter) to provide an initial plant cover prior to completion of works (completion of all activities required to finalise and rehabilitate disturbed areas, including placement of topsoil).

(Note - native plants – grasses, herbs, shrubs and small trees - will germinate and establish significant cover in 1-2 months and largely continuous cover in 3-6 months, depending on season.)

7.1.4 Management Action 4 – Programmed weed control

To control Project wide weed infestations during construction the EM or EC will ensure the following procedure is implemented:

- **Step 1** – Using the information on noxious weed distribution and infestation identify priority weed control areas and stockpile sites that may contain a seed bank or viable vegetative parts of noxious weeds.
- **Step 2** - The EM or EC shall discuss weed control options in priority weed control areas with the Project weed management contractor and Local Council Weed Management Officer as appropriate.
- **Step 3–** The Project weed management contractor will then determine the appropriate treatment methodology and timing. Recommended methods of treatment of noxious and highly invasive weeds are detailed in Appendix 1.
- **Step 4**– The EM or EC and the Project weed management contractor will ensure that a record of herbicide application is kept and public notifications made in accordance with relevant legislation where herbicides are to be used in areas that could be accessed by members of the public. A sample herbicide application record sheet is attached as Appendix 2 to this Strategy.
- **Step 5**– The EM or EC shall ensure that a follow-up inspection is undertaken (at a date determined by the Project weed management contractor). If treatment was unsuccessful the Project weed management contractor will be required to re-treat the area until it is successful.
- **Step 6** – Any weeds physically removed (particularly those bearing seeds) are to be disposed of in an appropriately licensed landfill site in accordance with the Waste and Resource Management Plan (WRMP) or buried on site.

7.1.5 Management Action 5 – Inspection and Reporting

Record and report on the progress of the weed control works. The reporting should include:

- **Step 1** – As a minimum, undertake weed inspections of target areas (i.e. areas of known infestation) on a monthly basis for the first six months after commencement of construction (or as necessary in response to seasonal and climatic conditions), then at least every two months for a further six months until the Date of Construction Completion.
- **Step 2** – Submit a report to the Project Verifier and RMS Representative outlining the results of each monitoring inspection against the weed management objectives and activities in the Weed and Pathogen Management Plan.
- **Step 3** – Preparation of an updated weed survey of the site and adjacent areas prior to construction commencing, to determine the presence of weed species, density and abundance. Prepare weed distribution map.
- **Step 4** – Reporting of any Class 1 noxious weeds to DPI and eradication prior to impact.
- **Step 5 -** Document the weed management activities undertaken in accordance with the approved weed control schedule of works. To include, but not limited to the following information:
    - Species targeted and mapped.

- Photographic monitoring (pre and post monitoring)
- Areas treated (mapped)
- Details of herbicide application (from pesticide application sheets in Appendix 2).

- **Step 6** – Obtain appropriate sign off from the EC/EM and update weed management strategies, maps/plans and weed control schedules or programs accordingly.

Table 7-1: Management actions for the control of noxious weeds

Management Action	Monitoring/ Timing	Responsibility	Action	Evidence of management action implemented
1. Ensuring only clean plant is brought to site.	all plant.	Project / Site Engineers Foreman / Leading Hands Environmental Coordinators	- Completion of Plant Clean Down Checklist and Random Inspections (EC). - Reject plant and machinery that does not comply with management plan.	- Maintain records of inspections of plant and machinery brought to site, including completed Plant Clean Down Checklists.
2. Prevention of weed spread on site.	monthly	ALL	- Location of noxious weeds to be included in project induction and relevant EWMS toolboxes - Requirements of vehicle and machinery wash down procedures are communicated to the construction team. - Installation of ERSED measures to minimise the potential transport of weed seeds through entrained sediment loss. - Weed infested topsoil not to be segregated and buried in deep fills where possible.	- Bi-monthly inspections (documented on environmental inspection checklist)
3. Prevention of weed spread from salvaged and re-used topsoil.	weekly	Project / Site Engineers Foreman / Leading Hands Environmental Coordinators	- Ensure all top soils removed from high risk noxious weed zones are segregated from 'clean' native top soils. And where possible, buried or disposed of offsite at licensed waste facilities. - Ensure noxious weed infested top soils that cannot be buried or disposed of at offsite licensed facilities are managed in accordance with Management action 4.	- Establish and maintain top soil stockpile register (location, quantity, vegetation type and weed infestation if applicable) and on-site signage to identify contaminated top soils.
4. Programmed weed control (Infested stockpiles and within the construction footprint)	Six monthly	Project / Site Engineers Foreman / Leading Hands Environmental Coordinators	- Liaise with weed control contractor and employ weed control measures from Appendix A at the appropriate time. - Maintain a record of herbicide application and make public notifications required in accordance with relevant legislation. - Undertake follow up inspection and re-treatment where required. - Dispose of physically removed weeds and seed at an appropriately licensed landfill facility.	- Maintain register of herbicide application and offsite disposal of weed infested materials.
5. Inspection and Reporting.	(first six months) then bi monthly until completion of construction.	Project / Site Engineers Environment Manager	- Monthly inspections (first 6 months) then; - Bi-monthly inspections (until construction completion) - Preparation of updated weed survey prior to commencement of construction	- Submit monthly reports to Project Verifier and RMS Representative.

8 Management actions for the control of pathogens

Pre-construction surveys undertaken by the Project Ecologist shall target the assessment of native vegetation to identify any potential infestations of pathogens (such *Phytophthora cinnamomi* and *Uredo rangelli (*Myrtle rust)). With finds recorded and reported back to the Environment Manager.

The project does not have significant aquatic habitat. During pre-clearing inspections, if relocation of frog species is required the “Hygiene Protocol for the Control of Disease in Frogs” will be implemented.

Should pathogens be identified they will be managed in accordance with Table 7.1 from the RMS Biodiversity Guidelines shown bel in Table 8.1.

Table 8.1: Table 7.1 from the RMS Biodiversity Guidelines

Best Practice Hygiene Protocols	Phytophthora (*Phytophthora cinnamomi*)	Chytrid (*Batrachochytrium dendrobatidis*)
Test for presence if determined in REF or environmental assessment	• Soil test by a **NATA approved laboratory.**	• Water test by a **NATA approved laboratory**.
Work programs	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas.	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas.
Restrict access	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.
Inductions	• All personnel (including visitors) to be inducted on Phytophthora management measures for the site.	• All personnel (including visitors) to be inducted on chytrid management measures for the site.
Vehicles and machinery	• Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces.	• Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces.
Personnel and equipment	• Provide boot wash down facility. • Restrict personnel to designated tracks and trails.	• Provide boot wash down facility. • Disinfect with cleaning products containing benzalkonium chloride or 70 per cent methylated spirits in 30 per cent water. • Disinfect hands or change gloves between the handling of individual frogs and between each site. • Only handle frogs when necessary. Use the 'one bag-one frog' approach.
New material	• Use a certified supply of plants and soil that is disease-free.	• n/a
Disposing of material	• Retain all potentially affected materials within the contaminated area. • Ensure stockpiles of mulch, topsoil and fill material are separated to avoid potential contamination and spread.	• To avoid cross contamination, generally avoid transferring water between two or more separate waterbodies.
Further information	• National best practice guidelines for management of Phytophthora for biodiversity conservation in Australia (O'Gara et al. 2005).	• Hygiene protocol for the control of disease in frogs, Information Circular Number 6 (Wellington and Haering 2008).

Best Practice Hygiene Protocols	Fusarium wilt (eg Panama disease)	Myrtle rust (*Uredo rangelli*)
Test for presence if determined in REF or environmental assessment	• Contact **DPI** before carrying out the works in former banana sites to see if and where Fusarium wilt is present.	• Before carrying out works in bushland, consult: (a) The DPI Myrtle Rust Management Zone map (www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust/zones) to determine reporting required and whether you are working in a high risk area, and (b) Local offices of **OEH/NPWS** for additional rust records and risk assessments. • Photograph potentially infected plants and send to: biosecurity@industry.nsw.gov.au for confirmation.
Work programs	• No earth work should occur during heavy rainfall or after extended rainfall. • Programming of works should always move from uninfected areas to infected areas.	• Programming of works should always move from uninfected areas to infected areas.
Restrict access	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.
Inductions	• All personnel (including visitors) to be inducted on Fusarium wilt management measures for the site.	• All personnel (including visitors) to be inducted on Myrtle rust management measures for the site.
Vehicles and machinery	• Provide vehicle wash down facility. • All vehicles to be washed with Truckwash® and then disinfected with Castrol Farmcleanse® (or equivalent). • For medium-long term projects, install a concrete wash down bay which will capture the water in a trench or bunded area. Water used for wash downs must not be used for dust control.	• Provide vehicle wash down facility. • All vehicles and machinery to be washed with Truckwash® (or equivalent). • Restrict vehicles to designated tracks, trails and parking areas. • For medium-long term projects, install a concrete wash down bay which will capture the water in a trench or bunded area. Water used for wash downs must not be used for dust control.
Personnel and equipment	• Provide boot wash down facility. • Remove mud/dirt from footwear and equipment and disinfect with Castrol Farmcleanse® (or equivalent).	• Personnel working in an infected site should shower and launder clothes (especially hats) before moving to another bushland site. • Provide boot wash down facility. • Footwear and equipment to be cleaned of soil/mud then sprayed with 70 per cent methylated spirits in 30 per cent water.
New material	• Ensure that new soil being brought onto the site is disease-free.	• Use a certified supply of plants and soil that is disease-free (the Australian Nursery Industry *Myrtle Rust Management Plan* (McDonald 2011) provides best practice Myrtle rust management that is to be expected from suppliers).
Disposing of material	• Run-off water must not be used for dust control or irrigation and it is not to be released. • Topsoil from potentially infected plantations must only be stockpiled and used within contaminated areas of the plantation.	• Plant material should be buried on site if possible. • Do not dispose of waste at another bushland site. • Buried material sites must be mapped to prevent re-exposure, especially if located near utility easements. • If material cannot be buried advice should be sought from **DPI**.
Further information	• Fusarium wilt management procedures should be included in the Construction Environmental Management Plan (CEMP) or associated plans.	• DPI handout prepared for Myrtle rust response 2010–11: *Preventing spread of Myrtle Rust in bushland*. Information on managing Myrtle rust can be obtained from: www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust • The OEH Interim management plan for Myrtle rust in bushland (2011).

Appendix 1

Noxious Weed Identification and Control Guide

Information sourced from Weeds Australia.

Note: Recommended control method indicated by ☺ symbol

NOXIOUS WEEDS

Fireweed

Senecio madagascariensis

Declaration class 4

Description

Mostly erect annual or biennial herb to 70 cm high. Leaves variable, to 8 cm long and to1.5 cm wide.

Habitat and distribution

Coastal pastures in eastern Australia where it covers thousands of hectares. Most spread is by wind dispersed seed. Long distance dispersal also occurs by seeds on animals, in stock feed or in mud on vehicles.

Problem

Losses result from decreased pasture production and reductions in growth rates, or death, of cattle and horses caused by pyrrolizidine alkaloids occurring in the plant.

Control

☺ Chemical x Biological ☺ Mechanical/Physical

Management options will vary depending on the situation, with different approaches, for example, for grazing enterprises, environmental areas or small area holdings:

- for environmental areas, hand-pulling individual plants and using spot spraying for herbicide application may be used

It is preferable to manage a small area correctly than to poorly manage a large area.

Mother of Millions

Bryophyllum species

Declaration status Class 3

Description

Succulent perennial growing to 2 metres tall.

Stems pinkish brown and greyish in colour.

Leaves are dull blue-green and up to five oval leaflets with navy edges.

Flowers are reddish in colour often tinged with pink, occur in loose clusters on stalks growing along the upper portion of the stem.

Habitat and distribution

Commonly found growing on gravel and sandy soils. Predominately in disturbed sites but also readily occurs in bushland

Problem

Plant, especially the flower is poisonous/lethal to livestock.

Control

☺ Chemical x Biological ☺ Mechanical/Physical

For small infestations the plant can be removed by pulling out individual plants by hand. Once the plant has been removed it should be burnt, stored in black plastic bags until completely decayed or buried. Care needs to be taken when using this method as plantlets may detach from the leaves during removal and establish as new plants. Some regrowth will therefore occur and follow up treatment will be required.

Herbicide application is effective if sufficient wetting agent is used to penetrate the waxy outer covering of the plant. Spraying during the flowering season prevents new seeds developing.

Asparagus fern

Asparagus virgatus

Declaration class 4

Description

Asparagus fern is an erect herb, climber or shrub 0.4-0.8 m tall, usually with year-round foliage.

Berries are 1-seeded, 4-6 mm in diameter and bright orange at maturity. Fruit are borne year round.

Habitat and distribution

It was introduced into Australia as an ornamental plant and is still found in older gardens. Its foliage is still used world-wide in the cut flower industry.

It now occurs in coastal and sub-coastal Queensland and is especially common in the south-east of that state. In New South Wales it is not widespread, but occurs mostly in the Sydney district.

Problem

Asparagus fern has the potential to invade a wide range of coastal and sub-coastal plant communities, in areas north from Sydney.

It competes with native ground cover and understorey plants by forming dense infestations that smother other species and prevent their germination and establishment.

Control

☺ Chemical x Biological ☺ Mechanical/Physical

Management options will vary depending on the situation, with different approaches, for example, for grazing enterprises, environmental areas or small area holdings:

- for environmental areas, hand-pulling individual plants and using spot spraying for herbicide application may be used

It is preferable to manage a small area correctly than to poorly manage a large area.

African Olive

Olea europaea

Declaration class 4

Description

Leaves are a shiny grey-green colour with the under surface being green or yellowish brown. Leaves are simple with a rectangular to elliptical shape, entire, with recurved margins. They have a hooked tip and are opposite, growing from 6-10cm long and 10-25mm wide. The petiole (leaf stalk) is 10mm long. The bark is grey to blackish-brown. It is rough but may be smoother in older plants.

Habitat and distribution

African olive was introduced into Australia as a hedging plant and rootstock for edible olives in the mid-1800s, and has now spread rapidly throughout the Camden-Picton district.

Problem

African olive is an aggressive woody weed that invades native bushland, creating a dense shady canopy that excludes the growth of native understorey plants. African olive is a very long-lived tree and permanently changes the plant diversity and structure of bushland. It is a tropical wild olive that comes from eastern Africa. It is related to the edible European olive however the fruit is not edible and has no commercial value

Control

☺ Chemical x Biological ☺ Mechanical/Physical

Management options will vary depending on the situation, with different approaches, for example, for grazing enterprises, environmental areas or small area holdings:

- for environmental areas, hand-pulling individual plants and using spot spraying for herbicide application may be used

It is preferable to manage a small area correctly than to poorly manage a large area.

Small leaved Privet

Ligustrum sinense

Declaration class 4

Description

A shrub or small tree with hairy younger stems and leaves. Its relatively small leaves (2-7 cm long and 1-3 cm wide) are borne in pairs along the stems. Its small white flowers have four petals and are produced in small branched clusters (4-11 cm long) at the tips of the stems. Its small rounded or egg-shaped fruit (4-6 mm long) turn bluish-black in colour when mature.

Habitat and distribution

Chinese privet (Ligustrum sinense) is most commonly found in wetter tropical, sub-tropical and temperate regions. It is a particularly common weed of rainforest areas and waterways, but is also a weed of urban bushland, gullies, open woodlands, waste areas, disturbed sites and roadsides.

Problem

The plant is able to germinate easily and grow prolifically, giving it the ability to suppress and shade other plants living in the understorey. The complex and tenacious root system chokes the soil, reducing the availability of water and nutrients for competing native species.

Control

☺Chemical x Biological ☺ Mechanical/Physical

Management options will vary depending on the situation, with different approaches, for example, for grazing enterprises, environmental areas or small area holdings:

- for environmental areas, hand-pulling individual plants and using spot spraying for herbicide application may be used

It is preferable to manage a small area correctly than to poorly manage a large area.

Appendix 2

Sample Herbicides Application Sheet

Herbicides Application Sheet

Project Name: The Northern Road Upgrade Stage 3
Location: _____
Name: _____ Signed: _____
Date: _____

Information to be recorded	***Brief description***	***Enter data here***
1. Date and time	*Start date and time* *Finish date and time*	
2. Wind speed and direction	*Record wind speed and direction (only if the pesticide is applied through the air). Wind speed must be <10km/hr. Write down any changes in weather during application.*	
3. Other weather details	*Record any weather details such as temperature, humidity and/or rainfall where the pesticide product label requires to assess these.*	
4. Who applied the pesticide	*Full operator name* *Operator contact address* *Operator contact phone*	
5. Boundaries of treated area and order of treatment	*List treated areas and order of treatment, preferably with reference to the map. List order of treatment.*	
6. Problem treated	*Identify the pest or problem treated (e.g. controlling of spot weed infestation)*	
7. Product used	*Record either full name, or a product code if a list of full product names of pesticides you use is kept at the front of your logbook.*	
8. Quantity applied and dilution	*Total amount of pesticide product mix used. Write down whether the mix was concentrated product or a diluted mixture (note the rate of dilution)*	
9. Equipment used	*Describe the equipment used (e.g. boom-spray, hand-held backpack sprayer etc)*	
10. Other Observations	*Detail any other required observations (e.g. Fruiting, flowering, fauna, flora)*	

Appendix 3

PLANT CLEAN DOWN CHECKLIST

PLANT CLEAN DOWN CHECKLIST

Project: The Northern Road Upgrade Stage 3 **Date:** _____

Objective: All machinery, equipment or apparatus will be clean and visually free of mud, plant or weed material, oil & grease before entering site.

Action: All appliances will be cleaned of all **LOOSE SOIL** and **PLANT MATERIAL** before entering site using one (1) of the following procedures:

Physical removal, brush down, wash down or high pressure water cleaner.

Note: Appliances that are not transferring high – risk items, for example deliveries to site compounds, are exempt from clean down procedures.

Plant No: _____

APPLIANCE Plant	Component to Be Checked (includes any other part of an Appliance not mentioned)	Authorised Signature	Date
Bulldozer	Rippers, Blade, Track Frame, Belly Plate, Tracks		
Excavator	Track Frame, Underside of Slew Ring, Buckets, Tracks		
Rollers	Track Belly Plate		
Grader	Rippers, Mould Board, wheels		
Scraper	Overflow area on rear of scraper, Belly Plate, wheels		
Tractors	Underside of tractor		
Backhoe	Buckets and Backhoe attachment, Belly Plate, wheels		
Bobcat	Buckets, Belly Plate/other attachments		
Trucks	Soil build – up bins, chassis rails		
Other Appliance			
Other Appliance			

Lend Lease/ Subcontractors:_____

Name of person cleaning / checking equipment: _____

Signed: _____ Date: __/__/__

Please return completed form to Environment Manager

Appendix 4

LLE902 Plant On-boarding Form

LLE902I

Hired Plant Inspection Report – Earthmoving Plant

Project :	The Northern Road Upgrade Stage 3			**Date:**	
Plant Hirer:				**Make:**	
				Model:	
Plant/Unit No:		**Serial Number:**		**Rego Number:**	
Rego Expiry Date:		**State Registered:**		**Hours:**	
Hours Last Service:		**Date Last Service:**		**Next Service Due:**	
Location of Service History Records:				**Project Issued Plant Number:**	

THE FOLLOWING ITEMS ARE MANDATORY REQUIREMENTS	**Plant Supplier to Complete**	**Project Confirmed**
Australian Standard R.O.P.S Canopy (where applicable)	Yes ☐ No ☐	☐
Australian Standard F.O.P.S. Canopy (where applicable)	Yes ☐ No ☐	☐
Plan Utilised for Clearing and Grubbing Operations must comply with AS2153.1	Yes ☐ No ☐	☐
All Safety Guards and Decals in Good Condition and Fitted	Yes ☐ No ☐	☐
Seatbelt Fitted, Operational and in Good Condition	Yes ☐ No ☐	☐
Fire Extinguisher Fitted and Charged (Test date must be within last 6months)	Yes ☐ No ☐	☐
Reverse Alarm Operation	Yes ☐ No ☐	☐
Flashing Light Fitted and Operational	Yes ☐ No ☐	☐
U.H.F. Radio Fitted and Operational	Yes ☐ No ☐	☐
Emergency Stops Fitted and All Operational	Yes ☐ No ☐	☐
All Vehicle System Operational	Yes ☐ No ☐	☐
Excavator Quick Hitches Supplied and Fitted with Secondary Locking Device	Yes ☐ No ☐	☐
Vehicle cleaned of weed & pest infestations	Yes ☐ No ☐	☐
Plant Registration Paperwork Provided including Conditional (Where Applicable)	Yes ☐ No ☐	☐
Operation and Maintenance Manual with Plant	Yes ☐ No ☐	☐
Plant Risk Assessment Supplied with Plant	Yes ☐ No ☐	☐
Daily Pre-start Log Book Supplied with Plant	Yes ☐ No ☐	☐
Service Records Supplied with Plant	Yes ☐ No ☐	☐
THE FOLLOWING ITEMS ARE MANDATORY WHEN LIFTING FREELY SUSPENDED LOADS WITH EARTHMOVING PLANT		
Audible Warning Device (i.e. Horn)	Yes ☐ No ☐	☐
Level Indicator	Yes ☐ No ☐	☐
Rated Capacity (SWL/WLL) Displayed on the Boom/Frame	Yes ☐ No ☐	☐
Controlled Lowering Device (Burst Valves)	Yes ☐ No ☐	☐
Rated Capacity Chart Displayed in the Cabin	Yes ☐ No ☐	☐

LLE902I Hire Plant Inspection Report – Earthmoving Plant

Carry Out the Following Checks and List Other Defects on the Reverse Side	Tick if ok	Action To Be Taken/Comments
ENGINE		
Coolant Level/ Leaks	☐	
Radiator Hose and Clamps	☐	
Radiator Core Condition	☐	
Vee Belt Condition and Adjustment	☐	
Fan Hub Bearings	☐	
Oil Level/ Leaks	☐	
Air Intake Hoses and Clamps	☐	
Air Cleaner Indicator Level	☐	
Mountings	☐	
DRIVE TRAIN		
Transmission Oil Leaks	☐	
Wheel Hub Oil Leaks	☐	
Final Drive Condition/Leaks	☐	
Wheel Nuts, Locks and Rims	☐	
Suspension Condition/Leaks	☐	
Front and Rear Drive Line Condition (Cracks/Wear)	☐	
Tyre Condition	☐	
Undercarriage Condition	☐	
HYDRAULIC SYSTEMS		
Hose Condition/Leaks	☐	
Cylinder Condition/Leaks	☐	
Reservoir Condition/Oil Level	☐	
STEERING SYSTEMS		
Hose Condition/Leaks	☐	
Cylinder Condition/Leaks	☐	
Linkages: Condition/Wear	☐	
Reservoir Condition/Oil Level	☐	
Articulation Condition/Movement (Cracks/ Wear)	☐	
ELECTRICAL SYSTEMS		
Wiring Condition	☐	
Battery Condition	☐	
Lights Fitted and Operational (including indicators etc.)	☐	
AIR SYSTEMS		

LLE902I Hire Plant Inspection Report – Earthmoving Plant

Carry Out the Following Checks and List Other Defects on the Reverse Side	Tick if ok	Action To Be Taken/Comments
Hose Condition/Leaks	☐	
Air Tanks Condition/Leaks	☐	
Drain valves Condition/Leaks (Test)	☐	
Compressor Condition/Leaks	☐	
BRAKING SYSTEM		
Hose Condition/Leaks (Air/Fluid)	☐	
Service Brake Condition	☐	
Park Brake Condition	☐	
Brake Boosters Condition/Leaks	☐	
Reservoir Condition/Fluid Level	☐	
MAINFRAME		
Cracking/Wear	☐	
Grease Lines/Nipples Fitted and in Good Condition	☐	
WORK TOOLS / ATTACHMENTS		
Frame / Hitch / Pin Joints	☐	
Bucket / Blade	☐	
Bowl / Dump Body	☐	
Ripper / Hammer	☐	
G.E.T Teeth / Edges	☐	
Compactor Feet	☐	
Wheel / Drum Scrapers / Cleaners	☐	
Guards / Panels	☐	
Auger / Chains	☐	
Forks / Carriage	☐	
Jib / Hook (Self latching)	☐	
Other:	☐	
CAB		
Steps/Grab Rails	☐	
General Cab Condition	☐	
Glass	☐	
Mirrors Fitted	☐	
All Controls Clearly Labelled	☐	
OPERATIONAL CHECKS		
Lights (Head, Tail, and Dash) and Reflectors	☐	

LLE902I Hire Plant Inspection Report – Earthmoving Plant

Carry Out the Following Checks and List Other Defects on the Reverse Side	Tick if ok	Action To Be Taken/Comments
Warning Lights, Gauges and SMU Operational	☐	
Horn Operation	☐	
Controls Operation	☐	
Engine Operation Noise/Smoke	☐	
Neutral Start Fitted and Operational	☐	
Drive Train Operation Forward/Reverse and Upshift/Downshift	☐	
Hydraulic System Operation	☐	
Steering System Operation Including Emergency System	☐	
Service Brake Operation Stall Test	☐	
Park Brake Operation Hold Test	☐	
Window Wiper/Washer Operation	☐	
Air Conditioner/Heater/Fan Operation	☐	
Work Tool / Attachment Operation	☐	
Emergency Stops Shut Plant Down	☐	
Plant with Noise Level >85dba to have Signage Fitted for Hearing Protection	☐	

Owner's Inspector:	
Signature:	
Qualifications:	
Date:	

I certify that the described plant is to the manufacturer's specifications and is being serviced and maintained by competent personnel to the manufacturer's recommendations.

I agree to provide on request copies of records indicating the service history of the plant or allow the inspection of these records at their storage location.

I certify that this plant is fit for service and operation within its design limits

Signature:		**Date:**	
Print Name:		**Position:**	

LLE902I Hire Plant Inspection Report – Earthmoving Plant

To Be Completed By Lendlease Project Personnel:			
1. Documents Checked By:	Name:	Date:	Signature:
2. Plant Inspected By:	Name:	Date:	Signature:
3. Accepted On Site By:	Name:	Date:	Signature:
COMMENTS:			

DISTRIBUTION
Copy – Site
Copy – Book

Appendix C - Pre-clearing permit

February 2017

Revision history

Revision	Date	Description	Approval
0	October 2016	Initial draft	
1	December 2016	Update	HC
2	February 2017	Update	

Pre-clearing permit

Project:	**Permit No.:**
Requested by:	**Date Inspected:**
Vegetation clearing start date:	**Expected completion date:**
Subcontractor:	**List of Machinery:**

Vegetation clearing Locations (Attach drawings/sketches)

Ch. From	Ch. To	Carriageway	Location	Comments

Following sections to be completed by Engineer and checked by Project Ecologist and Environmental Officer

#	Control Measure	Yes	No	Comments (Note N/A if required)
1.	Are the proposed works covered by an existing Approval? Note which document covers the works in Comments section: (e.g. REF or another approval).			
2.	Are all Sensitive Areas shown on the attached clearing plans, and been checked for accuracy/required updates? (attach the marked up SAPs)			
3.	Has the vegetation to be cleared been clearly delineated and checked by the Project Ecologist?			
4.	Have all trees / vegetation to be retained been identified by survey and exclusion areas fenced off and sign-posted? State how identified in Comments section.			
5.	Has the required threatened flora been translocated or fenced off prior to clearing?			
6.	Have all hollow bearing trees, potential hollow bearing trees, trees containing nests, bush rocks and hollow logs been clearly marked by the Project Ecologist prior to the commencement of clearing?			
7.	Have any 'Hazardous Trees' been identified and assessed by the Project Ecologist, Environmental Manager, Safety Manager and the RMS for potential early removal?			If yes. Detail assessment in the descriptive section of this permit
8	Have any "Hazardous Trees' been identified on or adjacent to the clearing boundary that require removal? If so, have they been assessed as above?			If yes. Detail assessment in the descriptive section of this permit
9.	Have all pre-clearing assessments required by the FFMP been undertaken by the Project Ecologist and have the checks for animals occurred at the appropriate times? Where required, state how survey was completed, including results?			

10.	If soil disturbance is to occur, has a PESCP Plan been created and have these controls been installed?			
11.	Has weed management been undertaken, if required?			
12.	Have the Project Ecologist / relevant fauna rescue organisations been contacted and do they have adequate resources available to assist with fauna rescue? Ensure the contact details of the Project Ecologist or rescue organisations have been provided to the relevant supervisory personnel.			
13.	Has the Project Ecologist been advised of the times when they must be present for the felling of habitat trees? Note: Minimum 48 hour (2 night) wait period required for felling habitat trees.			
15.	Are any animals present? (If *Yes*, relocation required)			
16.	Are any active nests present? (If *Yes*, relocation required)			
17.	Have the signatories to this permit walked the area concerned and confirmed the clearing boundary and sensitive areas (including heritage areas) are clearly demarcated (with appropriate durable delineation)?			

Brief description of sensitive areas / sites or threatened species within clearing zone:		
ALL PARTS OF THE PERMIT MUST BE COMPLETED		
Additional comments:		
Inspection completed by Project Ecologist:	Signature:	Date:
Approved by EO/EM:	Signature:	Date:
Approved by Survey Manager/Surveyor:	Signature:	Date:
<u>ENVIRO & FOREMAN SIGN-OFF: (Works Personnel to Sign-off Toolbox Form)</u>		

18.	Have relevant workers (including the clearing subcontractor) been toolboxes on the limit of clearing, sensitive area locations, no go areas, fauna descriptions and handling procedures and clearing eWMS?		

Unexpected Threatened Flora and Fauna Species and EEC Find Procedure

1 Purpose

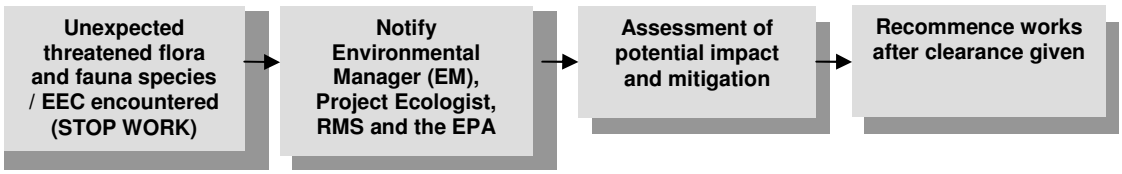
This procedure details the actions to be taken when a threatened species / EEC is unexpectedly encountered during excavation / construction activities.

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.

4 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**.



Refer to **Figure 5.1** for Unexpected Threatened Flora and Fauna Species / EEC Find Procedure flow chart.

5 Procedure

If a threatened flora and fauna 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, RMS and the EPA.

An assessment is to be undertaken by the EM and the Project Ecologist to determine the likely impact to the threatened flora and fauna species / EEC and appropriate management options developed in consultation with RMS.

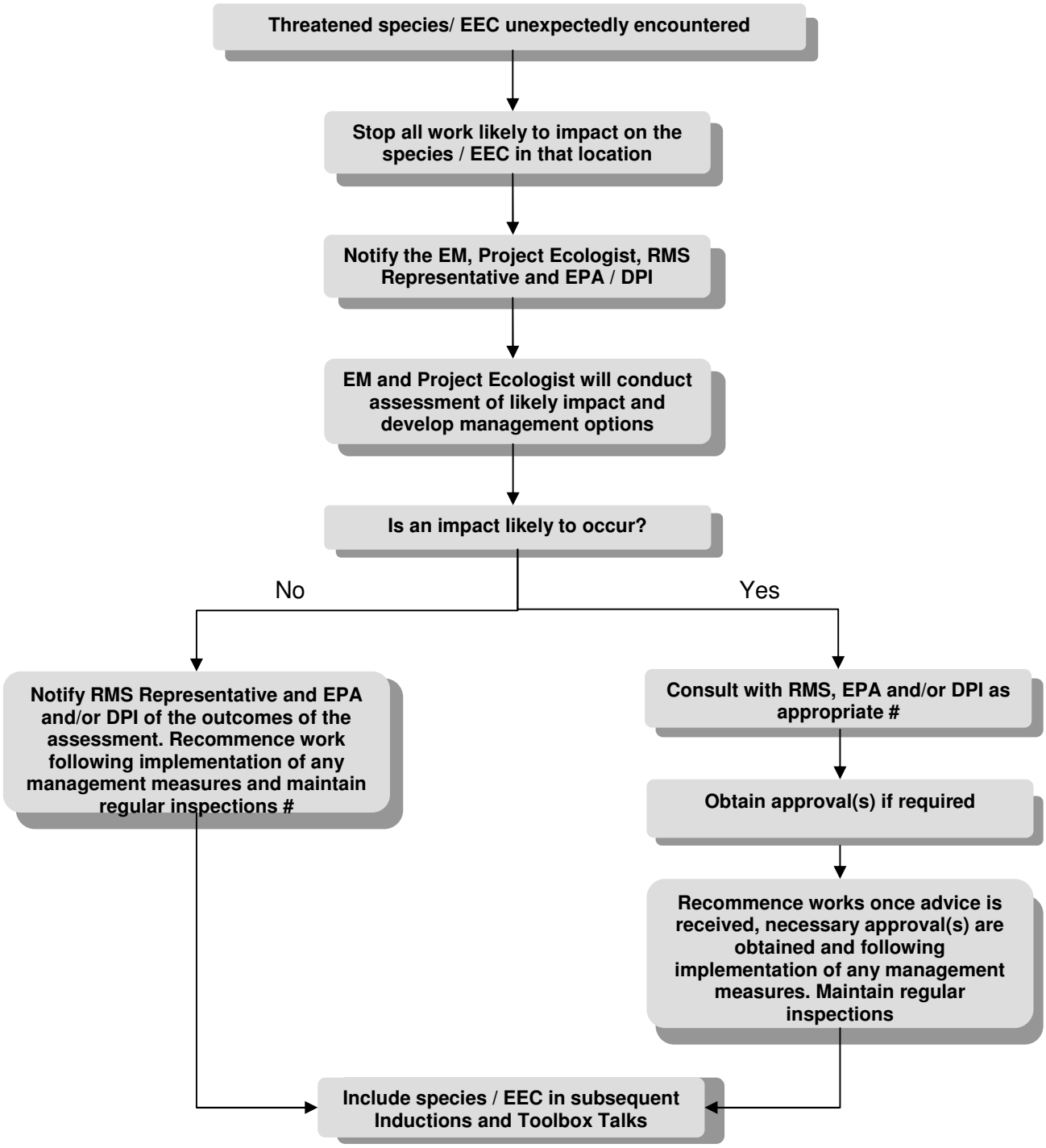
If a significant impact is likely to occur, consultation will be undertaken with the EPA and / or DPI as appropriate.

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

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

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

Figure 5.1 Unexpected Threatened Flora and Fauna Species / EEC Find Procedure Flow Chart



Note: The Commonwealth Department of Sustainability, Environment, Water, Population and Communities is to be consulted if the flora species encountered is listed under the EPBC Act.

Appendix E - Working around trees guideline

February 2017

Document control

File name	Appendix E - Working around trees guideline - Rev2.doc
Report name	Working around trees guideline
Revision number	2

Revision history

Revision	Date	Description	Approval
0	November 2016	DRAFT	
1	December 2016	Draft 1	
2	February 2017	Update	

1 Introduction

There are no restrictions on the distribution/circulation of this guideline within the Northern Road – Stage 3 North Project (the Project).

2 Purpose

Many of the works to be undertaken for the Project involve works within or near trees. Damage to trees and roots from excavation or material /equipment storage can cause declining tree health leading to structural instability. Damage can also result in an increased risk to worker and public safety from unstable trees and possible fines for Lendlease and its subcontractors.

This guideline has been prepared to provide Lendlease and its contractors with an easy to use guide to the minimum requirements of working around trees to reduce the risk of damage.

In addition, recommendations are made for the protection of vegetation to be retained during the construction of the project. Examples of locations where vegetation/trees are likely to be retained include but are not limited to:

- Tree's adjoining the clearing limit for the works; and
- Other trees where recommended by the Project Ecologist.

3 Induction / Training

Personnel involved in any aspect of working around trees will be trained in the requirements of this guideline. All personnel are to be inducted on the location of sensitive areas, exclusion zones, the associated fencing / signage delineating these areas and the relevant actions for them with regards to this guideline during the project induction, EWMS and regular toolbox talks.

4 Scope

This guideline is applicable to all activities relating to working around trees on the Project.

5 Guidelines

5.1 Tree protection

For trees identified specifically for protection, environmental and construction personnel, under supervision of an ecologist where required, are to ensure appropriate demarcation (i.e. star pickets with paraweb fence and protection area signage), signposting and maintenance to ensure no impact to these trees occurs.

5.2 Site material storage

The storage of soils/material under trees can compact soil, limit water and oxygen uptake, damage roots and cause tree death. Therefore prior to the commencement of works near trees, the Foreman or other construction personnel should determine areas where machinery, materials and equipment can be stored that are outside the drip line of trees.

5.3 General construction near trees

For all works to be undertaken near vegetation to be retained, the following points should be observed:

1. Prior to using machinery within or close to the drip line of trees, observe the location of trunks, roots and branches to ensure damage is avoided.
2. Trees identified for retention/protection should be clearly delineated prior to the commencement of work within the tree protection zone.
3. Some branches can be tied back if they are obstructing work. This depends on the flexibility and strength of the tree. Contact the Foreman who will get the EC (who may contact the ecologist or arborist if required) to undertake flexibility test prior to tying back branches.
4. Report any tree damage to the Foreman or EC. Quick remedial action can usually prevent long term damage to the tree.

5.4 Excavations near trees

Some construction works, particularly drainage, may be designed within close proximity to vegetation planned to be retained. To ensure roots are not damaged in a way that could detrimentally affect tree health, the following points should be observed:

1. Where possible, redesign drainage to avoid impact within the drip lines of retained vegetation.
2. Excavation with machinery should occur outside the drip line of trees where possible.
3. For necessary excavation works within the drip line of trees, where the tree is planned to be retained, smaller machinery or hand excavation should be used to avoid or minimise root damage where reasonable and feasible.
4. For all excavations within the drip zones of trees to be retained, proceed with caution and monitor for roots greater than 50mm in diameter

   Roots greater than 50mm must not be damaged unless approved by the Environment Officer, or if required a qualified arborist. As damage to woody roots >50mm may make trees unstable and they can fall over. Larger roots may need to be cut by an arborist.

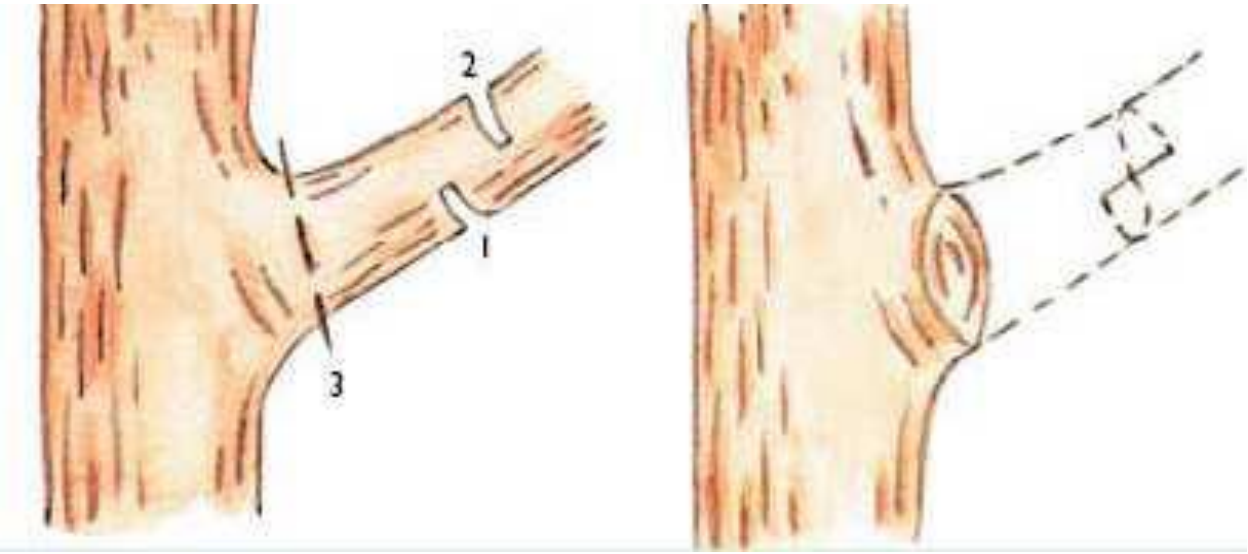
5.5 Tree trimming or removal

Some construction works will require tree removal or trimming that has not been included in the design. Where additional impacts to trees are proposed, the following process should be followed:

1. The Foreman should notify the EC of the location and need for the tree impact.
2. The EC should confirm that the tree (or other vegetation type) is not protected under relevant legislation and is able to be removed and/or trimmed, through consulting the Project Ecologist.
3. If impact is permitted as per Step 2, and the tree is to be retained, the EC will contact an arborist to undertake the trimming of the tree(s) as required.
4. If impact is permitted as per Step 2, and the tree is to be removed, the EC will notify the Foreman that the tree can be removed implementing the Pre-clearing permit and Clearing, Grubbing and Mulching EWMS.
5. The Foreman should await confirmation from the EC prior to re-commencing works around the tree(s).

Heavy machinery should not be used for pruning or trimming. Appropriate tools to use are loppers, chain saws and vehicle mounted saws. Larger limbs should generally be cut in accordance with the three cut method, shown below in Figure 1.

Limbs containing hollows should be retained wherever possible. If this is not possible, the hollow bearing limb should be inspected by the Project Ecologist, who supervises the felling operation, and placed in adjacent un-disturbed vegetation to provide fauna habitat.



1. The undercut.
2. The upper cut to remove the branch.
3. The final trim cut.

Figure 1 - Three cut method

Appendix F - Fauna handling and rescue procedure

FEBRUARY 2017

Document control

File name	Appendix F - Fauna handling and rescue procedure - Rev2.doc
Report name	Fauna handling and rescue procedure
Revision number	2

Revision history

Revision	Date	Description	Approval
0	November 2016	Initial Draft	
1	December 2016	Draft	
2	February 2017	Update	

Contents

1 Introduction

There are no restrictions on the distribution/circulation of this procedure within The Northern Road – Stage 3 North Project (the Project).

2 Purpose

This procedure explains the actions to be undertaken in the event fauna (including injured, shocked, dependent juvenile or other) 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**.**

3 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.

4 Scope

This procedure is applicable to all activities that may lead to fauna handling or rescue, such as clearing operations, on the Project.

5 Procedure

5.1 Discovery of wildlife on project site during construction activities

If wildlife 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 Environmental 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 the animal faces a risk of injury, death or severe stress and no ecologist or wildlife carer is available on site and the animal is not potentially venomous and is able to be handled safely, the Environmental Coordinator shall:
    a) If time permits, call ecologist or fauna rescue for advice.
    b) Attempt to herd animal into adjoining forest.
    c) If capture is necessary, cover larger animals with a towel or blanket and place in a cardboard box and/or canvas bag.
    d) Place smaller animals in a cotton bag, tied at the top.
    e) Keep the animal in a quiet, cool, ventilated and dark location away from noisy construction activities.
    f) 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 FAWNA / 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 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).

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. FAWNA / 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 follow:

Agency/business	Contact Number
Project Ecologist	TBD
Sydney Wildlife (only to be called if Project Ecologist not available)	02 9413 4300
WIRES	1300 094 737
RSPCA	02 4782 2674
Veterinary Hospital	02 4736 2027

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 Coordinator or Environmental Manager must:

a) Immediately cease all work likely to affect the threatened species.

b) The Environmental Manager shall contact the RMS Representative to inform them of the situation.

c) The Environmental Manager shall then contact the following stakeholders, in this order, to determine the appropriate corrective actions and additional safeguards to be undertaken:

- Project Ecologist.
- EPA (131 555).
- Others as instructed by the RMS Representative or EPA.

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

8. Environmental Manager to record find in 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.

11. Relocation of fauna adjacent to the footprint will be undertaken 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 undertaken during periods of heavy rainfall.

    e) Hollow-dependent species, particularly those with dependent young, shall be released into a temporary nest box.

6 Aquatic fauna relocation

Where necessary, aquatic fauna shall be relocated in accordance with the following steps:

1) Ensure all aquatic fauna relocation works are supervised by a suitably qualified aquatic ecologist.
2) The water level should be pumped down to a level that will allow the safe implementation of physical removal methods such as enviro nets, and a combination of netting and electrofishing. Ensure a fine mesh screen is installed on the inlet of the pump to remove the risk of native aquatic faun being transferred through pump.
3) Aquatic ecologist is to establish the presence of native and introduced aquatic fauna and plan the relocation. I.e. relocate native aquatic fauna species into suitable habitat downstream of the works area as close to the original location as possible.
4) Separate the native fish and pest species, native fish placed in tubs full of water from the water body for later relocation and pest fish placed in an ice slurry to be euthanised.
5) Transfer native aquatic fauna species to an aerated transport tank for immediate release downstream in previously identified suitable habitat.
6) Following completion of the relocation, a final check shall be undertaken to find any remaining fish, or dying/dead fish.
7) All euthanised and dead fish are to be transported to a licensed landfill facility for disposal.
8) Aquatic ecologist is to prepare a report on the relocation, detail the source of the fish, the number and species of fish released and euthanized.

6.1 Project Ecologist responsibilities for fauna handling and rescue

The Project Ecologist will follow the relevant steps detailed below:

1. Surveys and rescue 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 48 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.

Note -Habitat trees are to be felled using equipment that allows habitat trees to be carefully felled with minimal impact.

2. 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 (within or adjacent to the Project boundary) taking into account:

a) The release site contains similar habitat and occurs as close to the point of capture as possible;

b) If the species is nocturnal, release will normally be carried out at dusk;

c) Hollow dependent nocturnal fauna will generally be housed in a nest box, which will be installed temporarily at the release site and unplugged at dusk. The box will be checked and retrieved the following day.

d) Release would generally not be undertaken during periods of heavy rainfall except for aquatic fauna; and

e) Non-native fauna will be euthanased.

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, selected by the Project Ecologist that will not be disturbed by the project construction works. The Project Ecologist will record and provide the capture and relocation data in the post clearing report.

3. 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 suitable nest box, carry cage or canvas bag.

b) Place smaller animals in a cotton bag, tied at the top, or suitable nest box.

c) Place frogs/tadpoles in a plastic bag with a small amount of water and leaf litter. One individual per bag.

d) Fish and other aquatic life (i.e. turtles) place in plastic aquaria or plastic container with sufficient water.

e) For terrestrial fauna keep the animal in a quiet, cool, well ventilated and dark place away from noisy activities.

f) For aquatic fauna species ensure there is sufficient water and adequate aeration.

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 Sydney Wildlife / 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).

4. In the event an animal is injured the following fauna rescue services and local veterinary surgeries contact details are detailed in 5.1(6) above.

In the event the rescue service and/or local veterinary service cannot be contacted, 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.

5. If the fauna species is identified as a threatened species that is not a species identified in the FFMP, notify the Environmental Manager who will follow steps 5.1(7) to 5.1(11)