APPENDIX B2
Construction Flora and Fauna Management Sub Plan

The Northern Road Upgrade
Between Mersey Road and Eaton Road
November, 2018
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The Northern Road Upgrade between Mersey Road and Eaton Road
Construction Flora and Fauna Management Sub Plan
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## Glossary / Abbreviations

<table>
<thead>
<tr>
<th>Term</th>
<th>Expanded text</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASS</td>
<td>Acid sulfate soil</td>
</tr>
<tr>
<td>BC Act</td>
<td><em>Biodiversity Conservation Act 2016</em></td>
</tr>
<tr>
<td>BMAD</td>
<td>Bell Miner Associated Dieback</td>
</tr>
<tr>
<td>CCS</td>
<td>Community Communications Strategy</td>
</tr>
<tr>
<td>CMS</td>
<td>Complaints Management System</td>
</tr>
<tr>
<td>CEMP</td>
<td>Construction Environmental Management Plan</td>
</tr>
<tr>
<td>CFFMP</td>
<td>Construction Flora and Fauna Management Sub Plan</td>
</tr>
<tr>
<td>CoA</td>
<td>Condition of Approval</td>
</tr>
<tr>
<td>Compliance audit</td>
<td>Verification of how implementation is proceeding with respect to the CEMP (which incorporates the relevant approval conditions)</td>
</tr>
<tr>
<td>CSSI</td>
<td>Critical State Significant Infrastructure</td>
</tr>
<tr>
<td>DBH</td>
<td>Diameter at breast height</td>
</tr>
<tr>
<td>DEC</td>
<td>Department of Environment and Conservation (NSW) (former)</td>
</tr>
<tr>
<td>DECC</td>
<td>Department of Environment and Climate Change (NSW) (former) DECC Department of Environment and Climate Change (now EPA)</td>
</tr>
<tr>
<td>DEOH</td>
<td>Defence Establishment Orchard Hills</td>
</tr>
<tr>
<td>DoEE</td>
<td>Commonwealth Department of the Environment and Energy</td>
</tr>
<tr>
<td>DP&amp;E</td>
<td>NSW Department of Planning and Environment</td>
</tr>
<tr>
<td>DPI</td>
<td>Department of Primary Industries</td>
</tr>
<tr>
<td>EEC</td>
<td>Endangered Ecological Community</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>Environmental aspect</td>
<td>Defined by AS/NZS ISO 14001:2015 as an element of an organisation’s activities, products or services that can interact with the environment</td>
</tr>
<tr>
<td>Environmental heritage</td>
<td>Places, buildings, works, relics, movable objects and precincts, of State or local heritage significance as outline in Section 4 of the Heritage Act</td>
</tr>
<tr>
<td>Environmental impact</td>
<td>Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s environmental aspects</td>
</tr>
<tr>
<td>Environmental incident</td>
<td>An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment</td>
</tr>
<tr>
<td>Term</td>
<td>Expanded text</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Environmental objective</td>
<td>Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve</td>
</tr>
<tr>
<td>Environmental Representative (ER)</td>
<td>A suitably qualified and experienced person independent of Project design and construction personnel employed for the duration of Construction. The principal point of advice in relation to all questions and complaints concerning environmental performance</td>
</tr>
<tr>
<td>Environmental target</td>
<td>Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives</td>
</tr>
<tr>
<td>EPA</td>
<td>NSW Environment Protection Authority</td>
</tr>
<tr>
<td>EP&amp;A Act</td>
<td><em>NSW Environmental Planning and Assessment Act 1979</em></td>
</tr>
<tr>
<td>EPBC Act</td>
<td><em>Commonwealth Environmental Protection and Biodiversity Conservation Act 1999</em></td>
</tr>
<tr>
<td>EPL</td>
<td>NSW Environment Protection Licence under the <em>Protection of the Environment Operations Act 1997</em></td>
</tr>
<tr>
<td>ERG</td>
<td>Environmental Review Group</td>
</tr>
<tr>
<td>ESR</td>
<td>GEJV Environmental Site Representative</td>
</tr>
<tr>
<td>EWMS</td>
<td>Environmental Work Method Statements</td>
</tr>
<tr>
<td>Federal-CoA</td>
<td>Condition of the Federal Department of the Environment and Energy Approval Decision</td>
</tr>
<tr>
<td>FM Act</td>
<td><em>Fisheries Management Act 1994</em></td>
</tr>
<tr>
<td>GEJV</td>
<td>Georgiou Ertech Joint Venture</td>
</tr>
<tr>
<td>GMS</td>
<td>Georgiou management system</td>
</tr>
<tr>
<td>Hold Point</td>
<td>A point beyond which a work process must not proceed without express written authorisation from Roads and Maritime</td>
</tr>
<tr>
<td>HSE</td>
<td>Health, Safety and Environment</td>
</tr>
<tr>
<td>HSEQ</td>
<td>Health, Safety, Environment and Quality</td>
</tr>
<tr>
<td>JHA</td>
<td>Job Hazard Analysis</td>
</tr>
<tr>
<td>MNES</td>
<td>Matters of national environmental significance</td>
</tr>
<tr>
<td>Non-compliance</td>
<td>Failure to comply with the requirements of the Project approval or any applicable licence, permit or legal requirements</td>
</tr>
<tr>
<td>Non-conformance</td>
<td>Failure to conform to the requirements of Project system documentation including this CEMP or supporting documentation</td>
</tr>
<tr>
<td>NPW Act</td>
<td><em>National Parks and Wildlife Act 1974</em></td>
</tr>
<tr>
<td>NSW-CoA</td>
<td>Condition of the NSW DP&amp;E Infrastructure Approval</td>
</tr>
<tr>
<td>Term</td>
<td>Expanded text</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NSW Infrastructure Approval</td>
<td>The infrastructure approval for the Northern Road Upgrade issued by the New South Wales Government on [30th May 2018]</td>
</tr>
<tr>
<td>NW Act</td>
<td>Noxious Weeds Act 1993</td>
</tr>
<tr>
<td>OACEMP</td>
<td>Overarching Construction Environmental Management Plan</td>
</tr>
<tr>
<td>OEH</td>
<td>NSW Office of Environment and Heritage</td>
</tr>
<tr>
<td>PCT</td>
<td>Plant community types</td>
</tr>
<tr>
<td>Principal, the</td>
<td>Roads and Maritime</td>
</tr>
<tr>
<td>Project, the</td>
<td>The Northern Road Upgrade Between Mersey Road and Eaton Road</td>
</tr>
<tr>
<td>REMM</td>
<td>Revised Environmental Management Measure as provided in the Final EIS / SPIR</td>
</tr>
<tr>
<td>Roads and Maritime</td>
<td>NSW Roads and Maritime Services</td>
</tr>
<tr>
<td>RTA</td>
<td>Roads and Traffic Authority (former)</td>
</tr>
<tr>
<td>SEARs</td>
<td>Secretary’s Environmental Assessment Requirements</td>
</tr>
<tr>
<td>Secretary</td>
<td>Secretary of the NSW Department of Planning and Environment, or delegate</td>
</tr>
<tr>
<td>SPIR</td>
<td>Submissions and Preferred Infrastructure Report</td>
</tr>
<tr>
<td>TEC</td>
<td>Threatened ecological community</td>
</tr>
<tr>
<td>TNR</td>
<td>The Northern Road</td>
</tr>
<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995 (former)</td>
</tr>
<tr>
<td>VMP</td>
<td>Vegetation Management Plan</td>
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</tbody>
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1 Introduction

1.1 Context

This Construction Flora and Fauna Management Sub Plan (CFFMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Northern Road Upgrade between Mersey Road and Eaton Road (the Project). The Project is being delivered by Georgiou Ertech Joint Venture (GEJV). An overview of the Project is shown on Figure 1-1.

An Overarching Construction Environmental Management Plan (OACEMP) has been prepared by Roads and Maritime to address the State and Federal conditions of approval (CoA) and environmental management measures listed in The Northern Road Upgrade – Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park NSW Environmental Impact Statement / Commonwealth Draft Environmental Impact Statement (EIS) as amended by The Northern Road Upgrade – Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park Submissions and Preferred Infrastructure Report (SPIR), Roads and Maritime specifications and all applicable legislation.

This CFFMP has been prepared by GEJV to address the mitigation and management measures outlined in the OACEMP, Roads and Maritime QA specifications, conditions of approval and all relevant legislation.

1.2 Background

As part of EIS development, a detailed flora and fauna assessment was prepared to address the Secretary’s Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment (DP&E) and the Commonwealth EIS Guidelines issued by the Federal Department of the Environment and Energy (DoEE). The flora and fauna assessment, including Biodiversity Offset Strategy was included in the EIS as Appendix I.

Further assessment of flora and fauna impacts was undertaken subsequent to exhibition of the EIS. This assessment was included in the SPIR as Appendix C. Revised environmental management measures (REMMs) were provided within the SPIR.

1.3 Environmental management system overview

The overall Environmental Management System (EMS) for the Project is described in Section 3.1 of the Construction Environmental Management Plan (CEMP).

The CFFMP is part of the GEJV environmental management framework for the Project, as described in Section 3.4 of the CEMP.

Mitigation and management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS).

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, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by GEJV personnel and subcontractors.

The review and document control processes for this Plan are described in Section 6.7 and 6.8 of the CEMP.
1.4 Consultation

Consultation with Roads and Maritime, the community, relevant stakeholders and agencies by GEJV regarding the management of flora and fauna within the Project area will occur throughout the Construction of the Project as required. The approach to community consultation is documented in the Community Communication Strategy (CCS). GEJV will undertake consultation activities in accordance with the principles and processes outlined in the CCS.

In accordance with NSW-CoA B5, prior to the commencement of vegetation clearing, Roads and Maritime and GEJV will consult with community groups, the Mulgoa Valley Landcare Group, Liverpool City Council, Penrith City Council and relevant government agencies to determine if retained timber and root balls could be used for environmental rehabilitation projects, before pursuing other disposal options.

The project Ecologist will consult with OEH, DPI and DoEE as appropriate if threatened ecological communities, flora or fauna not assessed in the biodiversity assessment, are identified in the Project site. Approval

Specific consultation requirements for the management of flora and fauna during Construction of the Project by GEJV are outlined in Table 1-1 below.

Table 1-1 Consultation requirements

<table>
<thead>
<tr>
<th>Consultation</th>
<th>Reference within this CFFMP</th>
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<tr>
<td>GEJV may consult with DPI Fisheries prior to vegetation clearing to identify any trees proposed to be removed that could potentially be used for re-snagging of a waterway.</td>
<td>Section 6.6</td>
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<tr>
<td>The Unexpected Threatened Species (EECs) Procedure will be updated by the GEJV Environmental Site Representative (ESR) in consultation with an external Ecologist engaged by GEJV prior to commencement of Construction of the Project.</td>
<td>Section 6.2 Anallexure B</td>
</tr>
<tr>
<td>GEJV will implement environmental controls in consultation with the Ecologist to prevent the spread or introduction of weeds and pathogens into the Project area.</td>
<td>Annexure D</td>
</tr>
<tr>
<td>Consultation requirements relevant to the Vegetation Clearing Procedure include:</td>
<td>Annexure E</td>
</tr>
<tr>
<td>• Consultation will be undertaken with community groups and relevant government agencies for the supply of root balls prior to clearing commencement</td>
<td></td>
</tr>
<tr>
<td>• Consultation will be undertaken with community groups, the Mulgoa Valley Landcare Group, Liverpool City Council and relevant government agencies prior to the commencement of vegetation clearing to investigate the options for re-use of retained timber and root balls</td>
<td></td>
</tr>
<tr>
<td>Consultation</td>
<td>Reference within this CFFMP</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Consultation will be undertaken with an Ecologist or, where threatened species are likely to be encountered, OEH and DoEE to determine suitable habitat for fauna.</td>
<td>Annexure E</td>
</tr>
<tr>
<td>A nest box strategy will be developed in consultation with an Ecologist.</td>
<td></td>
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</table>
Figure 1-1: Overview of the Project

The Northern Road Upgrade Between Mersey Road and Eaton Road
Construction Flora and Fauna Management Sub Plan
2 Purpose and objectives

2.1 Purpose
The purpose of this Plan is to describe how Construction impacts on flora and fauna will be minimised and managed during Construction of the Project.

2.2 Objectives
The key objective of the CFFMP is to ensure that impacts to flora and fauna are managed appropriately, and minimised, throughout the Construction of the Project. 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.
- Minimise the removal of vegetation and habitat, and ensure re-establishment of native vegetation and habitat following Construction of the Project.
- Develop and implement appropriate biodiversity offsets.
- Ensure appropriate measures are implemented to address the relevant mitigation measures from the OACEMP, the EIS, SPIR, conditions of approval and all relevant Roads and Maritime specifications.
- Ensure appropriate 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:

- Ensure full compliance with the relevant legislative requirements, CoA and management measures detailed in the EIS and SPIR.
- No disturbance to flora and fauna outside the proposed Construction footprint and associated access tracks and site compounds.
- 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 local and adjacent areas where possible.
- Effective rehabilitation / revegetation that ensures different successional stages of rehabilitation are achieved.
- No fauna mortality during Construction. All fauna species encountered during Construction are handled humanely in accordance with industry standards.
- Not facilitate spread of feral animals as a result of Construction.
- No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat.
- Minimise barriers to fauna movement
- Minimise impacts on, and complaints from, the community and stakeholders.
3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation
Legislation relevant to flora and fauna management includes:

- Biosecurity Act 2015 (replaces the Noxious Weeds Act 1993)
- Pesticides Act 1999

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

3.1.2 Guidelines

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

- Roads and Maritime QA Specification G1 – Job Specific Requirements for The Northern Road Upgrade
- Roads and Maritime QA Specification R176 – Native Seed Collection
- *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Department of Sustainability, Environment, Population and Communities, 2013)
- *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth agencies* (Department of Sustainability, Environment, Population and Communities, 2013)
- Framework for Biodiversity Assessment (OEH, 2014)
The Northern Road Upgrade Between Mersey Road and Eaton Road

Construction Flora and Fauna Management Sub Plan

- NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014)
- NSW Guide to Surveying Threatened Plants (OEH, 2016)
- Guidelines for vegetation management plans on waterfront land (NSW Office of Water, 2012)
- Policy and Guidelines for Fish Habitat Conservation and Management (NSW Department of Primary Industries (DPI), 2013)
- Policy and Guidelines for Fish Friendly Waterway Crossings (DPI, 2004)
- Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003)
- Australian Standard AS 4373 Pruning of amenity trees
- NSW Department of Primary Industries, Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings, Fairfull and Witheridge, 2003

Roads and Maritime specifications are a key source of environmental protection management processes relevant to this CFFMP. The specifications set out environmental protection requirements, including Hold Points, which must be complied with by GEJV during Construction of the Project. A Hold Point is a point beyond which GEJV will not proceed without express written authorisation from Roads and Maritime.
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 Section 7.3 and Appendix I of the EIS, and Section 5.1.3 and Appendix C of the SPIR. The Project boundary and relevant ecological data is shown on the sensitive area maps included in the CEMP (Appendix A6).

4.1 Flora

4.1.1 BC Act Threatened ecological communities (TECs)

The field study conducted as part of the EIS identified two threatened ecological communities listed under the Biodiversity Conservation Act 2016 (BC Act):

- Cumberland Plain Woodland in the Sydney Basin Bioregion – listed as critically endangered under the BC Act
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – listed as endangered under the BC Act

The location of these TECs in relation to the Project is shown on Figure 4-1. A map of surrounding plant community types and vegetation zones in relation to the Project is shown in Figure 4-2.

Table 4-1: Plant community types and vegetation zones in the Project area

<table>
<thead>
<tr>
<th>Vegetation zone</th>
<th>Plant community type (PCT)</th>
<th>Condition class</th>
<th>Equivalent TEC</th>
<th>Conservation status</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT no. 849)</td>
<td>Moderate/Good</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act) Portions of zone meet EPBC Act thresholds</td>
<td>13.89</td>
</tr>
<tr>
<td>4</td>
<td>Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT no. 849)</td>
<td>Moderate/Good_Poor</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act)</td>
<td>10.17</td>
</tr>
<tr>
<td>5</td>
<td>Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT no. 850)</td>
<td>Moderate/Good_Poor</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act) Portions of zone meet EPBC Act thresholds</td>
<td>13.38</td>
</tr>
</tbody>
</table>

The Northern Road Upgrade Between Mersey Road and Eaton Road

Construction Flora and Fauna Management Sub Plan

9
<table>
<thead>
<tr>
<th>Vegetation zone</th>
<th>Plant community type</th>
<th>Condition class</th>
<th>Equivalent TEC</th>
<th>Conservation status</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT no. 835)</td>
<td>Moderate/Good_Poor</td>
<td>River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</td>
<td>Endangered (BC Act)</td>
<td>10.30</td>
</tr>
<tr>
<td>7</td>
<td>Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT no. 850)</td>
<td>Moderate/Good_High</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act)</td>
<td>7.33</td>
</tr>
<tr>
<td>8</td>
<td>Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT no. 850)</td>
<td>Moderate/Good_Derived grassland</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act)</td>
<td>49.78</td>
</tr>
<tr>
<td>10</td>
<td>Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT no. 850)</td>
<td>Moderate/Good_Medium</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically endangered (BC Act)</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Notes: * = Vegetation in Moderate/Good condition is all native vegetation that is not in low condition. Vegetation in Low condition is defined as:

a) woody native vegetation with native over-storey percent foliage cover less than 25% of the lower value of the over- storey percent foliage cover benchmark for that vegetation type, and where either:

– less than 50% of ground cover vegetation is indigenous species, or
– greater than 90% of ground cover vegetation is cleared OR

b) native grassland, wetland or herbfield where either:

– less than 50% of ground cover vegetation is indigenous species, or
– more than 90% of ground cover vegetation is cleared
Figure 4-1 Threatened ecological communities

Source: EIS (Roads and Maritime, 2017)
The Northern Road Upgrade
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Construction Flora and Fauna Management Sub Plan

Figure 4-2: Plant community types and vegetation zones
Source: EIS (Roads and Maritime, 2017)
4.1.2 Threatened or otherwise significant plant species

A database and desktop review of threatened flora species was conducted for the EIS study area, which included the entire TNR Upgrade Stages 4, 5 and 6 Project areas. The review assessed the likelihood of species occurring within 10 kilometres of this entire TNR Upgrade Project area. Threatened flora species recorded, or with the potential to occur, within the Project corridor and their conservation status, are listed in Table 4-2.

Targeted field surveys within the entire study area of all these identified flora species with suitable habitat resulted in recording of one threatened flora species listed under the BC Act and EPBC Act (*Pultenaea parviflora*) and one endangered population listed under the BC Act (*Marsdenia viridiflora*). Neither of these species were identified within the Project area. While none of the species listed in Table 4-2 were identified in the field surveys within the Project area, there is potential for them to occur within the Project area.

**Table 4-2: Threatened flora species**

<table>
<thead>
<tr>
<th>Common name (Scientific name)</th>
<th>Status</th>
<th>BC Act</th>
<th>EPBC Act</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austral Pillwort <em>(Pilularia novae-hollandiae)</em></td>
<td>Endangered</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Austral Toadflax <em>(Thesium australe)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Bynoes Wattle <em>(Acacia bynoeana)</em></td>
<td>Endangered</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td><em>Dillwynia tenuifolia</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Downy Wattle <em>(Acacia pubescens)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Eastern Underground Orchid <em>(Rhizanthella slateri)</em></td>
<td>Vulnerable</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Illawarra Greenhood <em>(Pterostylis gibbosa)</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Juniper-leaved Grevillea <em>(Grevillea juniperina subsp. juniperina)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td><em>Marsdenia viridiflora</em> subsp. <em>viridiflora</em> in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas</td>
<td>Endangered Population</td>
<td>-</td>
<td>Recorded</td>
<td></td>
</tr>
<tr>
<td><em>Micromyrtus minutiflora</em></td>
<td>Endangered</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Nodding Geebung <em>(Persoonia nutans)</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Persoonia hirsute <em>(Hairy Geebung)</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Spiked Rice-flower <em>(Pimelea spicata)</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Tall Knotweed <em>(Persicaria elatior)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>White-flowered Wax Plant <em>(Cynanchum elegans)</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td><em>Pultenaea parviflora</em></td>
<td>Endangered</td>
<td>Vulnerable</td>
<td>Recorded</td>
<td></td>
</tr>
</tbody>
</table>

4.1.3 Groundwater dependent ecosystems

No listed high priority groundwater dependent ecosystems are located in the Project area.
4.1.4 Noxious weeds

Field surveys of the flora in the Project area conducted for the EIS identified a number of groundcover, pasture and shrubby weed species, including exotic weeds. Exotic grasses and other vegetation were also recorded within the vegetation zones. However, no noxious weeds were identified in the Project area during the field surveys.

4.2 Fauna

4.2.1 Threatened fauna

A database and desktop review of threatened fauna species within the study area was conducted as part of the EIS Biodiversity Assessment, which included the entire TNR Upgrade Stages 4, 5 and 6 Project areas. The review assessed the likelihood of species occurring within 10 kilometres of this entire TNR Upgrade Project area. Threatened fauna species recorded, or with the potential to occur, within the entire TNR Upgrade Project corridor and their conservation status, are listed in Table 4-3.

Field surveys of all identified candidate fauna species with suitable habitat resulted in recording of one endangered (Cumberland Plain Land Snail) and three vulnerable fauna species (Eastern Bentwing-bat, Eastern Freetail-bat and Eastern False Pipistrelle) listed under the BC Act (formerly the TSC Act) and one species (Grey-headed Flying-fox) listed as vulnerable under the EPBC Act within the ecology study area of the Project. Figure 4-1 shows the recorded locations of these species within the ecology study area of the Project. The Grey-headed Flying-fox was identified at one location on private property off Willowdene Avenue, Luddenham during spotlight surveys.

Table 4-3: Threatened fauna species

<table>
<thead>
<tr>
<th>Common name</th>
<th>(Scientific name)</th>
<th>Status</th>
<th>Likelyhood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Painted Snipe</td>
<td>(Rostratula australis)</td>
<td>Vulnerable</td>
<td>Endangered</td>
</tr>
<tr>
<td>Australasian Bittern</td>
<td>(Botaurus poiciloptilus)</td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
<tr>
<td>Australian Grayling</td>
<td>(Prototroctes maraena)</td>
<td>Endangered (FM Act)</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Barking Owl</td>
<td>(Ninox connivens)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
<tr>
<td>Black Bittern</td>
<td>(Ixobrychus flavicollis)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
<tr>
<td>Black-chinned Honeyeater (eastern subspecies)</td>
<td>(Melithreptus gularis subsp. gularis)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
<tr>
<td>Black-tailed Godwit</td>
<td>(Limosa limosa)</td>
<td>Vulnerable</td>
<td>Migratory</td>
</tr>
<tr>
<td>Brown Treecreeper (eastern subspecies)</td>
<td>(Climacteris picumnus subsp. victoriae)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
<tr>
<td>Bush Stone-curlew</td>
<td>(Burhinus grallarius)</td>
<td>Endangered</td>
<td>-</td>
</tr>
<tr>
<td>Comb-crested Jacana</td>
<td>(Irediparra gallinacea)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
<tr>
<td>Cumberland Plain Land Snail</td>
<td>(Meridolum corneovirens)</td>
<td>Endangered</td>
<td>-</td>
</tr>
<tr>
<td>Diamond Firetail</td>
<td>(Stagonopleura guttata)</td>
<td>Vulnerable</td>
<td>-</td>
</tr>
</tbody>
</table>
### Common name (Scientific name) Status BC Act EPBC Act Likelihood of occurrence

<table>
<thead>
<tr>
<th>Common name</th>
<th>(Scientific name)</th>
<th>Status</th>
<th>BC Act</th>
<th>EPBC Act</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Bentwing-bat</td>
<td><em>(Miniopterus schreibersii oceanensis)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Recorded</td>
<td></td>
</tr>
<tr>
<td>Eastern False Pipistrelle</td>
<td><em>(Falsistrellus tasmaniensis)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Recorded</td>
<td></td>
</tr>
<tr>
<td>Eastern Freetail-bat</td>
<td><em>(Mormopterus norfolkensis)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Recorded</td>
<td></td>
</tr>
<tr>
<td>Eastern Pygmy Possum</td>
<td><em>(Cercartetus nanus)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Flame Robin</td>
<td><em>(Petroica phoenicea)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Freckled Duck</td>
<td><em>(Stictonetta naevosa)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Gang-gang Cockatoo</td>
<td><em>(Callocephalon fimbriatum)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Giant Burrowing Frog</td>
<td><em>(Heleioporus australiacus)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Greater Broad-nosed Bat</td>
<td><em>(Scoteanax rueppellii)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Green and Golden Bell Frog</td>
<td><em>(Litoria aurea)</em></td>
<td>Endangered</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Hooded Robin (south-eastern form)</td>
<td><em>(Melanodryas cucullata subsp. cucullata)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Koala</td>
<td><em>(Phascolarctos cinereus)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Large-eared Pied Bat</td>
<td><em>(Chalinolobus dwyeri)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Little Eagle</td>
<td><em>(Hieraetus morphnoides)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Little Lorikeet</td>
<td><em>(Glossopsitta pusilla)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Littlejohn’s Tree Frog</td>
<td><em>(Litoria littlejohni)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Macquarie Perch</td>
<td><em>(Macquaria australasica)</em></td>
<td>Endangered <em>(FM Act)</em></td>
<td>Endangered <em>(FM Act)</em></td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Masked Owl</td>
<td><em>(Tyto novaehollandiae)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>New Holland Mouse</td>
<td><em>(Pseudomys novaehollandiae)</em></td>
<td>-</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Painted Honeyeater</td>
<td><em>(Grantiella picta)</em></td>
<td>Vulnerable</td>
<td>Vulnerable</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Powerful Owl</td>
<td><em>(Ninox strenua)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Regent Honeyeater</td>
<td><em>(Anthochaera phrygia)</em></td>
<td>Endangered</td>
<td>Critically Endangered</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Scarlet Robin</td>
<td><em>(Petroica boodang)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Speckled Warbler</td>
<td><em>(Chthonicola sagittatus)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Spotted Harrier</td>
<td><em>(Circus assimilis)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Spotted-tailed Quoll</td>
<td><em>(Dasyurus maculatus)</em></td>
<td>Vulnerable</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Square-tailed Kite</td>
<td><em>(Lophoictinia isura)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Squirrel Glider</td>
<td><em>(Petaurus norfolcensis)</em></td>
<td>Vulnerable</td>
<td>-</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Stuttering Frog</td>
<td><em>(Mixophyes balbus)</em></td>
<td>Vulnerable</td>
<td>Endangered</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Swift Parrot</td>
<td><em>(Lathamus discolor)</em></td>
<td>Endangered</td>
<td>Critically Endangered</td>
<td>Moderate</td>
<td></td>
</tr>
</tbody>
</table>

The Northern Road Upgrade Between Mersey Road and Eaton Road

Construction Flora and Fauna Management Sub Plan
<table>
<thead>
<tr>
<th>Common name (Scientific name)</th>
<th>Status</th>
<th>BC Act</th>
<th>EPBC Act</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turquoise Parrot (<em>Neophema pulchella</em>)</td>
<td>Vulnerable</td>
<td>-</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Varied Sittella (<em>Daphoenositta chrysoptera</em>)</td>
<td>Vulnerable</td>
<td>-</td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>White-fronted Chat (<em>Epthianura albifrons</em>)</td>
<td>Vulnerable</td>
<td>-</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Yellow-bellied Sheathtail-bat (<em>Saccolaimus flaviventris</em>)</td>
<td>Vulnerable</td>
<td>-</td>
<td></td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Figure 4-1: Recorded threatened species
4.2.2 Aquatic fauna

The Project lies within the Lower Nepean River Management Zone of the Hawkesbury and Lower Nepean Rivers Water Source. The Project directly traverses Badgerys Creek as well as a number of other unnamed tributaries/drainage lines and farm dams.

Visual inspections of watercourses within the Project area were undertaken to identify aquatic fauna or potential for aquatic fauna. No protected or threatened fish species are considered likely to occur within the Project area due to the limited availability of water and suitable aquatic habitat. The locations of the aquatic survey locations are shown in Figure 4-2 and a summary of the findings of the survey presented in Table 4-4.

There is the potential for native and invasive fish species as well as freshwater eels and turtles, including the Eastern long neck turtle, to be present within dams and creeks. The invasive pest fish species *Gambusia holbrooki* has been sighted, and is likely to be present, in many of the watercourses within the Project area, including Badgerys Creek.

![Aquatic survey locations](image)

Figure 4-2: Aquatic survey locations
Table 4-4: Aquatic fauna

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 17 - Badgerys Creek</td>
<td>Visual inspection sighted the invasive pest species, Gambusia (Gambusia holbrooki) within the creek. No threatened or protected fish species are expected to occur within the creek.</td>
</tr>
<tr>
<td>Site 20 – Unnamed Gully upstream of Duncan’s Creek</td>
<td>No fish were sighted during visual inspections.</td>
</tr>
<tr>
<td>Site 23 – Farm Dam</td>
<td>No fish were sighted during visual inspections.</td>
</tr>
<tr>
<td>Site 27 – Farm Dam</td>
<td>Visual inspection sighted the invasive pest species, Gambusia (Gambusia holbrooki). No threatened or protected fish species are expected to occur in the dam.</td>
</tr>
<tr>
<td>Site 29a – Unnamed watercourse</td>
<td>No fish were sighted during visual inspections.</td>
</tr>
<tr>
<td>Site 29b – Farm Dam</td>
<td>No fish were sighted during visual inspections.</td>
</tr>
<tr>
<td>Site 39 - Unnamed Dam and Watercourse</td>
<td>No fish were sighted during visual inspections, however Gambusia (Gambusia holbrooki) are likely to be present. No threatened or protected fish species are expected to occur within the dam.</td>
</tr>
</tbody>
</table>

4.2.3 Aquatic habitat

DPI Fisheries defines 'Key Fish Habitats' (KFH) as those aquatic habitats that are important to the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. KFH includes all marine and estuarine habitats up to highest astronomical tide level (that reached by 'king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank. Small headwater creeks and gullies (first and second order streams), that only flow for a short period after rain are generally excluded, as are farm dams constructed on such systems. Wholly artificial waterbodies such as irrigation channels, urban drains and ponds, salt and evaporation ponds are also excluded except where they are known to support populations of threatened fish or invertebrates.

A map of KFH has been prepared based on this definition. These maps indicate that key fish habitat within the Project area is situated at Badgerys Creek as shown on Figure 4-2.

Fish habitats were also assessed using the fisheries habitat classification set out in Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003):

- **Class 1 – major fish habitat**: major permanently or intermittently flowing waterway (e.g. river or major creek), habitat of a threatened fish species.
- **Class 2 – moderate fish habitat**: named permanent or intermittent stream, creek or waterway with clearly defined bed and banks with semi-permanent to permanent waters.
in pools or in connected wetland areas. Marine or freshwater aquatic vegetation is present. Known fish habitat and/or fish observed inhabiting the area.

- **Class 3 – minimal fish habitat**: named or unnamed waterway with intermittent flow and potential refuge, breeding or feeding areas for some aquatic fauna. Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or recognised aquatic habitats.

- **Class 4 – unlikely fish habitat**: named or unnamed waterway with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free standing water or pools after rain events.

Fish habitat classification criteria for the locations shown on Figure 4-2 and the recommended crossing types are provided in Table 4-5.

**Table 4-5: Fish habitat classification criteria and recommended crossing types**

<table>
<thead>
<tr>
<th>Site</th>
<th>Fish passage classification</th>
<th>Crossing type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 17 - Badgerys Creek</td>
<td>Class 2</td>
<td>Culvert C620</td>
</tr>
<tr>
<td>Site 20 – Unnamed Gully upstream of Duncan’s Creek</td>
<td>Class 4</td>
<td>Culvert C2240</td>
</tr>
<tr>
<td>Site 23 – Farm Dam</td>
<td>Class 3</td>
<td>Culvert C2610</td>
</tr>
<tr>
<td>Site 27 – Farm Dam</td>
<td>Class 3</td>
<td>Culvert C2850</td>
</tr>
<tr>
<td>Site 29a – Unnamed watercourse</td>
<td>Class 2</td>
<td>Culvert C3250</td>
</tr>
<tr>
<td>Site 29b – Farm Dam</td>
<td>Class 3</td>
<td>Culvert C3250</td>
</tr>
<tr>
<td>Site 39 - Unnamed Dam and Watercourse</td>
<td>Class 2</td>
<td>Culverts C4460 and C4720</td>
</tr>
</tbody>
</table>

### 4.2.4 Migratory species

A search of the Protected Matters Search Tool identified 13 listed migratory species or their habitat as occurring within 10 km of the entire TNR Upgrade Stages 4, 5 and 6 Project areas. Targeted bird surveys carried out for the EIS were conducted during late spring and summer to coincide with the presence of migratory species. The surveys focused on specific habitats within the Project area. No EPBC Act listed migratory species were recorded during the targeted bird surveys.

Although not recorded during field surveys, a further three EPBC Act listed migratory species are considered likely to occur seasonally in the Project area. It is moderately likely that the Great Egret occurs in wetlands located within the Project area and surrounds, while the White-throated Needletail and Fork-tailed Swift are considered likely to fly over the Project area during their seasonal migration.
4.3 Pre-Construction surveys

Prior to commencement of the Project, GEJV will undertake Pre-Construction surveys to verify the Construction boundaries/footprint of the Project and to confirm the vegetation to be cleared. The Pre-Construction surveys will be conducted by the Project Ecologists and in accordance with the *Biodiversity Guidelines* (RTA, 2011). The purpose of the surveys is to identify habitat trees to be felled in a staged approach and identify fauna release areas should fauna be encountered during vegetation removal. Annexure E contains a Vegetation Clearing Procedure to ensure that all vegetation clearing and grubbing is undertaken within the approved areas and impacts to flora and fauna are minimised. The Procedure includes a Flagging Protocol that describes the process for the marking of environmentally sensitive areas during surveys. All site personnel with responsibilities related to vegetation clearing and working in environmentally sensitive areas will be trained in the Vegetation Clearing Procedure, including the Flagging Protocol.

GEJV will summarise the outcomes of the Pre-Construction surveys and provide Roads and Maritime the survey reports. The pre-Construction reports will be used to update the sensitive area plans. Any additional mitigation or management measures resulting from the surveys will be incorporated into the CFFMP as required. GEJV will update the stage specific Sensitive Area Plans (Appendix A6) with the information from these surveys.
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)
- Noise, vibration and light impacts
- Disturbance of soils, consequential erosion and the mobilisation of sediment
- Use of chemicals / fuels (potential for spills)
- Works around and within watercourses
- Dewatering of dams
- Establishment of ancillary facilities
- Demolition of built structures
- Vehicle movements
- Excavation works
- Drainage works.
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 include:
- Vegetation clearance including Endangered Ecological Communities.
- Loss of threatened flora species and their habitats
- Loss of threatened fauna species and their habitats
- Fragmentation of habitats and wildlife corridors
- Removal of hollow bearing trees
- Spread of weeds, pests, pathogens and disease
- Injury and mortality of individual fauna.
- Impacts to riparian areas
- Impact on water quality, aquatic habitat loss and instream barriers to movement of fauna
- Impact of noise, vibration, dust, light and contaminants
- Edge effects on adjacent native vegetation and habitat
- Cumulative impacts in association with nearby objects.
Notwithstanding, the mitigation and management measures provided in Table 6-1 aim to minimise the above likely and potential impacts on flora and fauna.
5.2.1 Clearing of native vegetation

Clearing of native vegetation for the Project will be in accordance with the impacts identified, assessed and approved in the EIS, as amended by the SPIR, and the requirements of NSW-CoAs A1 and A2. Clearing for the Project will result in the removal of native vegetation, and the impacts associated with this removal will be long-term.

Removal of BC Act listed threatened ecological communities

Clearing will result in the loss of vegetation representative of eight PCTs. Vegetation clearing will impact on the BC Act (formerly TSC Act) listed critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion ecological community and BC Act listed endangered River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions ecological community.

Removal of EPBC Act listed threatened ecological communities

Removal of EPBC Act listed EECs for the Project will be in accordance with the impacts identified, assessed and approved in the EIS, as amended by the SPIR, and the requirements of NSW-CoAs A1 and A2. Clearing within identified environmentally sensitive areas will not be undertaken without the approval of the Roads and Maritime Project Manager and Environmental Manager (or delegate).

The Project will result in the direct clearing of EPBC Act listed critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community. Some of this ecological community to be cleared is located on Commonwealth land. A matters of national environmental significance (MNES) assessment concluded that Construction of the Project will result in a significant and long-term impact to the critically endangered ecological community.

Removal of threatened fauna species habitat and habitat features

Clearing for Construction of the Project will have indirect impacts on fauna due to removal of foraging and/or breeding habitat. The BC Act (formerly TSC Act) listed endangered Cumberland Plain Land Snail occurs within the Project area. Clearing of native vegetation will remove a portion of suitable habitat for this species within the Project area.

Vegetation clearing will result in the loss of potential suitable local foraging habitat for four EPBC Act listed threatened fauna species, Grey-headed Flying-fox, Regent Honeyeater, Swift Parrot and Large-eared Pied Bat that were either recorded in or identified as having a moderate to high likelihood of occurring within the Project area. Vegetation removal is not expected to impact key breeding sites for these species and is therefore unlikely to result in declines in population. MNES assessments determined that the Project is unlikely to have a significant impact on these species.

Impacts to habitat for EPBC listed migratory species

A MNES assessment completed for recorded migratory species and those with a moderate or high likelihood of occurrence within the Project area concluded that, although the Project will result in the loss of occasional habitat for migratory species, no significant impact on migratory species listed under the EPBC Act is expected due to Construction of the Project.
5.2.2 Impacts to aquatic biodiversity

Construction activities adjacent to waterways have the potential to impact aquatic ecosystems by causing changes in water quality, habitat loss and instream barriers. Increased scour potential in drainage lines may deepen waterways and cause bank erosion. The removal of woody snags, changes to instream substrate and loss of aquatic plants has the potential to cause temporary changes to flow in watercourses and impact aquatic habitat. The removal of large woody debris or snags is listed under Schedule 6 of the FM Act as a key threatening process. All woody debris and snags encountered during Construction will be relocated instream to ensure impacts to the presence and availability of woody debris is prevented.

Stockpiles and compound sites will not be located within 50 m of any waterway, so as to minimise any effects on downstream water quality during wet weather. Man-made dams located within the Project area are unlikely to constitute key fish habitat, and threatened species are unlikely to be present within these dams. However, it is possible that native and invasive fish species as well as freshwater turtles and eels have colonised the dams. If native fish or aquatic fauna species are identified in dams or creeks to be dewatered during Construction of the Project, the species will be relocated to a similar aquatic environment to which it was found by a suitably qualified and trained aquatic ecologist under a Fisheries Permit issued by DPI Fisheries. Invasive fish species will be humanely euthanised by a trained aquatic ecologist in a manner consistent with the Prevention of Cruelty to Animals Act, 1979.

5.2.3 Habitat fragmentation

The Project area is located within an area in which historic land use has resulted in clearing of vegetation and much of the existing vegetation occurs as small fragments within an agricultural landscape. While many areas of vegetation within and directly adjacent to the Project area are already considerably edge-effected, there is potential for a high magnitude residual impact to occur to some of the more intact habitats within the Project area. Fragmentation due to the Project is not expected to prevent the breeding and dispersal of plant pollinators or the dispersal of plant propagules between habitat patches. However, local division of some wildlife populations, isolation of key habitat resources, loss of genetic connectivity and population viability may result from local fragmentation caused by the Project, which would create long-term impacts.

To minimise such impacts to wildlife corridors, a fauna crossing will be included as part of the refined design of culverts at Badgerys Creek.

5.2.4 Injury and mortality of fauna

There is potential for injury to or mortality of native fauna where native vegetation and other habitat features are to be cleared or demolished. Risk injury or mortality will be greatest for less mobile fauna, such as ground dwelling reptiles, nocturnal fauna, or tree-dwelling and hollow-dwelling mammals and Microchiropteran bat species. Common fauna species such as possums, reptiles and frogs are the most likely to be affected. Fauna may also be injured or become trapped in deep or steep-sided trenches or in machinery stored in the Project area.
5.2.5 Invasion and spread of weeds and pests

Construction activities such as earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery have the potential to disperse or import weed species into the Project area. Risk of habitat modification due to weed invasion is greatest when activities take place in relatively intact areas such as the higher condition areas of Cumberland Plain Woodland that exhibit low weed diversity and abundance.

Pests present within the Project area such as rabbits and foxes may be dispersed across the surrounding landscape due to disturbance from Construction activities.

Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners is listed as a key threatening process under the BC Act. This phenomenon, known as Bell Miner Associated Dieback (BMAD), currently affects Grey Box trees within the Project area. This species is a key component of the critically endangered Cumberland Plain Woodland ecological community and this issue is therefore a concern. Vegetation clearing that results in increased fragmentation and removal of trees used as habitat by psyllids and Bell Miners could increase the prevalence and severity of BMAD in the Project area.

5.2.6 Invasion and spread of pathogens and disease

Construction activities have the potential to introduce pathogens such as Phytophthora (Phytophthora cinnamomi) and Myrtle Rust (Uredo rangelii), both of which can lead to dieback of native vegetation, with associated loss of habitat for fauna species. Infection of native plants by P. cinnamomi and U. rangelii is listed as a key threatening process in NSW. In addition, there is potential for infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis, which is a key threatening process under both the EPBC Act and BC Act.

Construction activities associated with the Project that have the potential to introduce or spread disease include earthworks, movement of soil and through the movement of vehicles and machinery.

5.2.7 Water pollution

Water pollution may result from hydrocarbon leaks or spills from vehicles or equipment used during Construction adjacent to waterways. Surface excavation has the potential to expose acid sulfate soils (ASS), with potential for acidification.

5.2.8 Noise, vibration, dust, light and contaminants

Construction of the Project will result in increased noise and vibration, as well as light pollution due to night works. These impacts may disturb fauna, disrupting foraging, reproductive, or movement behaviours, particularly for nocturnal fauna and sensitive species.

Dust emitted during earthworks, vegetation clearing and due to vehicle movements may deposit on plant foliage, however the impact of dust pollution is likely to be localised, intermittent, and temporary in nature.

Adverse impacts to flora and fauna due to accidental release of contaminants to the environment may occur.
6 Environmental mitigation and management measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EIS and SPIR, the conditions of approval and Roads and Maritime documents. Specific measures and requirements to address impacts on flora and fauna are outlined in Table 6-1.

6.1 Biodiversity offsets

Biodiversity offsets are proposed as required by Roads and Maritime. These are documented separately in the Biodiversity Offset Strategy.

6.2 Unexpected threatened species or EEC finds

An Unexpected Threatened Species or Endangered Ecological Communities (EEC) Finds Procedure (Annexure B) has been prepared in accordance with the Biodiversity Guidelines (RTA, 2011), the OACEMP and Roads and Maritime specifications. The purpose of the Procedure is to outline the process to follow in the event of an unexpected species or EEC find during Construction. The Procedure includes:

- Stop work arrangements.
- A notification and communication protocol.
- The consultation process with appropriate specialists to assess the significance of the find and develop management options
- notification process for OEH, DPI, DP&E and DoEE as appropriate
- A procedure to obtain approvals, licences or permits prior to recommencement of works.

6.3 Fauna rescue and release

Handling of fauna during the Project may be required if fauna is encountered during Construction and is required to be relocated or transported to a vet or wildlife carer in the case of injury.

A Fauna Handling and Rescue Procedure is provided in Annexure C of this CFFMP. The purpose of the Procedure is to detail the actions to be implemented in the event that fauna (including injured, shocked, dependent juvenile or other) is discovered that requires handling during Construction of the Project.

The Procedure includes:

- Steps to be followed when rescue or relocation of fauna is required
- A process to ensure that, if native fauna is captured during vegetation clearing or other Construction activities, it is released into a suitable nearby habitat that has been identified as such by an ecologist
- Fauna rescue and release management measures for aquatic fauna and fish
- A procedure for handling of fauna by a licensed fauna handler such as a fauna spotter/catcher, fauna ecologist or wildlife carer with specific animal handling experience
- The responsibilities of the Project Ecologist
• A process to keep records of fauna captured and relocated
• A process to report any injury or death of threatened species.

6.4 Weed and pathogen control

Weed and pathogen management and control practices will be implemented throughout Construction to minimise the risk of spread into and out of the Project area and between Construction sites during Construction of the Project.

A Weed and Pathogen Management Plan (Annexure D) has been developed in accordance with the requirements of the Biodiversity Guidelines (RTA, 2011), Roads and Maritime specifications, and the template Weed and Pathogen Management Plan provided in the OACEMP. The purpose of the Plan is to:

• Identify the pathogens and key weed species and their distribution across the Project sites.
• Prevent the introduction and spread of weeds and pathogens throughout the Construction of the Project.
• Establish an inspection and reporting framework for weeds and pathogens.
  Set out performance criteria for the management of weeds and pathogens for the Project.

The Plan includes:

• Process for identification and mapping of weeds and pathogens at each site
• site assessment process
• measures to prevent the introduction and spreading of weeds and pathogens caused by the Project using a precautionary approach
• hygiene protocols
• weed and pathogen control methods
• disposal methods
• arrangements for monitoring

6.5 Pre-clearing process

A Vegetation Clearing Procedure has been prepared in accordance with the requirements of the Biodiversity Guidelines (RTA, 2011), the OACEMP and Roads and Maritime specifications and is provided in Appendix E of this CFFMP. A Clearing and Grubbing EWMS has also been prepared according to these requirements. The purpose of the Vegetation Clearing Procedure is to:

• Outline environmental control measures to minimise clearing of vegetation within the Project area
• Identify management measures to minimise impacts on biodiversity and the surrounding environment
• Provide a framework for the management of vegetation to be retained or removed
• Outline steps for the minimisation of loss of habitat and harm to associated fauna.
The Procedure includes, but is not limited to:

- Flora and fauna management strategies for pre-clearing, clearing and post-clearing Construction activities including environmental control measures
- Pre-clearing survey form
- Delineation methods for clearing
- Measures to minimise clearing of native vegetation
- Measure to protect vegetation and habitat during clearing activities
- Root ball management procedure
- Flagging protocol
- Specific procedures to protect threatened flora species and populations
- Specific reporting requirements associated with additional survey work and control of clearing activities.

The pre-clearing process will include a pre-clearing survey which will identify the quantity, quality and size of the tree hollows to be removed and the hollow-dependent fauna species inhabiting the area. The survey will identify habitat trees to be felled in a staged approach.

An inventory of hollow bearing trees will be developed as part of the pre-clearing surveys to inform the nest box strategy (Section 6.6). The inventory will include details of the location of each hollow bearing tree and their characteristics such as species, height and diameter at breast height (DBH), number of hollows on the tree, their position and size.

Fauna identified using hollows during surveys will further inform the nest box replacement strategy.

### 6.5.1 Post-Clearing Report

At the completion of clearing, the Project Ecologist will complete post-clearing surveys and prepare a Post-Clearing Report. The report will confirm the final area cleared, the number and identity of all vegetation removed, and specifically, the post-clearance abundance and density count of hollow-bearing trees. The Post-Clearing Report will also identify if any fauna, nests or other fauna habitats were impacted by clearing works and provide fauna capture and relocation data. Further details regarding responsibilities, timing and other requirements for preparation of Post-Clearing Reports is provided in Section 7.9 and Annexure E of this CFFMP.

### 6.6 Nest box strategy

Clearing activities for the Project may result in the removal of hollow bearing trees that provide shelter and nesting sites for fauna. To compensate for the loss of habitat trees within the cleared area, GEJV has developed a nest box management plan in accordance with Guide 8 of the *Biodiversity Guidelines* (RTA, 2011) to outline the specific measures to be implemented to mitigate the impacts of vegetation clearing on hollow-dependent fauna.

The nest box strategy will be based on the results of the pre-clearing survey (Section 6.5) and prepared in consultation with an Ecologist and the community. The strategy includes:

- Target species for the strategy
- Design and quantity of nest boxes according to the target species and number of hollows removed (the hollows: nest box ratio replacement ratio will be 1:1)
- Types and location for installation of nest boxes
- Timing for installation - up to one month prior to clearing, where possible, to provide alternative shelter for hollow-dependent fauna displaced during clearing and following clearing once the abundance/density of tree hollows removed is confirmed
- A monitoring program to coincide with nesting seasons for target species and at least annually
- Inspections of nest boxes for maintenance requirements and replacement where required.

6.7 Exclusion zones

GEJV will install exclusion zones and fencing or other means to demarcate vegetation to be retained. Exclusion zones will be mapped out by a qualified surveyor in accordance with the Flagging Protocol in the Vegetation Clearing Procedure (Annexure E) and Roads and Maritime Specification G40.

GEJV will install environmental protection area signage on exclusion zone fencing at regular intervals agreed to by the Roads and Maritime Environmental Manager (or delegate). The fencing will only be removed following agreement by the Roads and Maritime Environmental Manager (or delegate).

Prior to the removal of exclusion zone fencing the ESR will be consulted and fencing removal will only be undertaken with the approval of the ESR.

6.8 Vegetation rehabilitation

Rehabilitation of the disturbed areas of the site and re-establishment of native vegetation will be in accordance with the Biodiversity Guidelines (RTA, 2011), Guideline for Batter Surface Stabilisation using vegetation (Roads and Maritime, 2015) and Roads and Maritime specifications.

During revegetation, GEJV will implement measures to avoid compaction of soils in those areas and ensure suitable moisture requirements are maintained. GEJV will regularly inspect, monitor and maintain revegetated areas.

GEJV has engaged a qualified landscape subcontractor to carry out all revegetation, landscape planting and maintenance work. This work will be undertaken in accordance with Roads and Maritime Specification R178 (Vegetation) and R179 (Landscape Planting) and the Landscape Drawings.

6.8.1 Seed

Plants to be used in revegetation will be sourced from local provenance seed where appropriate and available, and associated seed collection will be undertaken prior to clearing. Where required, GEJV will prepare a Seed Supply Plan, in accordance with Roads and Maritime Specification R178, which includes:
• Seed species and application rates in accordance with the Landscape Drawings
• Seed species to be collected from site prior to commencement of clearing and grubbing and storage of site won seed
• Where seed species are unavailable, substitute species
• How application rate will be adjusted, where seed purity and germination / viability percentages are less than 100%
• Seed pre-treatment requirements for hard cased native seeds.

GEJV has engaged an experienced, licensed seed collector to carry out all seed collection that is identified for the Project.

Where the specified seed cannot feasibly and reasonably be sourced from the proposed clearing footprint or the immediate local area, unless otherwise agreed by Roads and Maritime, seed will be sourced from within the Sydney Basin bioregion (as defined by the Interim Biogeographic Regionalisation for Australia).

6.9 Coarse woody debris and snags

Woody debris and snags (branches, trunks and whole trees that fall into rivers and streams) provide important habitat for aquatic and terrestrial flora and fauna. Construction activities adjacent to watercourses may result in the need to remove or relocate woody debris or snags. When this occurs, GEJV will implement management measures (as outlined below) to ensure that only the minimum amount or number of woody debris or snags are disturbed.

During clearing activities, all woody debris and snags will be relocated from one location in the waterway to another location within the waterway. Relocation of woody debris and snags will be managed to minimise disturbance to the riparian bed or nearby sensitive aquatic habitats. The Project Ecologist will provide advice on the position and relocation areas for woody debris and snags. In addition:
• removal, stockpiling, transportation and relocation of woody debris and/or snags will be carried out in a manner that minimises disturbance to native vegetation
• The Project Ecologist will provide advice on positioning woody debris and snags in designated instream relocation areas
• GEJV may consult with DPI Fisheries prior to vegetation clearing to identify any trees proposed to be removed that could potentially be used for re-snagging of a waterway.

All site personnel will be trained in the sensitivity of aquatic habitats and riparian zones and the measures in place to protect them during inductions and toolbox talks.

6.10 Aquatic habitat

GEJV will manage aquatic habitat in accordance with Guide 10 of the Biodiversity Guidelines (RTA, 2011) and Section 3.3.2 of the Policy and Guidelines for Fish Habitat Conservation and Management Update (DPI, 2013) including:
• Consideration of timing of clearing to avoid flooding risks
• Retaining of tree roots or staged removal on the bank of a waterway in order to maintain bank stability
• Progressive removal of flow diversion barriers and sediment control
• Progressive stabilisation of banks in accordance with Specifications RMS R178 and RMS R179
• Avoidance of activities in aquatic habitats and riparian zones as much as practicable
• Establishment of exclusion zones for vehicles, plant and equipment, and provision of exclusion fencing around sensitive areas
• Keeping vehicles and machinery away from the banks of a waterway where possible
• Preventing refuelling of vehicles and plant, and chemical storage and decanting within 50 m of aquatic habitats and
• Removal of all temporary works, flow diversion barriers and sediment control barriers within aquatic habitats as soon as practicable and in a manner that does not promote future channel erosion.

Refer to the Fauna Handling and Rescue Procedure in Annexure C for dewatering procedure and aquatic fauna relocation.
### Table 6-1 Flora and fauna management and mitigation measures

<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF1</td>
<td>Provide to all staff (including plant operators and truck drivers) and subcontractor personnel working on the Site with environmental training to achieve a level of competence and awareness appropriate to their assigned activities before they commence their assigned activities.</td>
<td>Pre-Construction</td>
<td>GEJV’s Environmental Site Representative (ESR)</td>
<td>G36 Clause 3.5.2</td>
</tr>
<tr>
<td>FF2</td>
<td>This CFFMP is to include procedures for pre-clearance surveys that are consistent with the Roads and Maritime Biodiversity Guidelines (RTA 2011).</td>
<td>Pre-Construction</td>
<td>ESR</td>
<td>SPIR Table 6-1 (REMM B-1)</td>
</tr>
<tr>
<td>FF3</td>
<td>Produce updated sensitive aerial vegetation maps based on clearance surveys and previous survey work.</td>
<td>Pre-Construction</td>
<td>ESR, Supervisor</td>
<td>SPIR Table 6-1, (REMM B-1)</td>
</tr>
</tbody>
</table>

**PRE-CLEARING**

| FF4 | Pre-clearing surveys would be undertaken in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (NSW Roads and Traffic Authority 2011). These measures would be outlined in the CFFMP and would include monitoring and review procedures to be implemented to ensure the effective implementation of these measures. | Pre-Construction  | Project Ecologist, ESR, Supervisor                | SPIR Table 6-1 (REMM B-3) |
| FF5 | Clearing boundaries and location of exclusion zone fencing will be marked out accurately with a qualified surveyor. Maintain exclusion fencing until the potential for disturbance within the excluded zone has been eliminated through other means. Removal of fencing should be undertaken in consultation with environmental staff. Clearing limits and sensitive areas / no go zones must be clearly delineated on site at least five (5) working days prior to the proposed commencement of clearing. | Pre-Construction  | Project surveyors, Supervisor, Project/Site Engineers ESR | G36 Clause 4.8, G40 Clause 2.4, SPIR Table 6-1 (REMM B-15) |
| FF6 | The area to be cleared for the formation is that which will be occupied by the completed formation plus:  
  - a clearance of 4 m beyond tops of cuts and toes of embankments where the natural fall of the ground is towards the roadway, and;  
  - a clearance of 2 m beyond the tops of cuts and toes of embankments where the natural fall of the ground either slopes away from the roadway or is level | Pre-Construction  | ESR, Project surveyors                             | G40 Clause 2.1     |
<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
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</thead>
<tbody>
<tr>
<td>FF7</td>
<td>The extent of the construction footprint would be clearly marked and the movement of vehicles and plant outside of these areas would be avoided. Any trees, native vegetation and identified habitat features to be retained on-site will be protected and managed through the use of clearly marked exclusion zones (see Annexure E). Exclusion zones will be implemented in accordance with the Biodiversity Guidelines— Guide 2 (Exclusion zones) (RTA, 2011).</td>
<td>Pre-Construction</td>
<td>Project surveyors, Supervisor, Project/Site Engineers, ESR</td>
<td>G36 Clause 4.8 SPIR Table 6-1 (REMM B-15)</td>
</tr>
<tr>
<td>FF8</td>
<td>Erect signs to inform personnel of the purpose of exclusion zone fencing. Ensure all exclusion zones are regularly inspected and repairs to fencing are made where required.</td>
<td>Pre-Construction, Construction</td>
<td>ESR</td>
<td>SPIR Table 6-1 (REMM B-15)</td>
</tr>
<tr>
<td>FF9</td>
<td>A site walk-over with the Principal to confirm clearing boundaries will be undertaken before the start of work. Communicate the importance of exclusion zones, and any changes to the zones, to all site staff and visitors (eg in toolbox talks and inductions). Clearing of identified environmentally sensitive areas is not to be done without the approval of the Principal.</td>
<td>Pre-Construction</td>
<td>Project/Site Engineers, Supervisor, ESR</td>
<td>G40 Clause 2.2 SPIR Table 6-1 (REMM B-16)</td>
</tr>
<tr>
<td>FF10</td>
<td>If unexpected threatened fauna or flora species are discovered, works will stop works immediately and the Protecting and managing biodiversity on RTA projects (RTA 2011) will be followed.</td>
<td>Construction</td>
<td>Project Ecologist, Supervisor, Project/Site Engineers</td>
<td>SPIR Table 6-1 (REMM B-5)</td>
</tr>
</tbody>
</table>

**CLEARING OF NATIVE VEGETATION**

<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF11</td>
<td>Carefully clear vegetation so as not to mix topsoil with debris and to avoid impacts to surrounding native vegetation</td>
<td>Pre-Construction</td>
<td>Project/Site Engineers, ESR</td>
<td>SPIR Table 6-1 (REMM B-4)</td>
</tr>
<tr>
<td>FF12</td>
<td>Undertake vegetation clearance in accordance with Biodiversity Guidelines— Guide 4 (Clearing of vegetation and removal of bushrock) (RTA, 2011). Procedure found in Annexure E.</td>
<td>Pre-Construction Construction</td>
<td>Project/Site Engineers, ESR, Project Ecologist</td>
<td>SPIR Table 6-1 (REMM B-4)</td>
</tr>
<tr>
<td>FF13</td>
<td>Vegetation clearing will be restricted to those areas where it is necessary. Identify and protect areas of vegetation to be retained showing them as exclusion zones on sensitive area mapping, mapped out by a qualified surveyor and flagged in accordance with flagging protocol in Specification Roads and Maritime G40.</td>
<td>Pre-Construction</td>
<td>ESR, Project surveyor</td>
<td>G36 Clause 4.8 G40 Clause 2.2</td>
</tr>
<tr>
<td>FF14</td>
<td>Trees, stumps and logs of the sizes listed in Table G40.1 in G40 which are outside the area to be cleared but are considered by the Principal to be a</td>
<td>Pre-Construction, Construction</td>
<td>ESR</td>
<td>G40 Clause 2.2</td>
</tr>
<tr>
<td>ID</td>
<td>Measure / Requirement</td>
<td>When to implement</td>
<td>Responsibility</td>
<td>Reference</td>
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<tr>
<td>FF15</td>
<td>No-go fencing will be installed to limit vehicular and personnel entry into adjacent remnant vegetation during construction and operation. Environmental protection area signage on exclusion zone fencing must be installed at regular intervals agreed to by the Principal. Construction vehicles must remain within designated work zone areas and not encroach outside of these areas.</td>
<td>Construction</td>
<td>Supervisor, ESR, Project/Site Engineers</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td>FF16</td>
<td>At bridges, all trees and stumps and all built structures must be removed within the area specified in Annexure G40/A except where shown otherwise on the Drawings, are marked to be preserved or are within 5 m of the bank of any stream or other waterway. Trees outside this area but having branches overhanging the bridge must have their branches lopped to be 3 metres clear of the bridge.</td>
<td>Pre-Construction</td>
<td>ESR, Project surveyor</td>
<td>G40 Clause 2.3</td>
</tr>
<tr>
<td>FF17</td>
<td>Trees within 10 m of the centreline of a bridge and within 5 metres of the bank of any waterway must be cleanly cut off between 300 mm and 600 mm above the adjacent ground level so that stable vegetation is retained on the banks. This work must be undertaken in consultation with the Principal.</td>
<td>Pre-Construction</td>
<td>ESR, Project surveyor</td>
<td>G40 Clause 2.3</td>
</tr>
<tr>
<td>FF18</td>
<td>Trees will be removed in such a way as not to cause damage to surrounding vegetation. This will ensure groundcover disturbance will be kept to a minimum. Preserve existing trees, plants, and other vegetation that are to remain within or adjacent to the Site and use every precaution necessary to prevent damage or injury thereto.</td>
<td>Pre-Construction</td>
<td>Project/Site Engineers, Supervisor</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td>FF19</td>
<td>The Australian Standard AS 4373 Pruning of amenity trees should be followed for all pruning works.</td>
<td>Pre-Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1 (REMM B-4)</td>
</tr>
<tr>
<td>FF20</td>
<td>Non-woody vegetation should be incorporated into the stripping of topsoil to retain any organic materials and nutrients.</td>
<td>Pre-Construction</td>
<td>Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1 (REMM B-4)</td>
</tr>
<tr>
<td>FF21</td>
<td>Use experienced and licensed seed collectors to carry out seed collection in accordance with RTA Seed Collection QA Specification R176 and the Florabank Guidelines and Model Code of Practice.</td>
<td>Pre-Construction</td>
<td>ESR, Ecologist</td>
<td>SPIR Table 6-1 (REMM B-6)</td>
</tr>
<tr>
<td>ID</td>
<td>Measure / Requirement</td>
<td>When to implement</td>
<td>Responsibility</td>
<td>Reference</td>
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<tr>
<td>FF22</td>
<td>Habitat trees within areas to be cleared must be marked (see Annexure E), and removed in accordance with the Roads and Maritime Biodiversity Guidelines: Guide 4 Clearing of vegetation and removal of bush rock.</td>
<td>Pre-Construction</td>
<td>Project Ecologist</td>
<td>G40 Clause 2.4</td>
</tr>
<tr>
<td>FF23</td>
<td>Retain stumps in riparian zones and aquatic habitats to reduce the potential for bank erosion</td>
<td>Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1</td>
</tr>
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<td>(REMM B-8)</td>
</tr>
<tr>
<td>FF24</td>
<td>Separate woody vegetation into millable timber, secondary re-use (Guide 5) or exotic (non-native) vegetation</td>
<td>Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1</td>
</tr>
<tr>
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<td>(REMM B-8)</td>
</tr>
<tr>
<td>FF25</td>
<td>Native vegetation would be re-established in accordance with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (see Section 6.8). Habitat would be replaced or re-instated in accordance with Guide 5: Re-use of woody debris and bushrock and Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects.</td>
<td>Post-Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1</td>
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<td>(REMM B-6 and B-9)</td>
</tr>
<tr>
<td>FF26</td>
<td>During vegetation clearing, timber and root balls must be retained where practicable for reuse in habitat enhancement and rehabilitation work. The retained timber and root balls may be used on or off the CSSI site. Prior to the commencement of vegetation clearing, the Proponent must consult with community groups, the Mulgoa Valley Landcare Group and relevant government agencies to determine if retained timber and root balls could be used for environmental rehabilitation projects, before pursuing other disposal options.</td>
<td>Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>NSW-CoA E5</td>
</tr>
<tr>
<td>FF27</td>
<td>Retain the roots of trees on the bank of a waterway in order to maintain bank stability</td>
<td>Construction</td>
<td>ESR, Project/Site Engineers, Supervisor</td>
<td>SPIR Table 6-1</td>
</tr>
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<td>(REMM B-10)</td>
</tr>
</tbody>
</table>

**FAUNA AND HABITAT IMPACTS**

<p>| FF28 | The unexpected species find procedure is to be followed under Biodiversity Guidelines if flora or fauna not assessed in the biodiversity assessment are identified in the Project site (see Annexure B). The procedure is as follows: |
|      | • If threatened flora or fauna species found, stop work. |
|      | • Notify the environmental manager               | Construction      | ESR, Project/Site Engineers, Supervisor | SPIR Table 6-1     |
|      |                                                                                       |                   |                                         | (REMM B-5)         |</p>
<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF29</td>
<td>Fauna handling and vegetation removal must be carried out in accordance with the requirements Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on Roads and Maritime projects (Roads and Maritime Environment Branch, 2011) (see Annexure C).</td>
<td>Pre-Construction</td>
<td>Project Ecologist</td>
<td>SPIR Table 6-1 (REMM B-16) G40 Clause 2.4.1</td>
</tr>
<tr>
<td>FF30</td>
<td>Allow fauna to leave an area without intervention as much as possible.</td>
<td>Pre-Construction</td>
<td>GEJV site personnel</td>
<td>SPIR Table 6-1 (REMM B-16) G40 Clause 2.4.1</td>
</tr>
<tr>
<td>FF31</td>
<td>Use a licensed fauna ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling. Twenty four hours prior to clearing licensed fauna handlers must capture and/or remove fauna that have the potential to be disturbed as a result of clearing. If native fauna are captured during vegetation clearing, they must be released into a pre-determined suitable nearby location that has been identified as such by an ecologist and at a time of day appropriate for release of the species. Keep records of fauna captured and relocated. Report any injury or death of threatened species to the Principal.</td>
<td>Pre-Construction, Construction</td>
<td>Project ecologist, ESR</td>
<td>SPIR Table 6-1 (REMM B-16) G36 Clause 4.8</td>
</tr>
<tr>
<td>FF32</td>
<td>Release fauna into pre-determined habitat identified for fauna release, into habitats that are similar, or as near as possible to their capture location. Nocturnal fauna must be released at dusk</td>
<td>Pre-Construction, Construction</td>
<td>Project ecologist, ESR</td>
<td>SPIR Table 6-1 (REMM B-16)</td>
</tr>
<tr>
<td>FF33</td>
<td>Temporary fauna fencing may be required on projects to reduce the chances of road kill/injury from public traffic or construction machinery.</td>
<td>Pre-Construction, Construction</td>
<td>ESR</td>
<td>SPIR Table 6-1 (REMM B-16)</td>
</tr>
<tr>
<td>ID</td>
<td>Measure / Requirement</td>
<td>When to implement</td>
<td>Responsibility</td>
<td>Reference</td>
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</tr>
<tr>
<td>FF34</td>
<td>Nest box strategy to be prepared in consultation with the Principal and the local community.</td>
<td>Pre-Construction</td>
<td>Project Ecologist, ESR</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td>FF35</td>
<td>Conduct a pre-clearing survey for Cumberland Plain Land Snail and Eastern Long neck turtles in identified habitat areas by an appropriately qualified Ecologist.</td>
<td>Pre-Construction</td>
<td>Project ecologist, ESR</td>
<td>G36 Clause 4.8, G40 Clause 2.4</td>
</tr>
<tr>
<td>FF36</td>
<td>The ecologist pre clearing survey is to include a procedure for relocation of any Cumberland Plain Land Snails that are discovered during the survey and the relocation of habitat elements (large woody debris) from the impact area to a suitable pre-identified area within the study area which are not to be cleared.</td>
<td>Pre-Construction</td>
<td>Project ecologist, ESR</td>
<td>G40 Clause 2.4</td>
</tr>
<tr>
<td>FF37</td>
<td>Carry out staged habitat removal (Guide 4) where fauna habitat features have been identified and marked with a licensed wildlife carer or ecologist on-site.</td>
<td>Pre-Construction</td>
<td>Project ecologist, ESR</td>
<td>SPIR Table 6-1 (REMM B-3)</td>
</tr>
<tr>
<td>FF38</td>
<td>Keep records of all fauna rescue events, including locations to where fauna have been relocated.</td>
<td>Construction</td>
<td>Project ecologist, ESR</td>
<td>G40 Clause 2.4</td>
</tr>
</tbody>
</table>

**IMPACTS TO RIPARIAN AREAS AND AQUATIC ENVIRONMENT**

<p>| FF39 | Aquatic habitat would be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011) and Section 3.3.2 Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (DPI 2013). These measures include monitoring and review procedures to be implemented to ensure the effective implementation of these measures. Culvert Construction, waterway crossings and Sediment Basin management will be detailed in the EWMS. Dewatering of Farm Dams refer CSWMP Annexure E. | Construction | ESR | SPIR Table 6-1 (REMM B-10) |
| FF40 | Avoid clearing within the riparian zone during periods when flooding is likely to occur. | Construction      | Supervisor, Project/Site Engineers, ESR | SPIR Table 6-1 (REMM B-10), G36 Clause 4.8 |
| FF41 | Relocate large woody debris or snags existing in waterways instream, with position and relocation areas determined based on advice from an ecologist. | Pre-Construction, Construction | Project Ecologist, ESR | G36 Clause 4.8, SPIR Table 6-1 (REMM B-11) |</p>
<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
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<tbody>
<tr>
<td>FF42</td>
<td>An Emergency Spill Response Sub-Plan would be prepared to minimise the risk of spills and ensure adequate provision of spill management equipment on site, particularly at waterways.</td>
<td>Pre-Construction</td>
<td>ESR</td>
<td>G36 Clause 4.3</td>
</tr>
<tr>
<td>FF43</td>
<td>Refuelling of vehicles and plant, and chemical storage and decanting should not take place within 50 metres of aquatic habitats</td>
<td>Construction</td>
<td>Supervisor, Project/Site Engineers, ESR</td>
<td>SPIR Table 6-1 (REMM B-10) G36 Clause 4.8</td>
</tr>
<tr>
<td>FF44</td>
<td>During rehabilitation, stabilise the banks of the waterway through revegetation and/or armouring according to available landscape plans</td>
<td>Construction</td>
<td>Supervisor, ESR</td>
<td>SPIR Table 6-1 (REMM B-10) G36 Clause 4.8</td>
</tr>
<tr>
<td>FF45</td>
<td>Avoid activities in aquatic habitats and riparian zones as much as possible. Establish exclusion zones and set up exclusion fencing around sensitive areas. Keep vehicles and machinery away from the banks of a waterway where possible</td>
<td>Construction</td>
<td>Supervisor, Project/Site Engineers, ESR</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td>FF46</td>
<td>Remove all temporary works, flow diversion barriers and sediment control barriers within aquatic habitats as soon as practicable and in a manner that does not promote future channel erosion.</td>
<td>Construction</td>
<td>Supervisor, ESR</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td>FF47</td>
<td>All works on waterfront land would be carried out in accordance with the DPI Water Guidelines for Controlled Activities on Waterfront Land (2012).</td>
<td>Pre-Construction, Construction</td>
<td>Supervisor, Project/Site Engineers, ESR</td>
<td>SPIR Table 6-1 (REMM B-20)</td>
</tr>
</tbody>
</table>

**PESTS AND DISEASES**

<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF48</td>
<td>Management of pathogens in accordance Guide 7 – Pathogen Management: Protecting and managing biodiversity on RTA projects (RTA 2011)</td>
<td>Pre-Construction, Construction</td>
<td>ESR</td>
<td>Annexure D of this CFFMP SPIR Table 6-1 (REMM B-18)</td>
</tr>
</tbody>
</table>

**WEED SPREAD AND ESTABLISHMENT**

<table>
<thead>
<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF49</td>
<td>Prepare a Weed Management Sub-Plan in accordance with Roads and Maritime Biodiversity Guidelines – Guide 6, the Noxious Weeds Act 1993 and following the NSW Department of Primary Industry Guidelines (see Annexure D).</td>
<td>Pre-Construction</td>
<td>ESR</td>
<td>SPIR Table 6-1 (REMM B-17) G40 Clause 6.1 Annexure D</td>
</tr>
<tr>
<td>ID</td>
<td>Measure / Requirement</td>
<td>When to implement</td>
<td>Responsibility</td>
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</tr>
<tr>
<td>FF50</td>
<td>Use an ecologist or person trained in weed management and identification to undertake a site weed assessment to identify and describe or map weed infested areas within the site and adjacent areas.</td>
<td>Pre-Construction</td>
<td>Project Ecologist</td>
<td>SPIR Table 6-1 (REMM B-17)</td>
</tr>
<tr>
<td>FF51</td>
<td>Clean machinery, vehicles and footwear before moving to a new location (entering or exiting of the site). Provide vehicle and footwear wash down facilities for this purpose.</td>
<td>Pre-Construction</td>
<td>ESR, Project/site engineers, Supervisor</td>
<td>SPIR Table 6-1 (REMM B-17)</td>
</tr>
<tr>
<td>FF52</td>
<td>Map and mark areas that are infested with weeds as an exclusion zone with fencing and signage to limit access by personnel and vehicles.</td>
<td>Pre-Construction</td>
<td>ESR, Project Ecologist</td>
<td>SPIR Table 6-1 (REMM B-17)</td>
</tr>
<tr>
<td>FF53</td>
<td>Minimise soil disturbance within weed infested areas. Use mechanical weed control methods such as slashing or mowing, as well as a range of herbicides to avoid the development of herbicide resistance. Mow/slash areas infested with weeds before they seed. This may reduce the propagation of new plants.</td>
<td>Pre-Construction</td>
<td>ESR, Project/site engineers, Supervisor</td>
<td>SPIR Table 6-1 (REMM B-17)</td>
</tr>
<tr>
<td>FF54</td>
<td>Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles. Weed-contaminated soil must be disposed of at an appropriate waste management facility.</td>
<td>Pre-Construction</td>
<td>ESR, Supervisor</td>
<td>SPIR Table 6-1 (REMM B-17)</td>
</tr>
<tr>
<td></td>
<td><strong>DISTURBANCE TO FALLEN TIMBER, DEAD WOOD AND BUSH ROCK</strong></td>
<td></td>
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<tr>
<td>FF55</td>
<td>Re-use coarse woody debris and bushrock on-site in accordance with the management requirements of the Biodiversity Guidelines - Guide 5 (Re-use of woody debris and bushrock) (RTA, 2011).</td>
<td>Pre-Construction</td>
<td>Project Ecologist, Supervisor, ESR</td>
<td>G36 Clause 4.8</td>
</tr>
<tr>
<td></td>
<td><strong>LOSS OF MATURE TREES INCLUDING HOLLOW BEARING TREES</strong></td>
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<tr>
<td>FF56</td>
<td>An ecologist is to be engaged to undertake a pre-clearing survey to identify and mark any habitat trees (i.e. hollow-bearing and others occupied by fauna) within the clearing area and to advise on the presence of any fauna.</td>
<td>Pre-Construction</td>
<td>Project ecologist</td>
<td>G40 Clause 2.4.2, G36 Clause 4.8</td>
</tr>
<tr>
<td>FF57</td>
<td>A procedure for the removal of vegetation including habitat/hollow-bearing trees and culverts is to be prepared in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on Roads and Maritime projects (Roads and Maritime Environment Branch, 2011) (see Annexure E).</td>
<td>Pre-Construction</td>
<td>ESR</td>
<td>G40 Clause 2.4.1</td>
</tr>
<tr>
<td>ID</td>
<td>Measure / Requirement</td>
<td>When to implement</td>
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<tr>
<td>FF58</td>
<td>Relocate fauna microhabitat such as hollows, dead wood, dead trees, fallen logs and cleared tree trunks greater than 200 mm diameter in adjacent vegetated areas outside roadway clear zones (as agreed with the Principal), for use in conjunction with soil erosion and sediment control measures within the vegetation community of origin and in a manner sympathetic to the requirements of native fauna.</td>
<td>Pre-Construction, Construction</td>
<td>Project Ecologist, Supervisor, ESR</td>
<td>G40 Clause 5</td>
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<tr>
<th>ID</th>
<th>Measure / Requirement</th>
<th>When to implement</th>
<th>Responsibility</th>
<th>Reference</th>
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<tbody>
<tr>
<td>FF 59</td>
<td>The approval holder must undertake the action, including those parts of the action that occur on Commonwealth Land, in accordance with all conditions in the NSW Infrastructure Approval</td>
<td>N/A</td>
<td>N/A</td>
<td>Federal CoA 1</td>
</tr>
</tbody>
</table>

**TRN4 has no works on Commonwealth Land**
7 Compliance management

7.1 Roles and responsibilities
GEJV’s Project Team organisational structure and overall roles and environmental responsibilities are outlined in Section 5.1 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this Plan.

7.2 Communication
Roads and Maritime has prepared a Community Communication Strategy (CCS) in accordance with the requirements of NSW-CoA B1 to document the approach to stakeholder and community communications for the Project. The CCS identifies opportunities and tools for providing information and consulting with the community and stakeholders during the Construction of the Project. GEJV will support the delivery of the CCS, with specific measures outlined in the Construction Community Liaison Plan (Appendix B12 of the CEMP).

Flora and fauna management information will be communicated to the community and stakeholders in accordance with the principles and procedures outlined in the CCS.

Further detail about the CCS is provided in Section 5.5.3 of the CEMP.

7.3 Complaints management
Roads and Maritime has developed a Complaints Management System (CMS) to document the overall approach to complaints management for the Project. GEJV will adopt the requirements of the CMS, including reporting requirements. The CMS includes a Complaints Register which will record the details of all complaints relating to the Project.

Further detail about the CMS is provided in Section 5.5.3 of the CEMP.

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

- Existence and requirements of this CFFMP
- Relevant legislation, regulations and EPL conditions
- Incident response, management and reporting
- Environmentally sensitive locations and exclusion zones
- 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
- Flora and fauna habitat management
- General flora and fauna management measures
- Specific responsibilities for the protection of flora and fauna
- Site flagging protocol
- Boundaries for vegetation clearing.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in flora and fauna management or those undertaking an activity with a high risk of environmental impact. Site personnel will undergo refresher training at not less than six monthly intervals.

Daily pre-start meetings conducted by the Superintendent will inform the site workforce of any environmental issues relevant to flora and fauna that could potentially be impacted by, or impact on, the day’s activities.

Further details regarding staff induction and training are outlined in Section 5.3 of the CEMP.

### 7.5 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 schedule of monitoring and inspections is contained in Table 7-1. Inspections of exclusion zones will be undertaken on a regular basis during the Construction period to confirm that vehicle movements have not occurred within exclusion areas. A non-conformance in accordance with G36 Clause 3.10 will be raised if the exclusion zones have been breached.

<table>
<thead>
<tr>
<th>Table 7-1: Monitoring and inspections relevant to flora and fauna management</th>
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<tbody>
<tr>
<td><strong>Monitoring / Inspection</strong></td>
</tr>
<tr>
<td>Habitat clearance</td>
</tr>
<tr>
<td>Rehabilitation of site</td>
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<tr>
<td>Pre-clearance survey</td>
</tr>
<tr>
<td>Pre-clearance inspection</td>
</tr>
<tr>
<td>Site inspections</td>
</tr>
<tr>
<td>Visual surveillance (including exclusion zone fencing, erosion and sedimentation controls, stockpiles, threats to fauna or unexpected finds of flora and fauna)</td>
</tr>
</tbody>
</table>

Requirements and responsibilities in relation to monitoring and inspections are documented in Sections 6.1 and 6.2 of the CEMP.
7.6 Incident planning and response
Response to incidents will be undertaken as described in Section 5.6 of the CEMP and in accordance with the Roads and Maritime Environmental Incident Classification and Reporting Procedure (refer to Appendix A7 of the CEMP).

7.7 Auditing
Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan and other relevant approvals, licenses and guidelines.
Audit requirements are detailed in Section 6.4 of the CEMP.

7.8 Non-conformances
A non-conformance is the failure or refusal to comply with the requirements of Project system documentation, including this CFFMP. Any member of the Project Team may raise a non-conformance or improvement opportunity.

When a non-conformance is detected, the process described in Section 6.6 and Appendix A9 of the CEMP will be implemented. The Quality Plan describes the process for managing non-conforming work practices and initiating corrective / preventative actions or system improvements in accordance with the process outlined in Section 6.6.1 of the CEMP.

7.9 Reporting
Reporting requirements and responsibilities are documented in Section 6.5 of the CEMP. Specific reporting requirements associated with flora and fauna on the Project includes a report from the Ecologist which:

- Identifies the species and location of any weeds growing in the road reserve over the length to be cleared and grubbed
- Identifies all locations of threatened flora species and trees which have been marked or otherwise identified for preservation, including habitat trees
- Identifies measures to prevent clearing beyond the vegetation clearing limits
- Incorporates management measures to ensure vegetation and fauna habitat is protected and managed in accordance with requirements, including specific markings for trees to be retained in accordance with Roads and Maritime Biodiversity Guidelines Guide 4
- Lists any trees identified by a suitably qualified arborist outside the limits of clearing which may be unsound and likely to fall upon the roadway or private property
- Includes a sensitive area map clearly showing vegetation boundaries, and exclusion zones, identifies all locations of threatened flora species, indigenous heritage areas, non-indigenous heritage areas and trees which have been marked or otherwise identified particularly including your own site investigations as well as extracted from details included in the EIS for preservation
- Includes an ongoing process to communicate biodiversity management measures to all staff including subcontractors
- Includes a stop work procedure in the event of identification of unidentified species, habitats or populations
- Includes a process to review and update the adequacy of the Clearing and Grubbing Plan in the event of a biodiversity incident
• Identifies and provides a process to ensure that prior to commencement of work a Site walk is undertaken with Roads and Maritime to confirm clearing boundaries

• Provides a process to ensure that an experienced, licenced wildlife carer or ecologist is present to supervise vegetation clearing and capture then relocate fauna if required and in accordance with requirements in Roads and Maritime Specification G36 Clause 4.8

Includes a procedure for a suitably qualified Ecologist to undertake pre-clearing surveys for the Cumberland Land Snail in suitable habitats and relocate any snails and important habitat elements (large woody debris) from the impact area to a suitable pre-identified area within the study area which are not to be cleared.

Other reporting requirements throughout Construction include:

• Clearing and Grubbing EWMS
• Pre-clearing Survey Report
• Post Clearing Report
• Fauna handling procedure notification requirements
• Unexpected threatened species procedure notification requirements
• Fauna death or injury
• Summary of areas of vegetation cleared and areas approved for clearing for the Project to be included in the six monthly Construction Compliance Reports

GEJV will maintain accurate records substantiating all Construction activities associated with the Project or relevant to the conditions of approval, including measures taken to implement this CFFMP. Records will be made available to the DP&E and DoEE upon request, within the timeframe nominated in the request.
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.
- Identify environmental risks not already included in the risk register
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

GEJV is responsible for ensuring Project environmental risks are identified and included in the risk register and appropriate mitigation measures implemented throughout the Construction of the Project as part of the continuous improvement process. The process for ongoing risk identification and management during Construction is outlined in Section 4.3.2 of the CEMP.

8.2 CFFMP update and amendment

The processes described in Section 6.8 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to the CFFMP will be in accordance with the process outlined in Sections 1.6 and 6.8 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 6.7.2 of the CEMP.
Annexure A
Pre and Post Clearing Checklists
Pre Clearing Checklist: Pre Clearing and Ground Disturbance
‘Permit to Clear’

Checklist to be submitted to GEJV’s ESR after reviewing the completed Pre-Clearing Report and at least two (2) days prior to clearing commencement. Clearing must not commence in any part of the area until this vegetation clearing permit has been approved.
<table>
<thead>
<tr>
<th>Site Preparation</th>
<th>Control Measures</th>
<th>Y/N/NA</th>
<th>Comments/Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are the proposed works covered by an existing Approval? (Note the documents that cover the Works, e.g. Project approval or another approval)</td>
<td></td>
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<tr>
<td>2</td>
<td>Has Hold Point G40 Cl 2.4 detailing pre-clearing information, including Ecologist report been submitted at least fifteen (15) working days prior to commencement of clearing?</td>
<td></td>
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<tr>
<td>3</td>
<td>Have clearing boundary limits been established and clearly marked and fenced off, including from rivers, creeks, watercourses and drainage lines to indicate to the clearing contractors where to stop clearing?</td>
<td></td>
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<tr>
<td>4</td>
<td>Has the Project Ecologist completed the Pre-Clearing report?</td>
<td></td>
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<tr>
<td>5</td>
<td>Have the clearing limits been established by the Survey Team at least seven (7) working days prior to proposed commencement of clearing?</td>
<td></td>
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<tr>
<td>6</td>
<td>Refer to Ecologist pre-clearing Report to answer and implement the following:</td>
<td></td>
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<tr>
<td></td>
<td>a. Have EECs been identified and marked in the field? If yes, provide details of location and EEC on plan.</td>
<td></td>
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<tr>
<td></td>
<td>b. Is protective fencing installed around EECs and heritage items?</td>
<td></td>
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<tr>
<td></td>
<td>c. Have all hollow bearing trees, potential hollow bearing trees, trees containing nests, bush rocks and hollow logs to be cleared been clearly identified by the Project Ecologist for 2-stage clearing prior to clearing?</td>
<td></td>
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<tr>
<td></td>
<td>d. Have habitat trees and/or trees/vegetation to be preserved been identified and suitable protection implemented prior to clearing?</td>
<td></td>
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<td></td>
<td>e. Were any fauna identified during the pre-clearing assessment? If yes, provide a brief description of fauna and any actions taken</td>
<td></td>
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<tr>
<td></td>
<td>f. Were any threatened fauna species identified during the survey? If yes, was this fauna moved on from site?</td>
<td></td>
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<tr>
<td></td>
<td>g. Were any threatened flora species identified during the survey? If yes, was this translocated from clearing area or fenced off for protection prior to clearing?</td>
<td></td>
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<td></td>
<td>h. Have areas of weed infestation including topsoil been identified?</td>
<td></td>
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<tr>
<td></td>
<td>i. Were any trees outside the clearing limit been deemed unsound? If yes are they clearly marked?</td>
<td></td>
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<tr>
<td>7</td>
<td>Has the Sensitive Area Maps been updated to include the outcomes of the Ecologist Report?</td>
<td></td>
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<tr>
<td>Additional Environmental Controls</td>
<td></td>
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<tr>
<td>7</td>
<td>Has Liverpool City Council Weeds Officer been contacted? If yes, have all requested actions been undertaken?</td>
<td></td>
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<td>8</td>
<td>Have all residents with potential to be disturbed been advised at least two (2) weeks prior to clearing vegetation?</td>
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<tr>
<td>9</td>
<td>If near a creek or waterway crossing, ensure riparian zone is managed in accordance with FFMSM - Management and Mitigation Measures Table 6.1 impacts to riparian areas and aquatic environment</td>
<td></td>
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<tr>
<td>10</td>
<td>Have sediment control measures been installed before clearing as required by the Soil and Water Management Plan?</td>
<td></td>
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<tr>
<td>Fauna Protection Controls</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>Has the Project Ecologist been notified and scheduled to undertake pre-clearance and clearance activities? Have fauna release sites been identified?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Answer</td>
<td></td>
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<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>12</td>
<td>Has WIRES / licenced wildlife carer or fauna handler been notified of the intention to commence clearing?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Is a copy of Fauna Handling and Rescue Procedure available?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Are there any animals including active nests present? If yes relocation is required (Refer to Annexure C – Fauna Handling and Rescue Procedure)</td>
<td>Yes</td>
<td></td>
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</tbody>
</table>

**Training and Sign Off**

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>15</td>
<td>Have the relevant construction personnel been briefed on the 2 stage clearing process and any specific area issues?</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>Have all relevant staff and contractors been toolboxed on the clearing limits, sensitive area locations, no go areas, fauna descriptions and handling procedures etc.? Have all relevant workers signed off on EWMS?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Additional Comments:**

I have reviewed the "Permit to Clear" checklist and all measures have been implemented as required. The clearing between the above mentioned chainages may proceed in accordance with this procedure.

**Hold Point Signoff:**

Environmental Site Representative Sign-off
### Hollow Inspection Checklist

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Answer/Comments</th>
</tr>
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<tbody>
<tr>
<td><strong>Ecologist:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tree ID:</strong></td>
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<tr>
<td><strong>Species</strong></td>
<td></td>
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<tr>
<td><strong>Location:</strong> approx. CH</td>
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<table>
<thead>
<tr>
<th>Hollow Details</th>
<th>Type</th>
<th>Entrance Shape</th>
<th>Size</th>
<th>Depth</th>
<th>Height from ground</th>
<th>Suitability/ evidence of fauna</th>
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<thead>
<tr>
<th>Fauna Observed/Caught</th>
<th>Species</th>
<th>#</th>
<th>Age/breeding status</th>
<th>Treatment</th>
<th>Release Details</th>
</tr>
</thead>
<tbody>
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</table>

**Comments:**

**Completed by:** [Signature]: [Date]:

---

The Northern Road Upgrade Between Mersey Road and Eaton Road

**Construction Flora and Fauna Management Sub Plan**

50
Post Clearing Data Sheet
Record details of all fauna observed/caught during clearing operations.

<table>
<thead>
<tr>
<th>Species</th>
<th>Details of how the animal was injured/found</th>
<th>Location</th>
<th>Action Undertaken i.e. captured/released, self-escape, taken to vet etc.</th>
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<tbody>
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</table>
Toolbox

The objective of this toolbox is to ensure that all GEJV personnel and subcontractors involved with clearing operations during the Project are aware of their responsibilities and the environmental procedure/work method.

- Pre-clearing surveys must be undertaken prior to clearing commencement
- All environmental controls are to be in place and maintained
- All personnel are aware of relevant marking of habitat trees, environmentally sensitive areas, weeds, unsound trees and trees to be retained
- All personnel are aware of the 2 stage clearing method
- Know the procedures to be undertaken without the appropriate signoffs
- If any fauna is detected during clearing, immediately notify the Foreman or Environmental Site Representative.

We the undersigned understand that the procedure/WMS nominated above has been explained and its contents are clearly understood. We also clearly understand the controls.
Annexure B
Unexpected Threatened Species (EECs)
Procedure
Introduction

Purpose

This procedure details the actions to be taken when a threatened flora or fauna species or endangered ecological community (EEC) is unexpectedly encountered during excavation / Construction activities. This Procedure has been developed in accordance with Guide 1: Pre-clearing process, Biodiversity Guidelines (RTA, 2011).

Scope

This procedure is applicable to all activities conducted by GEJV personnel that have the potential to come into contact with threatened flora and fauna species and EECs during Construction of the Project. Where threatened fauna is unexpectedly encountered, the Fauna Handling and Rescue Procedure (Annexure C) will be followed.

Induction/Training

All site personnel (including sub-contractors) will be inducted on the identification of potential threatened species and EECs occurring, or likely to occur, within the Project area and the relevant actions for them with regards to this procedure during the Project site inductions, regular toolbox talks, pre-starts and targeted training as required.

No threatened species were observed within the Project study area by the Project Ecologist during the pre-clearance survey. However, to assist staff to recognise threatened species, fact sheets with pictures will be developed for the following species: Cumberland land snail, Eastern Bentwing Bat, Eastern Freetail Bat and Eastern False Pipistrelle. Fact sheets will be developed and communicated to staff during training and provided in the site office lunch rooms for reference.

Roles and responsibilities

The Environmental Site Representative will be notified in the event of an unexpected species or EEC find on site during Construction of the Project. The Environmental Site Representative is the key contact point for the Roads and Maritime Environmental Manager (or delegate) in regard to this Procedure. An Ecologist will be engaged by GEJV if required for the implementation of this Procedure.

The Roads and Maritime Environmental Manager (or delegate) will act as the liaison between GEJV and relevant government agencies in the event that a significant impact to a threatened species or EEC is likely to occur.

All site personnel are responsible for reporting any unexpected species or EEC finds for the duration of the Project.

Review

In the event this Procedure needs to be revised, it will be completed by the Environmental Site Representative in consultation with the Ecologist.

This Procedure will be reviewed annually, or as required in accordance with the continuous improvement process described in Section 8 of this CFFMP.
Threatened species and EECs likely to occur in the Project area

The threatened flora and fauna species and EECs which may be impacted by the Project are identified in Section 4 of this CFFMP. In the event that these species or EECs (or other threatened species or EECs not considered in the EIS or Section 4 of this CFFMP) be encountered on site, works must stop and this Procedure must be implemented.

Procedure

An overview of the steps to be followed in the event that a threatened flora or fauna species or EEC is unexpectedly discovered on site is outlined in the figure below, with further detail provided below.

**Threatened flora or fauna species or EEC unexpectedly encountered**

STOP WORK

Notify the Environmental Site Representative (ESR). ESR to notify the Roads and Maritime Environmental Manager (or delegate) (EM) and ecologist

ESR and ecologist to conduct assessment of likely impact and develop management measures

**Is a significant impact likely to occur?**

**YES**

EM will notify and consult with OEH, DPI Fisheries, DP&E and DoEE, as appropriate

EM will obtain necessary advice, approvals, licences or permits

Recommence work once EM confirms all advice, approvals, licences or permits are obtained and management measures are implemented

Threatened species or EEC included in subsequent inductions, toolbox talks and ESR to update this Procedure, if required

**Biodiversity Offset Package updated by EM, if required**

**NO**

ESR will notify EM and OEH, DPI Fisheries and DP&E, as appropriate, of outcome

Recommence work following approval by EM that management measures are implemented

Unexpected threatened species or EECs finds procedure flow chart
Step 1  Threatened flora or fauna species or EEC unexpectedly encountered during Construction activities

If a new threatened flora or fauna species or EEC is unexpectedly encountered:

**Cease work in the vicinity of the unexpected find.**

Immediately notify the Environmental Site Representative and the Roads and Maritime Environmental Manager (or delegate). The Environmental Site Representative will notify and engage an ecologist and notify DP&E, DPI Fisheries and OEH, if required.

Step 2.  Assessment of impact

The Environmental Site Representative will arrange for an ecologist to conduct an assessment of significance of the likely impact to the threatened species or EEC and develop management options.

If the ecologist’s assessment determines that no significant impact is likely to occur, the Contractor Environmental Site Representative will notify the Roads and Maritime Environmental Manager (or delegate) and the ER, OEH, DPI Fisheries and DP&E, as appropriate, of the outcome of the assessment, including any management measures to be implemented.

If the ecologist’s assessment determines that a significant impact is likely to occur, the Roads and Maritime Environmental Manager (or delegate) will notify OEH, DPI Fisheries, DP&E and DoEE as appropriate. Management measures will be developed in consultation with the appropriate authorities who will also confirm any necessary approvals, licences or permits required.

DoEE will be notified and consulted if the threatened species or EEC encountered is listed under the EPBC Act.

Step 3  Approvals

Any approvals, licences or permits required will be obtained by the Roads and Maritime Environmental Manager (or delegate) in consultation with the Contractor Environmental Site Representative and the ER

Step 4.  Recommencement of works

Where a significant impact is likely to occur, work will not recommence prior to confirmation by the Roads and Maritime Environmental Manager (or delegate) in consultation with the ER, that appropriate advice has been received, relevant approvals, licences and permits have been obtained, and the approved management measures have been implemented.

Where no significant impact is likely to occur, work will recommence following approval by the Roads and Maritime Environmental Manager (or delegate) in consultation with the ER that any necessary management measures have been implemented.

Regular inspections by the GEJV Environmental Site Representative, in consultation with the ecologist, if appropriate, will be conducted to ensure that management measures have been effectively implemented.

Step 5.  Review and update of environmental management documentation
The GEJV Environmental Site Representative will include the threatened species or EEC in subsequent inductions and toolbox talks and will update the listed species or EECs in this Procedure, if required.

The Roads and Maritime Environmental Manager (or delegate) will update the Biodiversity Offset Package to account for any significant impacts to threatened flora and/or fauna, where required.

**Records**

Accurate records of all unexpected threatened species or EEC finds will be maintained for the duration of the Project.
Annexure C
Fauna Handling and Rescue Procedure
**Introduction**

**Purpose**

Handling of fauna during the Project may be required where fauna is encountered during Construction and is required to be relocated or transported to a vet or wildlife carer in the case of injury. This Fauna Handling and Rescue Procedure details the actions to be taken in the event that fauna (including injured, shocked, dependent juvenile or other) is discovered that requires handling during Construction of the Project. This Procedure has been developed in accordance with *Guide 9: Fauna handling, Biodiversity Guidelines* (RTA, 2011).

**Objective**

The objective of this Procedure is to minimise impacts on fauna as a result of being handled by humans and to prevent injury to people handling fauna.

**Scope**

This Procedure is applicable to all activities that may result in site personnel handling or rescuing fauna during Construction of the Project. It is applicable to all native and introduced species that are found in the Project area.

**Induction and training**

All site personnel (including sub-contractors) will be inducted on this Procedure. Best practice methods for fauna handling will be communicated to site personnel to minimise the risk of injury in the event that unavoidable handling of fauna occurs on site during Construction.

Training in this Procedure will include inductions, toolbox talks, pre-starts and targeted training as required.

**Roles and responsibilities**

GEJV Environmental Site Representative is responsible for ensuring the effective implementation of, and training of site personnel in, this Procedure. In general, site personnel should avoid the handling of fauna on site, however best practice fauna handling methods will be implemented should fauna handling be unavoidable.

Prior to commencement of Construction, GEJV will contact a suitably qualified and located animal rescue agency/wildlife care group or vet to ensure that they are willing and available to be involved in fauna rescue and assist with injured animals during Construction of the Project. The contact details for the agency, group or vet will be prominently displayed at ancillary facilities, main compounds and offices on site.

GEJV has engaged a suitably qualified and experienced fauna ecologist/wildlife carer with specific animal handling experience to carry out any animal handling required by this Procedure. Relevant fauna rescue services and local veterinary surgeries contact details are below.
Fauna rescue contact details

<table>
<thead>
<tr>
<th>Agency / business</th>
<th>Contact no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads and Maritime Project Ecologist (Cassandra Thompson)</td>
<td>02 8843 3029</td>
</tr>
<tr>
<td>Project Ecologist (OSEM)</td>
<td>04 0746 1092</td>
</tr>
<tr>
<td>Sydney Wildlife</td>
<td>02 9413 4300</td>
</tr>
<tr>
<td>WIRES</td>
<td>1300 094 737</td>
</tr>
<tr>
<td>RSPCA Care Centre Rouse Hill</td>
<td>02 8883 0622</td>
</tr>
<tr>
<td>Rossmore Veterinary Hospital</td>
<td>02 9606 6984</td>
</tr>
</tbody>
</table>

Review

In the event this Procedure needs to be revised, it will be completed by the Environmental Site Representative in consultation with the Ecologist.

This Procedure will be updated throughout Construction of the Project to include any new fauna findings and subsequent management measures required. This Procedure will be reviewed annually, or as required in accordance with the continuous improvement process described in Section 8 of this CFFMP.

Pre Clearing Procedure

Twenty four hours prior to clearing licensed fauna handlers must capture and/or remove fauna that have the potential to be disturbed as a result of clearing. If native fauna are captured during vegetation clearing, they must be released in accordance with the procedure detailed below.

Rescue Procedure

In the event that wildlife is discovered on the site during Construction activities that may harm the animal or pose a risk to site personnel, the following procedure should be followed:

1. **Stop all works** in the vicinity of the animal and notify the supervisor or superintendent who is to notify the Environmental Site Representative and the Roads and Maritime Environmental Manager (or delegate) or the Project Ecologist, if the latter is present on site.
2. Contact the Project Ecologist to obtain positive identification of the subject species.
3. Provide exact location of the animal, clear directions to access the area and contact details for someone at the work front who will be able to meet the Project Ecologist or Wildlife Carer and show them where the animal is.
4. **Establish an exclusion zone around the animal.** Control plant and vehicle movements around this area.
5. **Allow animal to leave the area without handling if the animal is mobile.** Make sure the animal has a clear safe path to leave the Project area.
6. If the animal is unable or unwilling to leave the area of its own accord, only a licensed fauna ecologist or wildlife carer with specific animal handling experience should attempt to handle and relocate the animal.

7. If the Project Ecologist or Wildlife Carer is not immediately available and the animal is able to be handled safely, the following may be suitable to reduce stress to fauna and/or reduce the risk of further injury:
   i) Minimise the number of people around the animal;
   ii) Attempt to herd terrestrial fauna into adjoining forest or other vegetated area.
   iii) Cover larger animals with a towel or blanket and place in a cardboard box or hessian bag;
   iv) Place smaller animals in a cotton back or shoe box;
   v) Keep animal in a quiet, ventilated and preferably dark location away from Construction activities; and
   vi) Frogs and aquatic fauna to be placed in a plastic bag or container with sufficient amount of water.

8. If the animal cannot be safely handled (e.g. venomous reptiles);
   i) Maintain exclusion zone;
   ii) Supervise the animal until the Project Ecologist or Wildlife Carer arrives.

9. The Project Ecologist or Wildlife Carer will either:
   i) relocate fauna to nearby areas that will not be disturbed by the Project Construction works that contains similar / suitable habitat for the species;
   ii) hold the animal temporarily to release nocturnal animals at dusk or avoid periods of heavy rainfall; or
   iii) transport the animal to Veterinary Services for assessment if the animal is injured or stressed

In the event that 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

10. If the animal is a threatened species that is NOT identified in the CFFMP, the Environmental Site Representative is to immediately cease all work likely to affect the threatened species and notify the following relevant stakeholders;

   - The Roads and Maritime Environmental Manager (or delegate)

11. The Roads and Maritime Environmental Manager (or delegate) will contact the following stakeholders, in this order, to determine the appropriate corrective actions and additional safeguards to be undertaken:
   a) Project Ecologist
   b) OEH
   c) ER
   d) others as instructed by the ER or OEH

12. Following consultation with the relevant stakeholders, the Environmental Site Representative or Project Ecologist will implement any corrective actions and additional safeguards required.

13. If the animal is injured, requires veterinarian assessment, requires euthanasia or is killed, an Environmental Incident Report is to be completed in accordance with the Environmental incident classification and reporting procedure.
**Fauna Handling Considerations**

The table below provides a summary of considerations for general handling and rescue of fauna.

<table>
<thead>
<tr>
<th>Taxa/Activity</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling of Snakes</td>
<td>Handling of snakes can be unsafe and bites from certain species can result in serious illness, damage to organs or even death. Some monitor species also have anticoagulants that result in excessive bleeding. Handling of these species should be attempted by appropriately qualified personnel and where possible utilise no-direct contact handling techniques (i.e. use of snake hook and bag as opposed to directly handing the animal).</td>
</tr>
<tr>
<td>Handling of bats / removal of structures (bridges and culverts)</td>
<td>Some species of bats carry the Australian Bat Lyssavirus (ABL) which is a form of rabies. Anyone handling bats should be vaccinated. Bats that are held should be stored in a calico bag or sealed bat nest box. Prior to clearing of existing structures, an assessment for microbats and other fauna residing in the structure shall be completed. If the assessment determines that microbats are likely roosting in the structure, a site specific bat management strategy is to be developed to manage staged exclusion of the bats from the structure prior to removal.</td>
</tr>
<tr>
<td>Handling of frogs</td>
<td>Handling of frogs can result in the spread of the Amphibian Chytrid Fungus and shall be undertaken in accordance with the DECC Hygiene Protocol for Control of Disease in Frogs (DECC 2008). Frogs and tadpoles are to be placed into plastic bag (zip lock) or other plastic containers with a small amount of water and vegetation.</td>
</tr>
<tr>
<td>Handling of mammals and birds</td>
<td>Mammals and birds are capable of causing injury to handlers (e.g. bites, scratches) or themselves if handled incorrectly. Mammals and birds should be placed into a calico/hessian bag or a cardboard box. Possums which can easily rip through calico bags should be placed within double lined canvas bags.</td>
</tr>
<tr>
<td>Nestlings or juveniles</td>
<td>If habitat trees are found to contain nestlings or juveniles prior to felling then it would be preferable to leave trees intact until such a time that juveniles have vacated the nest or den. If, however, Construction timing does not permit this then attempts should be made to rescue juveniles for possible captive rearing by a responsible wildlife group (such as WIRES) and subsequent release into translocation sites. The success of this will depend upon the species, their stage of development and their likely chances of survival. Alternatively, and only as a last resort juveniles may be euthanized on-site.</td>
</tr>
<tr>
<td>Threatened species</td>
<td>If any habitat tree is found or suspected (based on fresh tree markings or scats) to contain any threatened species, the tree should be left in place for a minimum of two days and, if possible, be re-inspected prior to felling.</td>
</tr>
<tr>
<td>Arboreal animals</td>
<td>In the event that arboreal animals do not move or they cannot be captured because the tree hollow is too large, high or its recovery would breach OH&amp;S requirements then the tree will be felled and animals recovered post-felling.</td>
</tr>
</tbody>
</table>
### Taxa/Activity

<table>
<thead>
<tr>
<th>Taxa/Activity</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling of fish and aquatic species</td>
<td>Ensure that containers for holding aquatic species provide sufficient amount of water and adequate aeration.</td>
</tr>
<tr>
<td>Relocation and release of animals general</td>
<td>Animals should only be released at a time and place that is suitable to the species and provides it with a likely chance of survival (i.e. release should not increase the risk of stress or predation to the species). Release should not take place during periods of heavy rainfall.</td>
</tr>
<tr>
<td>Release of nocturnal species</td>
<td>Nocturnal animals captured during the day will be immediately taken to adjacent bushland and placed into a relocated tree hollow or nest box or held until the evening and released shortly after dusk (see below for holding of animals).</td>
</tr>
<tr>
<td>Temporarily holding animals</td>
<td>Collected animals may be held for a short period of time (preferably less than 24 hours prior to release). Animals kept for any purpose will be secured in a container (see above) and stored in a quiet, ventilated and preferably dark location away for Construction activities. Injured animals will require additional care and may need to be nursed on route to care.</td>
</tr>
<tr>
<td>Injured Animals</td>
<td>Injured animals will be cared for according to specific animal care and ethics guidelines and be given appropriate veterinary care, and if available, the services of one of the local animal welfare groups.</td>
</tr>
<tr>
<td>Euthanasia</td>
<td>In some instances severely injured and pest animals may need to be euthanized. This is to be done by a veterinarian after being assessed.</td>
</tr>
<tr>
<td>Release site selection</td>
<td>During the preliminary pre-clearing assessments, the Project ecologist is to identify and assess suitable release sites for fauna adjacent to the Project area.</td>
</tr>
</tbody>
</table>

## Fauna Likely to be affected by the Works

While some mobile species, such as birds, may be able to move away from the path of clearing, other species that are likely to be directly affected by the works include:

- Less mobile species unable to move rapidly over relatively large distances (e.g. frogs and reptiles, nesting birds and juvenile fauna);
- Arboreal and scansorial mammals (possums);
- Microbats residing in structures (bridges and culverts);
- other species utilising tree hollows and
- Fish and aquatic fauna (e.g. fish or eels) in waterways.

For these species, Construction activities will have the potential to result in loss of roosting habitat and potential injury or mortality. Mobile species fleeing clearing areas are also at risk from collision with vehicles.
Relocation procedure

Relocation of fauna will be undertaken by, or under advice from, the Project Ecologist or wildlife carer and records will be maintained in a register. If the animal is not injured or stressed, it will be released nearby in an area that is not to be disturbed by Construction, in accordance with the following procedures:

- sites identified as suitable release points by the Project Ecologist or wildlife rescuer
- sites of similar habitat and located as close to the original capture location as possible
- if the species is nocturnal, release will be carried out at dusk
- avoid release during periods of heavy rainfall where feasible
- hollow-dependent species, particularly those with dependent young, will be released into a temporary nest box.

If the animal has been placed into care due to injury, age (i.e. young) or stress, upon its rehabilitation it will be released in an area that is not to be disturbed by the Project Construction works, at the discretion of the Project Ecologist or wildlife rescuer.

Dewatering procedure and aquatic fauna relocation

A number of farm dams and creeks are located within the Project area and there is the potential for fish and other aquatic fauna, including turtles and eels, to be present within these watercourses. GEJV will prepare a Farm Dam Dewatering Plan in consultation with a qualified aquatic ecologist who will advise on measures relevant to relocation of fauna and prevention of transfer of exotic aquatic life (if appropriate).

Aquatic fauna will be relocated in accordance with the following steps:

1. Ensure all aquatic fauna relocation works are supervised by a suitably qualified aquatic ecologist.
2. Prior to the commencement of pumping, advice should be sought from the aquatic ecologist on pumping methods and the extent of drawdown.
3. The water level will be pumped down to a level that will allow the safe and effective implementation of capture methods, such as seine nets, dip nets and electrofishing.
4. A fine mesh screen (≤5 mm) may be installed on the inlet of the pump or a fish basket used to remove the risk of native aquatic fauna being transferred through pump. A maximum depth of 500 mm is typically required before fish salvage can commence but site-specific advice will be required from the aquatic ecologist.
5. The aquatic ecologist is to establish the presence of native and introduced aquatic fauna and plan the relocation. Access to adjoining properties may be required for relocation, particularly when dewatering dams. The aquatic ecologist will ensure that native aquatic fauna species are released into suitable habitat as close to the original location as possible.
6. In areas of identified frog habitat, dip-netting for tadpoles will be undertaken prior to substantial water draw-down.
7. Tadpoles will be placed in individual clip-seal bags and acclimatised to the release site (i.e. bag placed in waterbody for 30 minutes) before being released.
8. Separate the native fish and pest species, with 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.

9. Transfer native aquatic fauna species to an aerated transport tank for immediate release downstream in previously identified suitable habitat.

10. Following completion of relocation, a final check will be undertaken to find any remaining fish, or dying/dead fish.

11. All euthanised and dead fish will be transported to a licensed landfill facility for disposal.

Handling procedure

The following handling procedures will be implemented to minimise stress to fauna and/or remove the risk of further injury:

1. If time permits, call ecologist or fauna rescue for advice.

2. Attempt to herd terrestrial fauna into adjoining forest or other vegetated area.

3. If capture is necessary, cover larger animals with a towel or blanket and place in a large cardboard box or hessian bag.

4. Place smaller animals in a cotton/calico bag tied at the top.

5. Keep the animal in a quiet, warm, ventilated and dark place away from noisy Construction activities.

6. Animals such as venomous reptiles and raptors require particular handling and will only be handled by appropriately qualified personnel, i.e. Project Ecologist or wildlife rescuer.

7. If handling bats, the handler must be vaccinated against the Australian Bat Lyssavirus.

8. Aquatic fauna will be placed in plastic aquaria or a plastic bag with sufficient amount of water and aeration.

9. Frogs will be transported in moistened plastic bags (1 frog/bag) with a small amount of leaf litter. Handling and translocation of frogs shall be 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. Recommended measures include:
   - thoroughly cleaning/disinfecting footwear and equipment before entering frog habitat and when moving from one site to another
   - in high risk areas, spraying/flushing vehicle tyres with a disinfecting solution and avoid driving through frog habitat
   - cleaning/disinfecting hands between collecting samples/frogs (preference would be given to using bags, rather than bare hands to handle frogs)
   - limiting one frog or tadpole to a bag. Bags should not be reused.

Recommencement of work

Following consultation with all relevant stakeholders, the GEJV Environmental Site Representative, ER and Project Ecologist will implement any corrective actions and additional safeguards identified. Following confirmation by the Environmental Site Representative, ER and Project Ecologist that all appropriate safeguards have been implemented, Construction works can recommence.
**Project Ecologist responsibilities for fauna handling and rescue**

GEJV’s Project Ecologist has the following responsibilities in regard to this Procedure:

- relocation of captured fauna will be undertaken in accordance with Sections 2.2 and 2.3 of this Procedure
- record and provide capture and relocation data in the Post-Clearing Report (refer Annexure A of this CFFMP). Data will include the species, number, and general health of each individual
- in the event that the rescue service and/or local veterinary service cannot be contacted or non-native fauna are captured, the most appropriate euthanasia will be administered by the Project Ecologist (i.e. cervical dislocation for small vertebrates, ice slurry for introduced fish). This is to occur in accordance with applicable guidelines and legislative requirements
- if the fauna species is identified as a threatened species that is not identified in this CFFMP, notify the Environmental Site Representative or Roads and Maritime Environmental Manager (or delegate).

**Supervision of Clearing**

An ecologist or WIRES representative will be present during the clearing of suspected vegetation that may support a habitat for fauna to manage and/or relocate any fauna present.

The objective of the pre-commencement inspections and supervision of clearing is to direct clearing in a manner that either allows for fauna to safely flee the clearing area.

Uninjured animals that are unable to flee the clearing area will be captured and placed in adjacent areas of analogous habitat that contains suitable refuge habitat, to areas of adjoining habitat.

Injured animals will be cared for according to specific animal care and ethics guidelines (http://www.animalethics.org.au/reader/arrp-policies-and-guidelines) and be given appropriate veterinary care, and if available, the services of one of the local animal welfare groups. Severely injured and pest animals may need to be euthanized at the assessment of a veterinarian.

**Records**

GEJV will maintain accurate records of all fauna captured and relocated during the Project. The following details will be recorded for each event:

- species name
- location and time captured
- location and time released
- behaviour and condition upon release
- details of any injury or death that occurred
- contact details and location of licensed wildlife carer or vet if the animal was transferred into their care.
Reporting

The Project Ecologist will record fauna finds, relocations and euthanised animals in the Roads and Maritime Environmental Incident Report.

GEJV will immediately report any injury or death of a threatened species to the Roads and Maritime Project Manager or Environmental Manager (or delegate) and ER.
Annexure D
Weed and Pathogen Management Plan

Attachments
1  Priority weeds for the Greater Sydney Local Land Services region
2  National Environmental Alert List Weeds
3  Guide 6: Weed management, *Biodiversity Guidelines*
4  Guide 7: Pathogen management, *Biodiversity Guidelines*
Introduction

Purpose

Construction of the Project has the potential to cause the spread or importation of weeds and pathogens. Activities including vegetation clearing, soil disturbance, erosion and sediment control, vehicle movements, inadequate rehabilitation/ revegetation of disturbed areas and inappropriate topsoil management have been identified as potential risks in weed and pathogen management.

This Weed and Pathogen Management Plan has been prepared to identify the presence and management of pathogens and key weed species and their distribution across the Project area, and to outline the processes required to control and prevent the spread of weeds and pathogens. It has been prepared in consultation with a qualified Ecologist and in accordance with the Biosecurity Act 2015, Guide 6: Weed management and Guide 7: Pathogen management, Biodiversity Guidelines (RTA, 2011) and the Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022. The overviews from Guide 6 and Guide 7 of the Biodiversity Guidelines are attached to this template Weed and Pathogen Management Plan. Priority weeds and other weeds of regional concern are also attached to this Plan.

The purpose of this Plan is to

- identify the areas where potential pathogens and key weed species and their distribution across the Project sites
- prevent the introduction and spread of weeds and pathogens throughout the Construction of the Project
- establish weekly inspections that will be completed to monitor the presence of weed species

Scope

This Plan details control measures to be implemented throughout the Construction of the Project. This Plan focuses on weed control prior to vegetation clearance, weed management during clearing, and progressive weed control throughout the Construction of the Project.

Induction / training

All site personnel (including sub-contractors) will be inducted in this Plan and the existence of noxious and other weeds in the Project area. Training will also include requirements to inspect machinery and clean construction footwear to prevent the spread of weeds, and measures to identify and prevent the introduction or spread of Phytophthora cinnamomi (Root Rot).

Training will include inductions, toolbox talks, pre-starts and targeted training as required.

Roles and responsibilities

The Environmental Site Representative is responsible for ensuring the effective implementation of this Plan and training of site personnel in the requirements of this plan.

The Environmental Site Representative will liaise with Liverpool City Council where required in regard to Council requirements for weed control methods.

The Project Ecologist will advise on appropriate weed removal and control techniques for each weed species and for pathogens.
All persons entering the Project Construction sites are responsible for preventing the spread of weeds and pathogens within the Project area and offsite.

Review

This Plan will be updated throughout Construction of the Project to include any new weed or pathogen findings and subsequent management measures required. This Plan will be reviewed annually, or as required in accordance with the continuous improvement process described in Section 8 of this CFFMP.

Weeds and pathogens in the Project area

Weeds

The Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 identifies priority weeds and other regional weeds of concern for the Greater Sydney Region, including the Liverpool LGA.

Priority weeds in the Greater Sydney Region

State level determined priority weeds and regionally determined priority weeds, as identified in the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022, are provided in Attachments 1.1 and 1.2 respectively. Management requirements for weeds, whether that be specific regulatory measures (state level priorities) or outcomes to demonstrate compliance with the General Biosecurity Duty (regional priority weeds), are also detailed in Attachment 1.

The outcomes applied to a particular weed depend on factors such as the biology and ecology of the weed, the land use(s) in which it occurs, the distribution in the region and size of the infestation, potential pathways for infestation and others. These factors were taken into account in determining the suite of outcomes to demonstrate compliance with the General Biosecurity Duty and strategic responses. These obligations apply to all private and public landholders in the region.

Other regional weeds of concern list

Attachment 2 outlines other priority weeds identified by the Greater Sydney Regional Weed Committee in consultation with the community. These are species for which a consistent and/or collaborative approach to management will provide the best outcome across the region. Weeds identified within Attachment 2 are also subject to the General Biosecurity Duty and may be a focus for local management plans and coordinated campaigns by the community and other stakeholder groups in the region.

Weed identification and mapping

Detailed weed identification and mapping of Construction sites and adjacent areas will be undertaken by the Project Ecologist during pre-clearing surveys, and/or personnel trained in weed management prior to the commencement of Construction.

GEJV will update this Weed and Pathogen Management Plan with a detailed list of all weed species identified during the pre-clearing surveys as part of the GEJV’s CFFMP. GEJV will include details of the weed species including photographs, detailed descriptions and known locations. The detail to be provided will also include the weed status in accordance with Attachments 1 and 2.
This information will be disseminated to site personnel during training and induction.

**Pathogens**

Pathogens that have been identified to potentially occur in the Project area include:

- *Phytophthora cinnamomi* (Phytophthora)
- *Uredo rangelii* (Myrtle Rust)
- *Batrachytridium dendrobatidis* (Chytrid (Frog) fungus)

Myrtle Rust is identifiable in the field, however *Phytophthora* and *Chytrid* fungus can be confirmed by testing infected plants or soil (*Phytophthora*), or frogs (*Chytrid* fungus).

GEJV will prepare identification and/or fact sheets on each pathogen identified as having the potential to occur within the Project area or with the potential to be introduced to the area.
The Northern Road Upgrade
Between Mersey Road and Eaton Road

Construction Flora and Fauna Management Sub Plan

Weed management procedure
Approach to weed management

In NSW all plants are regulated with a general biosecurity duty under the Biosecurity Act 2015 to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

The figure below, from the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022, illustrates the invasion process for weeds from arrival to widespread establishment and shows that the effort and resources required to control a weed rise with time and area occupied. Managing weeds earlier rather than later is more effective. The asset protection phase shown in Figure 3-1 illustrates the shift in the focus from controlling a weed species to limiting the impact it may have on important assets.

![Weed Invasion Curve](Image)

**Figure 3-1:** Weed invasion curve

*Source: Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022*

Further detail of the management categories identified in Figure 3-1 is provided in Table 3-1.

**Table 3-1:** Regional weed management categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Objective</th>
<th>Weed Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention</td>
<td>To prevent the weed species arriving and establishing in the Region.</td>
<td>These species are not known to be present in the region. They have a high to very high weed risk (highly invasive and high threat) and have a high likelihood of arriving in the region due to potential distribution and/or an existing high risk pathway.</td>
</tr>
<tr>
<td>Category</td>
<td>Objective</td>
<td>Weed Characteristics</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Eradication</td>
<td>To permanently remove the species and its propagules from the Region OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.</td>
<td>These species are present in the region to a limited extent only and the risk of re-invasion is either minimal or can be easily managed. They have a high to very high weed risk and high feasibility of coordinated control.</td>
</tr>
<tr>
<td>Containment</td>
<td>To prevent the ongoing spread of the species in all or part of the Region.</td>
<td>These species have a limited distribution in the region. Regional containment strategies aim to prevent spread of the weed from an invaded part of the region (core infestation), and/or exclude the weed from an uninvaded part of the region (exclusion zone).</td>
</tr>
<tr>
<td>Asset Protection</td>
<td>To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread has already occurred.</td>
<td>These weed species are widespread and unlikely to be eradicated or contained within the wider regional context. Effort is focussed on reducing weed threats to protect priority high value assets.</td>
</tr>
</tbody>
</table>

**Site weed assessment**

The GEJV Environmental Site Representative will undertake an inspection of the Project Construction site with the Project Ecologist to assess the area for weeds. Weed assessments will occur:

- as part of the pre-clearing survey
- prior to drainage works
- during regular site inspections during Construction
- when a potential weed infestation has been identified
- before spring to identify weeds before they go to flower and seed.

The weed assessment will involve the following activities:

- identify and describe or map weed infested areas
- include photographic guide to identifying common weed species within the Project area
- identify surrounding land uses and sensitive environmental areas
- determine weed management priorities and objectives in accordance with Attachments 1 and 2.

**Establish weed control measures**

*Prevention of weed spread / importation*
Environmental controls will be implemented by GEJV in consultation with the Project Ecologist to prevent the spread or introduction of weeds to the Project area. Controls will include:

- GEJV or delegate to map and mark areas that are infested with weeds as an exclusion zone with fencing and signage to limit access by personnel and vehicles with Maps available on the HSE notice board.
- Install wheel wash and rumble grids at Construction sites
- All plant arriving on site will be inspected to ensure they are free of organic material. This will be completed via an online Plant compliance checklist on an online inspection app. program works from least to most weed infested areas, where possible.
- All mulch and topsoil will be stockpiled as close as possible to where it was generated and outside of drainage lines to minimise the distribution of weeds (that may be present).

**Determine weed control / removal methods**

Weed control methods include mechanical, physical and chemical techniques. The suitability of control techniques will vary depending on the target weed species and the desired outcomes. The Project Ecologist will advise on the most appropriate weed treatment methodology and timing.

**Implement weed control / removal methods**

Weed control methods will be implemented under guidance from the Project Ecologist. Methods of control will/may include:

- Use of mechanical weed control methods such as slashing or mowing
- Timing of when weeds to be sprayed
- Use of herbicides to avoid the development of herbicide resistance
- Mowing/slashing of areas infested with weeds before they seed to reduce the propagation of new plants
- Separate weeds from native vegetation where native vegetation is to be used for mulch
- Identify weed infested areas
- Topsoil recovered from areas of low weed infestation will be stockpiled separately
- Remove weeds immediately onto suitable trucks and dispose of without stockpiling
- Following weed removal, any exposed areas will be stabilised and/or rehabilitated to reduce erosion, and minimise the potential for further weed invasion.
- During regular site inspections during Construction

**Pesticide use**

In the unlikely event that pesticides are used, they will be utilised in accordance with the *Pesticides Act 1999 (NSW)*, other relevant legislation, label directions, any relevant industry codes of practice and the requirements of Roads and Maritime Specification G36. Details will be included in EWMS and toolbox talks/training conducted as appropriate.

The Environmental Site Representatives will ensure that a Pesticide Application Record is completed and public notifications made in accordance with relevant legislation and Roads.
and Maritime specifications, where pesticides are to be used in areas that could be accessed by members of the public. The Environmental Site Representatives will complete a Pesticides Application Record Sheet (provided in G36/G) within 24 hours of applying the pesticide and submit a copy to the Roads and Maritime Environmental Manager (or delegate).

The Records Sheet does not need to be completed if all of the following are satisfied:

- the pesticide is, or is part of a product that is widely available to the general public at retail outlets
- the pesticide is only applied by hand or by using hand-held equipment
- if applied outdoors on any single occasion, in quantities of no more than 5 L/5 kg of concentrated product or 20 L/20 kg of the ready-to-use product or, if applied indoors, in quantities of no more than 1 L/1 kg of concentrated product or 5 L/5 kg of the ready-to-use product.

Public notification of pesticide use will be in accordance with Roads and Maritime specification G36 Section 4.12 and Annexure H whenever pesticides are used adjacent to, or across the road from a public place or private property. Appropriate environmental management measures will be implemented where pesticides are proposed during Construction to avoid or minimise impacts on adjoining properties.

Any spraying of noxious weeds must avoid damage to adjacent native vegetation and to prevent overspray entering waterways or adjoining properties. Only pesticides registered for use near water may be used near any waterways.

The following measures will be implemented whenever pesticides are to be used adjacent to, or across the road from, a "sensitive place", for example next to a house, school, waterway/dam or playground.

- use of mechanical means of pest control (such as mowing or slashing) where feasible or
- use of hand-held application of pesticides where mechanical means of pest control are not feasible.

Pesticide application will be appropriately scheduled. Pesticides will not be applied:

- on hot days when plants are stressed
- after seed has set
- within 24 hours of rain or when rain is imminent
- when winds will cause drift of pesticides into non-target areas.

All personnel managing and using pesticides must receive appropriate training and hold an appropriate licence (i.e. Chemcert) prior to commencing work.

Ongoing management of weeds

- minimise soil disturbance within weed infested areas
- ensure topsoil imported onto site is free of weed propagules
- regularly inspect and clean machinery, vehicles and footwear using installed facilities
- wash down the wheels of all Construction plant before transportation to the site
• keep records of all screening checks and subsequent actions taken
• securely cover loads of weed-contaminated material during transportation
• avoid use of weeds as mulch
• avoid re-use vegetation or topsoil containing weed material on site unless appropriately treated
• monitor disturbed and rehabilitated sites for presence of weeds.

Weed and pathogen management for the DEOH site

No waste material generated outside the DEOH site will be used within the bounds of DEOH as soil, fill, or a component of soil or fill, within the boundaries of DEOH nor within 10 metres of the DEOH boundary, unless:

• the material is Virgin Excavated Natural Material and
• the material is sourced from a location that appropriate testing demonstrates is free of weed propagules and/or Phytophthora cinnamomi. Details of the material source and testing undertaken will be provided to the Minister for DoEE before the material is taken onto the DEOH site. The Minister may write to Roads and Maritime or GEJV at any time and advise that the Minister for DoEE is not satisfied with the testing undertaken. If the Minister for DoEE provides such advice, GEJV will not source any further material from that site without the Minister’s written agreement.

Between 10 m and 30 m of the DEOH boundary, GEJV will make all reasonably practical efforts to ensure that material used is free of weed propagules and/or Phytophthora cinnamomi.

No topsoil material generated outside the DEOH site may be used as soil, fill, or a component of soil or fill, within the boundaries of DEOH nor within 30 metres of the DEOH boundary, unless:

• GEJV can make all reasonable practical efforts to ensure the topsoil material is free from contaminants that would adversely affect the environment and
• the topsoil material is sourced from a location that appropriate testing demonstrates is free of weed propagules and/or Phytophthora cinnamomi. Details of the topsoil material source and testing undertaken must be provided to the Minister for the DoEE before the topsoil is taken onto the DEOH site. The Minister may write to Roads and Maritime or GEJV at any time and advise that the Minister is not satisfied with the testing undertaken. If the Minister provides such advice, GEJV must not source any further topsoil material from that site without the Minister’s written agreement.

Weed disposal

Weeds and topsoil potentially containing weed propagules disturbed by Construction activities will be removed and disposed of at a suitable landfill location in accordance with the requirements of Liverpool City Council. Exotic plant species will be removed, bagged and disposed offsite to a licensed landfill facility in accordance with the requirements of the relevant local Council.

Pathogen management procedure
Site pathogen assessment

The biodiversity assessment carried out for the EIS included a visual assessment for presence of pathogens in the Project area. No pathogens were found to be present during the visual assessment. A site assessment for potential risk of pathogens in the Project area will be undertaken by the Project Ecologist during pre-clearing surveys. The site assessment will identify and describe or map potential pathogen-containing vegetation areas. In the event that pathogens are confirmed to be present GEJV will refer to DPI guidelines for the most up-to-date hygiene protocols for each pathogen and for the most recent locations of contamination.

Testing from a National Association of Testing Authorities (NATA) approved laboratory may be required to confirm the presence of pathogens in the soil and/or water.

Establish pathogen control measures

Prevention of introduction or spread of pathogens

Pathogens can be spread during Construction on footwear, vehicles and machinery, particularly during wet weather or in wet conditions. Controlling the introduction and spread of pathogens that have the potential to harm the environment in the Project area is a high priority. Environmental controls will be implemented by the GEJV in consultation with the Project Ecologist to prevent the spread or introduction of pathogens to the Project area.

Details will be included in EWMS and toolbox talks/training conducted as appropriate.

Controls will include:

- map and mark areas that are infested with pathogens as an exclusion zone with fencing and signage to limit access by personnel and vehicles
- install wheel wash and rumble grids at Construction sites
- provide boot wash down facilities at Construction sites if required
- program works to be completed to avoid potential cross contamination from uninfected areas to infected areas, where possible.
- Visually assessing plant coming to site and ensuring they are free of organic material
- minimise soil disturbance within pathogen infested areas
- keep records of all screening checks and subsequent actions taken
- securely cover loads of weed-contaminated material during transportation
- avoid re-use vegetation or topsoil containing weed material on site unless appropriately treated

Determine pathogen prevention / control methods

Management measures for pathogens can include planning or awareness measures, exclusion measures and containment measures. The suitability of control techniques will vary depending on the pathogen and will be determined on advice from Project Ecologist and best practice guidelines. Best practice protocols include:

- minimise work during excessively wet or muddy conditions
• provide parking and turn-around points on hard, well-drained surfaces
• restrict vehicles to designated tracks, trails and parking areas
• restrict personnel to designated tracks and trails
• personnel working in an infected site should shower and launder clothes before moving to another vegetated site
• use disinfectant or gloves when handling frogs and only handle frogs when necessary
• ensure vehicles and footwear are free of soil before entering or exiting the site (i.e. directed to wash down area before entering or exiting the site)
• use a certified supply of plants and soil that is disease-free
• hygiene protocols, such as use of disposable suits, will be used where site personnel are required to work in areas identified as containing pathogens that are located in the vicinity of threatened flora or fauna or EECs
• removed infected vegetation will be securely wrapped in bags prior to disposal.

Material disposal
Disposal of infected material will vary depending on the pathogen in the affected material.

Where materials are known or suspected to be affected by *Phytophthora*, the material will be retained within the contaminated area. Stockpiles of mulch, topsoil and fill material will be separated to avoid potential contamination and spread.

Plant material infected with Myrtle Rust will be buried on site if possible and will not be disposed of at another vegetated site. Buried material sites will be recorded on maps to prevent re-exposure. Where material is unable to be buried, advice will be sought from DPI.

To avoid cross contamination of frogs with *Chytrid*, GEJV will avoid, where possible, transferring water between two or more separate waterbodies.

Inspection, monitoring and reporting
Where applicable monitor weed and/or pathogen infestations will occur as part of the routine weekly environmental inspections to determine the effectiveness of management controls. The presence of any weeds and/or pathogens and the necessary management actions will be noted on the Environmental Inspection Checklist.

GEJV will prepare a weed and pathogen monitoring program that includes:
• inspection of the general condition of the Project area including identification of additional weeds and pathogens or reduction in the occurrence of weeds and pathogens
• measures to assess the effectiveness of weed and pathogen treatments
• modifications to weed and pathogen treatments if required
• schedule to re-apply treatments if previous treatments are not fully effective
• measures to improve the quality of habitat in retained vegetation
• site visits, mapping and fixed point photographs of the Construction corridor and adjoining impacted areas.
Inspections will be carried out on a monthly basis for a period of six months (or as necessary responding to seasonal and climatic conditions), then at least every three months for the remainder of Construction of the Project. The Project Ecologist will undertake all monitoring and inspections. The Environmental Site Representative will report the results of each monitoring inspection against the weed and pathogen management objectives to the Roads and Maritime Project Manager and the Roads and Maritime Environmental Manager (or delegate).

Where required, GEJV will prepare and implement an action plan to manage any ongoing weed and pathogen problems.
## Attachment 1 - Priority weeds for the Greater Sydney Local Land Services region

<table>
<thead>
<tr>
<th>Construction Plan</th>
<th>Flora and Fauna Management</th>
<th>Sub</th>
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<tbody>
<tr>
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</table>
Attachment 2 - National Environmental Alert List Weeds
Attachment 3 - Guide 6: Weed management, Biodiversity Guidelines
Attachment 4 - Guide 6: Weed management, Biodiversity Guidelines
Annexure E
Vegetation Clearing Procedure
Introduction

Purpose
Clearing associated with Construction of the Project will result in the loss of vegetation and fauna habitat, with impacts on native flora and fauna, including threatened species and EECs. This Vegetation Clearing Procedure has been prepared in accordance with Guide 1: Pre-clearing process, Guide 2: Exclusion zones, Guide 4: Clearing of vegetation and removal of bushrock and Guide 8: Nest boxes, Biodiversity Guidelines (RTA, 2011) and Roads and Maritime specifications.

The purpose of this Procedure is to outline environmental control measures to minimise clearing of vegetation within the Project area and impacts on biodiversity and the surrounding environment. It provides a framework for the management of vegetation to be retained or removed and the minimisation of loss of habitat and harm to associated fauna.

Induction / training
All site personnel (including sub-contractors) will be inducted on the potential threatened species and EEC and sensitive environmental areas occurring within the Project area and this Procedure. Training will include inductions, toolbox talks, pre-starts and targeted training as required. Topics will include, but not be limited to, the two stage habitat removal process, clearing limits, no go zones, fauna descriptions and handling procedures.

All site personnel working in the Project area will be informed of exclusion zones in place and where they occur.

Scope
This Procedure details control measures to minimise impacts of vegetation clearing to be implemented throughout the Construction of the Project.

Roles and responsibilities
The Project Environmental Site Representative, Supervisor and Project Ecologist, are required for Project clearing activities. The following specialised roles are also required for Project clearing activities:

- a suitably qualified Ecologist will undertake pre-clearing surveys, including targeted surveys for the Cumberland Land Snail and Eastern Long neck turtle
- a qualified arborist will undertake an assessment of existing trees within the road reserve that are to be retained and identify techniques to maximise tree health and longevity. Any pruning will be carried out by an arborist using only the appropriate tools
- an experienced, licenced wildlife carer or fauna handler will supervise vegetation clearing and capture and relocate fauna.

Consultation
Consultation requirements relevant to this Procedure include:

- consultation will be undertaken with community groups and relevant government agencies for the supply of root balls prior to clearing commencement
- consultation has been undertaken with community groups, to investigate the options for re-use of retained timber and root balls
o the Mulgoa Valley Landcare Group, were unable to take root balls.

o Penrith City Council are interest in the root balls and discussions continue in regards to transport to Emu Plains

o consultation has been undertaken with The GEJV Ecologist

o The GEJV Ecologist will communicate with OEH and DoEE where threatened species are likely to be encountered on order to determine suitable habitat for fauna.

Review
This Procedure will be reviewed annually, or as required in accordance with the continuous improvement process described in Section 8 of this CFFMP.

Vegetation clearing procedure
Pre-clearing
Pre-clearing process
The pre-clearing process provides a final check for any threatened flora or fauna species that may have moved into the area since previous surveys were undertaken. An Ecologist will undertake the pre-clearing survey to identify and mark any habitat features within the area to be cleared and to advise on the presence of any fauna. The pre-clearing process will include the following activities:

o identify and locate habitat features on site

o Habitats demarcated in accordance with the flagging protocol.

o identify exclusion zones, install fencing/flagging/signage

o install erosion and sedimentation controls

o identify fauna that have the potential to be disturbed, injured or killed during clearing activities (e.g. nesting birds)

o survey for the presence of threatened flora and fauna species identified as being confirmed or likely to occur in the Project area

o identify the number and species of trees at 1.2 m above ground with DBH >100 mm outside of EECs

o identify the number and species of trees within EECs

o Types of ERSED controls implemented

o record the details for all hollow-bearing trees, trees containing threatened fauna and threatened flora

o mark habitats to be protected during clearing

o identify suitable habitat areas for fauna relocation

o 24 hours prior to clearing, licensed wildlife carers and/or ecologists should capture and/or remove fauna that have the potential to be disturbed as a result of clearing activities and relocate to the pre-determined location (as above).
Pre-clearing survey form

GEJV has developed a pre-clearing survey form to provide a checklist (provided in Annexure A) of steps to be followed prior to any disturbance of vegetation or ground in the Project area. The survey form will be completed by the Project Ecologist and reviewed for approval by the Environmental Site Representative.

Targeted pre-clearing survey species

Targeted pre-clearing surveys will be carried out for the Cumberland Plain Land Snail and Eastern Long Neck Turtles in identified habitat areas by an appropriately qualified Ecologist.

Eastern Long Neck Turtle surveys will be conducted by a marine ecologist as required for dam dewatering, and the findings will be included in the Dam Dewatering Procedure (Appendix B4 of the CEMP, Annexure E).

A land ecologist has conducted a pre-clearing report, and key findings will be included in the EWMS as required.

Cumberland Land Snails identified during the pre-clearing surveys will be relocated together with any important habitat elements (large woody debris) from the impact area to a suitable pre-identified area within the Project area which is not being cleared.

Exclusion zones

Exclusion zones will be established to prevent damage to native vegetation and fauna habitats and prevent the distribution of pests, weeds and disease in accordance with the following:

- Identify exclusion zones on a suitable plan to be displayed in prominent places in the Project area. Include in the plan aerial photographs, Construction chainages, clear labelling of what is being excluded and access points
- Mark out exclusion zones on site with temporary markings such as pegs or paint and where possible use a qualified surveyor
- Erect signs to inform personnel of the purpose of exclusion zone fencing
- Ensure all exclusion zones are regularly inspected and repairs to fencing are made where required
- Maintain exclusion fencing until the risk to disturbance within the excluded zone has been eliminated through other means
- Undertake removal of fencing in consultation with the Environmental Site Representative.

Flagging protocol

Site delineation, including environmentally sensitive area protection, habitat tree identification and clearing limits, must be consistent with the Roads and Maritime Flagging Protocol. Clearing boundary survey pegs must be numbered as outlined in the Flagging Protocol. Refer to figures included at the end of this Procedure.

Clearing limits will be flagged at least seven working days prior to the proposed commencement of clearing. Clearing limits will be identified using signage and highly visible continuous barrier or tape such as bunting, nightline or other similarly robust and durable material. Sensitive areas such as Badgerys Creek, Aboriginal heritage areas and non-
Aboriginal heritage areas (Miss Lawson’s Guesthouse) will be identified in a Sensitive Area Maps. No vegetation clearing within the excluded areas will occur.

**Clearing process**

The area to be cleared will be confirmed following a site inspection with the Roads and Maritime Environmental Manager (or delegate).

Clearing within identified environmentally sensitive areas will not be undertaken without the approval of the Roads and Maritime Project Manager and Environmental Manager (or delegate). Clearing of riparian vegetation or EECs will be in accordance with the areas assessed in the EIS, as amended by the SPIR.

Exclusion zone fencing will be installed to delineate the areas to be cleared.

GEJV has prepared a Clearing and Grubbing EWMS (002) for the Project.

GEJV will also prepare a report that includes:

- the identity of species and location of any weeds growing in the area to be cleared and grubbed
- detailed sensitive area maps
- identification of any unsound trees outside the limits of clearing
- management measures to be implemented to identify and protect clearing limits, habitat features and exclusion areas
- measures to prevent clearing beyond the vegetation clearing limit
- measures to clearly mark the clearing boundary, in line with the Flagging Protocol
- procedure for clearing of vegetation including potential habitat, hollow-bearing trees and culverts
- procedure for vegetation removal.
- an ongoing process to communicate biodiversity management measures to all staff including subcontractors
- a stop work procedure in the event of identification of unidentified species, habitats or populations
- a process to review and update the adequacy of the Clearing and Grubbing Plan
- a process to ensure that prior to commencement of work a Site walk is undertaken with Roads and Maritime to confirm clearing boundaries
- a process to ensure that an experienced, licenced wildlife carer or ecologist is present to supervise vegetation clearing and capture then relocate fauna
- a procedure for a suitably qualified Ecologist to undertake pre-clearing surveys for the Cumberland Land Snail in suitable habitats and relocate any snails and important habitat elements (large woody debris) from the impact area to a suitable pre-identified area which is not to be cleared

Clearing will be undertaken in accordance with the following methods:

- carefully clear vegetation so as not to mix topsoil with debris and to avoid impacts to surrounding native vegetation
o separate woody vegetation into millable timber, secondary re-use or exotic vegetation

o temporary stockpiles of vegetation and timber will be less than 2 metres in height, and mulched as soon as practical and managed in accordance with the Management of Tannins from Vegetation Mulch Procedure (refer to Annexure H of the Construction Soil and Water Management Plan) non-woody vegetation should be incorporated into the stripping of topsoil to retain any organic materials and nutrients

o topsoil is not to be mixed with subsoil and will be stockpiled separately for re-use

o the staged habitat removal process is to be used when identified habitat is to be removed, with a licensed wildlife carer or ecologist on site

o undertake bush rock removal in a way that minimises damage to the bush rock, avoids excessive soil disturbance and avoids climatic seasons when species are utilising this resource

o pruning will be undertaken by a qualified arborist.

Controls for protection of vegetation

General controls

GEJV will implement protective measures during clearing to avoid damaging or destroying vegetation and habitat which have been marked (as per the “flagging Protocol”) or otherwise identified for preservation. The Project ecologist will assess the areas through the pre clearance survey and control implemented accordingly. The Site Supervisor will be responsible for carrying out the works under the direction from the Project ecologist and Environmental Site Representative.

Measures will include:

o installation of fencing

o avoid stockpiling of materials and vehicle parking under the tree canopy

o avoid excavation or the placing of fill near any tree without advice from an Ecologist/arborist

o haul roads and access tracks will be located away from the tree canopy

o trees will be marked for directional felling to avoid damage to environmentally protected areas

o assess existing trees within the road reserve that are to be retained to identify techniques to maximise their health and longevity

o existing trees, grasses and other ground cover within 15 m of watercourses and in all drainage lines will be retained until immediately before Construction commences in the area

o access tracks will be constructed and aligned to minimise erosion

o plant and equipment will be selected to minimise tracking and disturbance of existing ground.

Threatened flora

Although the below species have not been identified within the Project area, the Project ecologist will complete a pre clearing survey to identify any areas that are considered to
contain threatened flora. Areas will be demarcated until direction has been received from Roads and Maritime Project Manager. Targeted surveys of threatened flora species and populations undertaken for the EIS confirmed that there is one threatened species and one threatened population that will be directly impacted by the Project as follows:

- *Pultenaea parviflora* (EPBC Act listed vulnerable and BC Act listed endangered species)

The location of these flora is identified in the Sensitive Area Maps (refer to Appendix A6 of the OACEMP).

Management measures to minimise impacts to threatened flora, in addition to the general control measures listed above, include:

- exclusion zones will be established around *Marsdenia viridiflora* subsp. *Viridiflora* plants in the area of the DEOH fence between Kings Hill Road and Longview Road
- exclusion zones will be established around the *Pultenaea parviflora* plants to be retained in the area of the Vineyard Road extension
- exclusion zones will be established around any additional plants identified during the pre-clearing surveys
- Roads and Maritime will investigate options for salvage of genetic material and/or translocation of *Marsdenia viridiflora* subsp. *viridiflora* and *Pultenaea parviflora* plants that are to be impacted prior to Construction

**Controls for protection of fauna**

A qualified fauna handler, wildlife carer or ecologist (contact details available in Annexure C) will be available during clearing and will direct clearing in a manner that encourages and allows fauna to safely flee the clearing area. Where animals are unable to flee as a result of injury or otherwise, they will be captured and placed in adjacent areas of equivalent habitat. In the event that fauna handling is required, the Fauna Handling and Rescue Procedure will be implemented (refer Annexure C of this CFFMP).

**Staged habitat removal**

The staged habitat removal process will be used when identified habitat (eg hollow-bearing trees, habitat trees or bushrock) is to be removed from Construction sites.

Staged habitat removal is conducted in at least two stages. Non-habitat trees and surrounding understorey vegetation will be felled or cleared first in order to give any fauna an opportunity to relocate. Habitat trees will be felled or cleared under the supervision of the Project Ecologist after a minimum of 24 hours after clearing of non-habitat vegetation. The following actions will be undertaken for staged habitat removal:

- removal works will be timed to minimise impacts on fauna (e.g. avoid known breeding/nesting seasons)
- contact vets and wildlife carers prior to commencing works to ensure willingness to assist if required
- the Project Ecologist and/or a licensed wildlife carer will be present on site during habitat removal
- habitat trees will be felled using the "slow drop" technique and relocated for re-use
- accurate records of trees removed and fauna encounters will be recorded within environmental inspections.

If fauna is encountered during clearing activities, a stop work procedure will be implemented in accordance with the Unexpected Threatened Species or EEC Finds Procedure (refer Annexure B of this CFFMP). The following steps will be taken:

- cease work in the vicinity of the fauna and immediately notify the Environmental Site Representative
- allow the animal to relocate by itself, however if it is injured (or suspected to be injured), contact a licenced fauna handler or rescuer (e.g. WIRES) or the Project Ecologist (Contact details available in Annexure C)
- injured fauna will be transferred to Rossmore Veterinary Hospital for treatment
- non-injured fauna will be relocated to appropriate pre-determined nearby habitat.

**Root ball management**

During vegetation clearing, timber and root balls will be retained where practicable for reuse in habitat enhancement and rehabilitation work. The retained timber and root balls may be used on or offsite. Prior to the commencement of vegetation clearing, GEJV will consult with community groups, the Mulgoa Valley Landcare Group, Liverpool City Council and Penrith City Council and relevant government agencies to determine if retained timber and root balls could be used for environmental rehabilitation projects, before pursuing other disposal options.

**Post-clearing**

The Environmental Site Representative and Project Ecologist or delegate will complete a post clearing checklist within 21 days of the completion of substantial clearing. The post-clearing process includes:

- completion of a post-clearance checklist (checklist prepared in Annexure A)
- stabilisation of disturbed areas with revegetation or other material to be carried out where earthworks are not planned to commence within four weeks of clearing, to prevent erosion any damage to vegetation to be retained will be immediately reported to the Environmental Site Representative and Roads and Maritime Environmental Manager (or delegate) and rectified with the advice of an ecologist or arborist
- holes remaining after tree removal will be backfilled and vegetated. Backfill material will prevent the infiltration and ponding of water and be compacted to at least the relative compaction of adjacent ground.

**Reporting**

**Pre-clearing Survey Report**

The Project Ecologist will complete a Pre-Clearing Survey Report after undertaking the pre-clearing survey for review by the Roads and Maritime Environmental Manager (or delegate). The report will include:

- description of the pre-clearing survey methodology
identification of targeted species, including as a minimum; Cumberland Plain Land Snail and Eastern long necked turtle
- identification of number and species of trees to be removed
- identification of habitat trees to be removed within areas to be cleared.
- Identification of active nests present.

**Clearing and Grubbing EWMS**

GEJV has prepared a Clearing and Grubbing EWMS, including a report on the presence of weeds and unsound trees, together with written notice that limits of clearing and areas of weed infestation identified in the Ecologist report have been marked. The Clearing and Grubbing EWMS includes, but is not limited to, the following information:

- methods used to identify and mark areas of weeds to be removed and for their removal
- procedure for the disposal of weeds and exotics
- procedure for protecting threatened flora species and trees marked for preservation
- methods used for identifying, marking and removing or pruning unsound trees likely to fall upon the roadway or onto private property
- procedure for identifying and removing trees, stumps and logs above the specified size and within the hazard line.

**Post-clearing Report**

GEJV will prepare a Post-Clearing Report containing a summary of the results of post-clearing surveys, and any fauna rescues, injury or mortality during clearing activities. The Post-Clearing Report will be reviewed by the Roads and Maritime Environmental Manager (or delegate). The report will be provided progressively (weekly) and a final report within 21 days from the completion of substantial clearing. The report will include:

- name and qualifications of the Ecologist or wildlife carer present during clearing
- assessment of the habitat and handling of fauna
- information on clearing operations, dates, procedures, areas
- areas of PCTs, EECs, CEECs and all other vegetation removed and areas approved for removal in the EIS and SPIR
- number and species of trees and other vegetation removed
- number and size of hollows contained in trees removed
- live fauna sightings, captures, any releases or injured/shocked wildlife
- any damage to trees to be retained, nests or other fauna habitat features
- injury or mortality of fauna
- photographs of rescued fauna
- records of all fauna rescue events, including locations to where fauna has been relocated.

GEJV will provide details of the vegetation cleared against the areas assessed and approved in the EIS and amended by the SPIR, in the six monthly Construction compliance reports to
be prepared for submission to DP&E and DoEE, as required by NSW-CoA A32 (refer to Section 6.3 of the CEMP).
Flagging Protocol

<table>
<thead>
<tr>
<th>Flagging Protocol</th>
<th>Description</th>
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<tbody>
<tr>
<td>Green Flagging — Project Boundary</td>
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<tr>
<td>Orange Flagging — Clearing Limits/Exclusion Fencing. No clearing outside this flagging at any time during the project.</td>
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<tr>
<td>HABITAT TREE</td>
<td>Red and White Tape — Habitat tree. Habitat Tree, Spraying circle and writing H (in white)</td>
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<tr>
<td>Yellow and Black Tape — 10m exclusion zone from underground services. Trees to only be stump cut within this area.</td>
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</tr>
<tr>
<td>To be allocated by contractor</td>
<td></td>
</tr>
<tr>
<td>Orange Parawebbing with “NO ENTRY—Environmental Protection Area” signs — (Heritage, Threatened Flora/Fauna). Absolutely NO ENTRY WITHOUT WRITTEN PERMIT FROM ENVIRONMENTAL MANAGER</td>
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