



The Northern Road Upgrade - Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park

Prepared for Roads & Maritime Services by Jacobs Australia

Biodiversity Offset Strategy

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The Northern Road Upgrade - Mersey Road, Bringelly to Glenmore Parkway, Glenmore Park

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Executive Summary

The Northern Road is about 45 km west of the Sydney central business district and traverses the local government areas of Penrith in the north and Liverpool in the south. The Northern Road is a key north–south road between Narellan and Richmond, connecting the North West and South West Priority Growth Areas (see Figure 1-1). The road intersects several regional motorways, arterial and collector roads such as (north to south) Richmond Road, Great Western Highway, M4 Motorway, Elizabeth Drive, Bringelly Road, and Camden Valley Way.

Approval was sought for the project under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Impacts Statement (EIS) was prepared to assess the impacts of the project under Part 5.1 of the EP&A Act. This Biodiversity Offset Strategy (BOS) forms part of the Biodiversity Assessment Report (BAR) prepared under the project Framework for Biodiversity Assessment (FBA) to accompany the EIS.

On 21 July 2016, the Commonwealth Minister for the Environment determined that the project had the potential to significantly impact on matters of national environmental significance and the project was therefore a 'controlled action'. The project was approved with conditions on 15 June 2018 by a delegate of the Commonwealth Environment Minister and on 30 May 2018 by the NSW Planning Minister. Submission of the BOS is a requirement of the NSW Department of Planning and Environment Condition of Approval E2 and Commonwealth Department of Environment and Energy Condition of Approval 3. To meet these conditions, the BOS must be submitted for the approval of both the NSW Secretary and Commonwealth Minister within 12 months of the commencement of Construction or within another timeframe agreed with the applicable consent authority.

Under the *Agreement between the Commonwealth of Australia and the State of New South Wales relating to Environmental Assessment* (Department of the Environment, 2015), offset requirements for biodiversity matters of national environmental significance for major projects must be addressed under the NSW Biodiversity Offsets Policy through application of the Framework for Biodiversity Assessment (FBA).

This BOS outlines the offsets required for unavoidable (residual) biodiversity impacts associated with the project and demonstrates that Roads and Maritime has secured appropriate offsets for the project.

The residual impacts from the project that were identified as requiring offsets (ecosystem and species credits) under the FBA are as follows:

- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion – 161 ecosystem credits
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion – 347 ecosystem credits
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion – 685 ecosystem credits
- *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion – 139 ecosystem credits
- *Pultenaea parviflora* – 90 species credits
- *Marsdenia viridiflora* subsp. *viridiflora* - endangered population – 4,560 species credits
- Cumberland Plain Land Snail – 163 species credits
- Regent Honeyeater – 1,882 species credits.

The impact to the Regent Honeyeater as a result of the project includes the removal of 24.44 hectares of foraging habitat only. Through email correspondence with the (then) NSW Office of Environment and Heritage (OEH), OEH determined that the credit requirements for Regent Honeyeater will be met by the ecosystem credit requirement for the site and no additional credits would be required for this species (email correspondence

dated 6 February 2019). The offset requirement is therefore satisfied through the purchase of the required ecosystem credits for the project.

Roads and Maritime began sourcing credits for the project in early 2016 and sourced credits from the Biobanking Public Register, Biobank expressions of interest (EOI) register and held two EOI processes seeking interest in selling credits to Roads and Maritime, some of which were in the process of registration on the public register. In addition, Roads and Maritime ran an expression of interest program for landholders in Western Sydney during 2017. Through the combination of these processes, Roads and Maritime secured 1,201 ecosystem credits and 1,309 species credits. These credits will be retired as offsets for the project (see Section 3.1 for EPBC Act listed biodiversity and Section 3.2 for TSC Act listed biodiversity).

In accordance with Commonwealth approval Condition 3(e), Roads and Maritime is required to secure the biodiversity offsets prescribed in the approved *The Northern Road Upgrade – Mersey Road to Glenmore Parkway Biodiversity Offset Strategy Working Paper* (22 February 2017) within 12 months after the date of the action commencing. After this date, Roads and Maritime must not conduct any works further impacting a matter protected under Part 3 of the EPBC Act unless it has secured sufficient offsets or has obtained written agreement from the Minister that works may continue.

Through securing like-for-like credits for all biodiversity matters of national environmental significance affected, Roads and Maritime have met their offset obligations as stipulated by the Commonwealth conditions of approval.

In relation to Roads and Maritime's biodiversity offset obligations under the NSW Infrastructure Approval, Roads and Maritime has secured about 99 per cent of the ecosystem credits, and about 32 per cent of the species credits required for the project. The following credits for TSC Act listed biodiversity are still outstanding:

- *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (HN 630) – 133 credits still need to be secured
- *Marsdenia viridiflora* subsp. *viridiflora* in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas – 4,560 credits still need to be secured.

Roads and Maritime are investigating other avenues for securing the outstanding offset requirements identified above, including:

- An EOI in local newspapers circulating in the Cumberland – Hawkesbury/Nepean IBRA subregion for expressions of interest from landholders interested in establishing a biodiversity stewardship site that will protect the above credits in perpetuity
- Engaging with existing biodiversity credit holders who may have suitable habitat for *Marsdenia viridiflora* subsp. *viridiflora* to discuss undertaking additional species credit surveys
- Undertaking desktop assessment of potential offset sites and, where feasible, conduct surveys of potential offset sites for species credits. Progress stewardship site agreements on suitable sites.
- If credits cannot be sourced it may be possible to satisfy the offset obligation for these species through a payment into the Biodiversity Conservation Fund, managed by the Biodiversity Conservation Trust.

The Office of Environment and Heritage in its submission regarding the project recommended that, in addition to the offset requirements calculated in accordance with the FBA, additional offsets, supplementary measures or other actions should be implemented to address impacts on Cumberland Plain Woodland. Roads and Maritime is proposing to work with Penrith City Council to identify and undertake supplementary measures to contribute to the local conservation of Cumberland Plain Woodland in order to address this issue.

1. Introduction

The Northern Road upgrade between Mersey Road, Bringelly and Glenmore Parkway, Glenmore Park is about 45 km west of the Sydney central business district and traverses the local government areas of Penrith in the north and Liverpool in the south. The Northern Road is a key north–south road between Narellan and Richmond, connecting the North West and South West Priority Growth Areas (see Figure 1-1). The road corridor intersects with several regional motorways, arterial and collector roads such as (north to south) Richmond Road, Great Western Highway, M4 Motorway, Elizabeth Drive, Bringelly Road, and Camden Valley Way.

Approval was sought for the project under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Environmental Impacts Statements (EISs) are prepared to assess the impacts of major projects, including State Significant Infrastructure (SSI) projects, under Part 5.1 of the EP&A Act. This Biodiversity Offset Strategy (BOS) forms part of the Biodiversity Assessment Report (BAR) prepared under the project Framework for Biodiversity Assessment (FBA) (Office of Environment and Heritage, 2014a) to accompany the EIS. As such, this BOS is to be read in conjunction with the BAR for the project, however updates have since been made in response to modifications, consistency assessments and pre-clearing surveys.

On 21 July 2016, the Commonwealth Minister for the Environment determined that the project has the potential to significantly impact on matters of national environmental significance and is therefore a ‘controlled action’. The controlled action is considered likely to have a significant impact on the following EPBC Act listed threatened species and ecological communities:

- Critically endangered – Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Cumberland Plain Woodlands)
- Critically endangered – *Lathamus discolor* (Swift Parrot)
- Critically endangered – *Anthochaera phrygia* (Regent Honeyeater)
- Vulnerable – *Pultenaea parviflora*
- Vulnerable – *Pteropus poliocephalus* (Grey-headed Flying-fox).

1.1 Conditions of Approval

The project was approved with conditions on 15 June 2018 by a delegate of the Commonwealth Environment Minister and on 30 May 2018 by the NSW Planning Minister. The conditions of approval administered by the NSW Planning Minister and Commonwealth Environment Minister relating to the Biodiversity Offset Strategy are shown in Table 1.1.

Table 1-1 Conditions of Approval (CoA) regarding biodiversity offsets

CoA	Condition	Where addressed in BOS
NSW Department of Planning and Environment		
E2	The Proponent must develop a Biodiversity Offset Strategy (BOS) to outline how the ecological values impacted by the CSSI will be offset in perpetuity. The BOS must be developed from the draft BOS detailed in the documents listed in Condition A1 and include the threatened ecological communities identified in The Northern Road, Submissions and Preferred Infrastructure, Biodiversity Addendum technical memo (Jacobs, 26 October 2017). The BOS must be submitted for the approval of the Secretary within 12 months of the commencement of Construction or within another timeframe agreed with the Secretary.	This offset strategy
E3	Within 12 months of the approval of the BOS or within another timeframe agreed with the Secretary, the Proponent must develop and submit to the Secretary for approval, a Biodiversity Offset Package, consistent with the BOS approved under condition E2. The	a) Section 1.4 b) Section 3 c) Section 5

CoA	Condition	Where addressed in BOS
	<p>Package must be prepared in consultation with OEH and confirm how the impacts of the CSSI will be offset. The Package must be consistent with the biodiversity offset strategy requirements of the NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014), unless otherwise agreed by OEH. The Package must include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) identification of the number of biodiversity credits required to offset the impacts of the CSSI; b) details on the biodiversity credits identified to offset the impacts of the CSSI and evidence that they can be attained and secured in accordance with the NSW Biodiversity Offsets Policy for Major Projects; and c) for offsets not secured through the retirement of biodiversity credits, details on the supplementary measures that would be implemented to offset the residual impacts, in accordance with Appendix B of the NSW Biodiversity Offsets Policy for Major Projects and the Framework for Biodiversity Assessment (OEH, 2014). d) should supplementary biodiversity offset measures be proposed, the Biodiversity Offset Package must also provide details on the management and monitoring requirements for compensatory habitat works and other biodiversity offset supplementary measures proposed to ensure that outcomes of the package are achieved. 	<p>d) Section 5</p>
E4	<p>All required offsets must be secured, in consultation with the OEH, within 12 months of the approval of the Biodiversity Offset Package or within another timeframe agreed with the Secretary. The Proponent must submit to the Secretary a copy of the Credit Retirement Report issued by the OEH once the offsets are secured, within one month of receiving the report.</p>	<p>This offset strategy</p>
<p>Commonwealth Department of Environment and Energy</p>		
3	<p>The nature and quantity of offsets required to address the impacts of the action on biodiversity are to be implemented as required by the NSW Infrastructure Approval, with the following additional requirements:</p> <ul style="list-style-type: none"> a) The Biodiversity Offset Strategy described in Condition E2 of the NSW Infrastructure Approval must be submitted to the Minister for approval within 12 months after the date of commencement of the action. If the Biodiversity Offset Strategy is not submitted to the Minister for approval within 12 months after commencement, all physical works must cease, unless otherwise agreed in writing by the Minister. b) The Minister may, at any point after the Department receives submission of the Biodiversity Offset Strategy, provide written notice to the approval holder that the Biodiversity Offset Strategy is not adequate. The notice may specify a time in which the approval holder must resubmit a revised Biodiversity Offset Strategy. If the revised Biodiversity Offset Strategy is not resubmitted within the period specified in the notice, the approval holder must not undertake any further works without the written agreement of the Minister. c) In relation to Condition E3(c) of the NSW Infrastructure Approval, payment of funds into a statewide or multi-project biodiversity trust fund may not form part of an offset except with prior agreement in writing from the Minister. d) Except as otherwise required by the NSW Infrastructure Approval, the approval holder may commence the action and undertake the action for 12 months after the date of commencement prior to securing any offset. e) Once 12 months have passed since the date of commencement, the approval holder must not conduct any works further impacting a matter protected under Part 3 of the EPBC Act unless: 	<p>This offset strategy</p>

CoA	Condition	Where addressed in BOS
	<p>a) the approval holder has secured offsets sufficient to compensate for all impacts that occurred during the first 12 months after commencement, and</p> <p>b) the approval holder has secured further offsets sufficient to compensate for each future area of impact before that area is impacted.</p> <p>The approval holder may continue works without fulfilling the requirements of Conditions 3(e)a and 3(e)b of this approval if the Minister provides written agreement that works may continue.</p> <p>Note: an offset will be taken to be secured for the purposes of this condition if the approval holder has entered into a written in-principle agreement with a relevant landholder or landholders to purchase biodiversity credits from land the approval holder reasonably believes will yield an offset sufficient to discharge the relevant degree of offset liability.</p> <p>In addition to the requirements of Condition 3(e) of this approval, within 3 years after the date of commencement, the approval holder must provide the Department with a credit retirement report demonstrating to the Department's satisfaction that all offsets required under the NSW Infrastructure Approval are in place.</p>	

1.2 Requirements under the Framework for Biodiversity Assessment

The *NSW Biodiversity Offsets Policy for Major Projects* (Office of Environment and Heritage. 2014b) clarifies and standardises biodiversity impact assessment and offsetting for major project approvals in NSW. The FBA underpins and operationalises the *NSW Biodiversity Offsets Policy for Major Projects*. The FBA contains the assessment methodology that is adopted by the *NSW Biodiversity Offsets Policy for Major Projects* to quantify and describe the impact assessment requirements and offset guidance that apply to Major Projects.

The Secretary's Environmental Assessment Requirements (SEARs) issued for the project on 28 July 2015 and amended SEARs issued on 9 March 2016 require the FBA to be applied to the project to assess impacts on biodiversity. The SEARs included a requirement for a BAR and a BOS to accompany the EIS.

Under the *NSW Biodiversity Offsets Policy for Major Projects*, offsets must be targeted to the biodiversity values being lost or to higher conservation priorities. This generally means that a like-for-like offset is required. However, the *NSW Biodiversity Offsets Policy for Major Projects* provides greater flexibility for proponents to meet their offset requirements by providing various offset options while ensuring that the best and most credible offsets are provided (Office of Environment and Heritage. 2014a). This flexibility includes variations to the like-for-like requirement, mine site rehabilitation and supplementary measures (funds for other measures that benefit biodiversity). This BOS is centred on providing like-for-like offsets in the first instance in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*. This is necessary where offsets are for critically endangered ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act) and/or EPBC Act listed matters. If a like-for-like offset cannot be found, the variation rules, and potentially supplementary measures, will be examined and implemented where applicable.

All effort will be made to offset all Matters of National Environmental Significance (MNES) on a strict like-for-like basis.

1.3 Additional Supplementary measures

During the TNR EIS public exhibition, submissions made by OEH considered the impact of the project on Cumberland Plain Woodland was unacceptable without additional offsets, supplementary measures or other actions. Such offsets, supplementary measures or other actions would be additional to the credit requirements calculated under the FBA.

As a result of discussions between Roads and Maritime and OEH, it was agreed supplementary measures along the lines of a weed eradication program on a landscape scale in the local area would meet this requirement.

Members of Roads and Maritime’s project team met with Penrith City Council in October 2019 to discuss Roads and Maritime’s use of proposed supplementary measures for the project. While the scope of the supplementary measures (including timeframes) is yet to be finalised at this stage, discussions with Penrith City Council focused on Roads and Maritime providing funding and support for Council’s ongoing efforts to eradicate weeds in Cumberland Plain Woodland in the Penrith local government area. Activities would be focused on areas close to the project (i.e. within five kilometres) as a priority, though opportunities to support Council’s activities in a wider landscape scale would also be investigated.

1.4 Requirements of the Commonwealth EIS Guidelines

The Commonwealth EIS Guidelines issued on 5 August 2016 indicate that the EIS must deal with the issues identified in Table 1.2.

Table 1-2 Commonwealth EIS guidelines

Commonwealth EIS Guidelines	Where addressed in BOS
The EIS must include details of an offset package to be implemented to compensate for residual significant impacts associated with the project as well as an analysis of how the offset meets the requirements of the Department’s <i>Environmental Protection and Biodiversity Conservation Act 1999</i> Environmental Offsets Policy October 2012 (EPBC Act Offset Policy) or a state offsetting policy that has been endorsed by the Commonwealth.	Section 4
The offset package can comprise a combination of direct offsets and other compensatory measures, as long as it meets the requirements of the EPBC Act Offset Policy. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain.	Section 2, 3 and 4
Offsets should compensate for an impact for the full duration of the impact.	Section 4
Offsets must directly contribute to the ongoing viability of the protected matter impacted by the project and deliver an overall conservation outcome that maintains or improves the viability of the protected matter, compared to what is likely to have occurred under the ‘status quo’ (i.e. if the action and associated offset had not taken place).	Section 4
Note: Offsets do not make an unacceptable impact acceptable and do not reduce the likely impacts of a proposed action. Instead, offsets compensate for any residual significant impact.	Section 4
The EIS must provide: Details of the offset package to compensate for significant residual impacts on a protected matter An analysis of how the offset package meets the requirements of the EPBC Act Offsets Policy.	Section 3 Section 4

Commonwealth EIS Guidelines	Where addressed in BOS
<p>Details in relation to the proposed offsets package, including:</p> <ul style="list-style-type: none"> • The location and size, in hectares, of any offset site(s) • Maps for each offset site that clearly show: <ul style="list-style-type: none"> • The relevant ecological features • The landscape context • The cadastre boundary • The current tenure arrangements (including zoning and ownership) of any proposed offset sites • Confirmed records of presence (or otherwise) of relevant protected matter(s) on the offset site(s) • Details of studies and surveys used to confirm the presence of individuals and or likely habitat within offset site(s), including the scope, timing/effort (survey season/s) and methodologies employed • Detailed information regarding the extent (in hectares) and quality of habitat for relevant protected matter(s) on the offset site. The quality of habitat should be assessed in a manner consistent with the approach outlined in the document titled How to use the offset assessment guide available at http://www.environment.gov.au/epbc/publications/environmental-offsets-policy.html 	<p>This offset strategy</p>
<p>Provide information and justification regarding how the offsets package will deliver a conservation outcome that will maintain or improve the viability of the protected matter(s) consistent with the EPBC Act environmental offsets policy (October 2012) including:</p> <ul style="list-style-type: none"> • Management actions that will be undertaken to improve or maintain the quality of the proposed offset site(s) for the relevant protected matter(s). Management actions must be clearly described, planned and resourced as to justify any proposed improvements in quality for the protected matter(s) over time • The time over which management actions will deliver any proposed improvement or maintenance of habitat quality for the relevant protected matter(s) • The risk of damage, degradation or destruction to any proposed offset site(s) in the absence of any formal protection and/or management over a foreseeable time period (20 years). Such risk assessments may be based on: <ul style="list-style-type: none"> • Presence of pending development applications, mining leases or other activities on or near the proposed offset site(s) that indicate development intent • Average risk of loss for similar sites • Presence and strength of formal protection mechanisms currently in place • The legal mechanism(s) that are proposed to protect offset site(s) into the future and avert any risk of damage, degradation or destruction. 	<p>This offset strategy</p>
<p>Provide information regarding how the proposed offsets package is additional to that already required, as determined by law or planning regulations, agreed to under other schemes or programs or required under an existing duty-of-care.</p>	<p>Section 4</p>
<p>The overall cost of the proposed offsets package; including costs associated with, but not necessarily limited to:</p> <ul style="list-style-type: none"> • Acquisition and transfer of lands/property • Implementation of all related management actions • Monitoring, reporting and auditing of offset performance. 	<p>This offset strategy</p>

This BOS addresses the requirements of the Commonwealth EIS Guidelines regarding offsets. The Commonwealth EIS Guidelines that contain the information requirements for EPBC Act offset proposals are provided in Appendix D of the BAR. The approach taken to offsets for the project is a direct offset that aims to provide 'like for like' offset for all biodiversity values, this being the minimum requirement for those matters listed under the EPBC Act.

1.5 Impacts to be offset

1.5.1 Offsets required for impacts to EPBC Act listed biodiversity

The residual impacts to biodiversity listed under the EPBC Act that are to be offset, as identified in the BAR, SPIR, consistency assessments and pre-clearing reports are outlined in Table 1.5 and Table 1.6 below. These impacts to be offset include the impacts to the EPBC Act listed Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, Swift Parrot, Regent Honeyeater, *Pultenaea parviflora* and Grey-headed Flying-fox. Under the FBA, offsets for impacts to this ecological community and these species are mandatory whether a significant impact is likely or not.

Offsets for EPBC Act listed biodiversity proposed for the project in this BOS have been developed in accordance with the FBA. The FBA has been endorsed by the Commonwealth, so the BOS prepared according to the FBA is adequate to offset the impacts to EPBC Act listed biodiversity from the project. This applies to the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community (CEEC) which is considered likely to be significantly impacted by the Project.

The extent of direct clearing required to the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest CEEC was reduced at the detailed design phase to an overall impact of 15.08 hectares. The Stage 4 Consistency Assessment identified an additional impact of 0.07 hectares to the CEEC from the proposed changes, increasing the total impact to 15.15 hectares. The change is minor, and the impact will generally be in accordance with the impact outlined in the SPIR and Final EIS. The revised impact area and credits required are detailed in Table 1.3 and Table 1.4 below .

Table 1-3 : Summary of EPBC Act Threatened Ecological Community impacts

Threatened Ecological Community	EPBC Act	Equivalent PCTs	Area (ha)
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered ecological community (CEEC)	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN 528) Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN 529) Derived grasslands on shale hills of the Cumberland Plain (50-300m asl) (HN627)	15.15

Table 1-4 : Summary of EPBC Act species impacts and credits required

Common name	Scientific name	EPBC Act	Extent of impact (ha or individuals)	Number of species credits required under FBA
<i>Pultenaea parviflora</i>	<i>Pultenaea parviflora</i>	Vulnerable	6 plants	90
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically endangered	24.44 ha	None required. OEH has determined that the offset requirement for the species will be met by the ecosystem credit requirement for the site.

1.5.2 Offsets required under the Framework for Biodiversity Assessment

The residual impacts to biodiversity that are to be offset are outlined in Table 1.5 and Table 1.6 below. The area of impact is based on the areas reported in the in the BAR, but has been updated based on information from the Submissions and Preferred Infrastructure Report (SPIR) f subsequent consistency assessments and pre-clearing surveys .

Table 1-5 : Summary of ecosystem credits required under the FBA

Plant community type	TSC Act	Area (ha)	Credits required
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN 526)	Endangered River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	3.92	161
Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN 528)	Critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion	9.83	347
Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN 529) (now includes HN627 Derived grassland as reassigned in the SPIR)	Critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion	10.52	685
<i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands of the Sydney Basin Bioregion (HN 630)	Not listed	6.295	139
Total		41.405	1,329

Table 1-6 : Summary of species credits required under the FBA

Common name	Scientific name	TSC Act	Extent of impact (ha or individuals)	Number of species credits required
<i>Pultenaea parviflora</i>	<i>Pultenaea parviflora</i>	Endangered	6 plants	90
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	Endangered population	114 plants	4,560
Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	Endangered	12.56 ha	163
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically endangered	24.44 ha	None required. OEH has determined that offset requirement for the species will be met by the ecosystem credit requirement for the site.

2. Offset investigations

The aim of this BOS is to meet all Commonwealth and NSW offset requirements. The offsets proposed for the project in this BOS have been developed in accordance with the FBA which has been endorsed by the Commonwealth as adequate to offset the impacts to EPBC Act listed biodiversity. The FBA outlines two options to fulfil the offset requirement for the project which are:

- Retiring biodiversity credits – like-for-like offsets are secured, and credits retired (or variation rules are applied)
- Contributing to supplementary measures.

The project offsets will provide 'like for like' offsets for all biodiversity matters listed under the EPBC Act. Any remaining offset requirements for TSC Act listed threatened biodiversity will be met through the use of supplementary measures only if 'like for like' offsets are not available despite reasonable steps having been undertaken to acquire them.

Roads and Maritime have been assessing the likely offset requirements for projects associated with the Western Sydney Infrastructure Plan (WSIP) which includes The Northern Road upgrades and a desktop assessment of available offsets was prepared in March 2016. Potential sources of credits (ecosystem and species) were identified through:

- A search of the BioBanking Public Registers on the Office of Environment and Heritage (OEH) BioBanking webpage
- Communication with credit owners, accredited BioBanking assessors and other sources closely involved with the biodiversity credit market
- Communication with local Councils which are currently pursuing options to establish Biobank sites on their own Council land, or which were known to be interested
- Investigation of private properties
- Roads and Maritime EOI process.

To update this initial assessment, an updated investigation of credits available on the BioBanking Public Registers was undertaken in July 2016. A credits wanted request was placed on the BioBanking credits wanted register on 21 July 2016.

2.1 Reasonable steps to locate offsets

Reasonable steps have been undertaken by Roads and Maritime in an attempt to locate appropriate like-for-like offset sites before supplementary measures were considered. The following reasonable steps to locate like-for-like offsets have been undertaken:

- Checking the BioBanking public register and posting an expression of interest for credits for at least six months
- Liaising with an OEH office and relevant local councils to obtain a list of potential sites that meet the requirements for offsetting
- Running two Roads and Maritime EOI processes.

A key part of the reasonable steps taken to secure offsets for the project has been the initial assessment of the likely offset requirements for projects associated with the Western Sydney Infrastructure Plan (WSIP) (EcoLogical Australia, 2015). The BioBanking public register has been checked for available credits and a credits wanted request was placed on the BioBanking credits wanted register on 21 July 2016.

3. Offsets secured to date

Roads and Maritime began sourcing credits in Western Sydney in early 2016 and sourced credits from the Biobanking Public Register, Biobank expressions of interest (EOI) register and held two EOI processes seeking interest in selling credits to Roads and Maritime, some of which were in the process of registration on the public register. In addition, Roads and Maritime ran an expression of interest program for landholders in Western Sydney during 2017. Through this process, Roads and Maritime has purchased 1,201 ecosystem credits and 1,309 species credits to be retired as offsets for the project (refer Tables 3.1, 3.2, 3.3 and 3.4).

3.1 Offsets secured for impacts to EPBC Act listed biodiversity

Through the credit purchases undertaken to date, Roads and Maritime have met their offset obligations as required by the Commonwealth conditions of approval. Table 3-1 and Table 3-2 detail the number of credits required for each EPBC Act listed threatened community and species and the number of credits that have been secured to date. Roads and Maritime have entered an in-principle agreement to secure the remaining credits required through purchase of 90 *Pultenaea parviflora* credits from one landowner, which would be sufficient to fulfil the requirements of Condition 3(e).

The impact to the Regent Honeyeater as a result of the project includes the removal of 24.44 hectares of foraging habitat only. Through email correspondence with the (then) NSW Office of Environment and Heritage, it was determined that an adequate offset for this impact would be the purchase of the appropriate amount of ecosystem credits (email correspondence dated 6 February 2019). This offset requirement has therefore been satisfied through the purchase of ecosystem credits.

The offsets proposed for the project in this BOS have been developed in accordance with the FBA. The FBA has been endorsed by the Commonwealth, so the BOS prepared according to the FBA is adequate to offset the impacts to EPBC Act listed biodiversity from the project, including the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CPSWSGTF) ecological community. Impacts to CPSWSGTF have been offset through the purchase of ecosystem credits in accordance with the FBA. The adequacy of these offsets is discussed in further detail in Section 4.

Table 3-1 Summary of EPBC Act ecosystem credits required

Plant community type	EPBC Act	Credits required	Direct credits secured	Alternative approved credits secured	Offset obligation satisfied?
Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN 528)	Critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	346	346	0	Yes - refer Section 4
Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN 529) (includes HN627 as reassigned in the SPIR)	Critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	685	685	0	Yes - refer Section 4

Table 3-2 Summary of EPBC Act species credits required

Common name	Scientific name	EPBC Act	Extent of impact (ha or individuals)	Number of species credits required	Credits secured	Offset obligation satisfied?
<i>Pultenaea parviflora</i>	<i>Pultenaea parviflora</i>	Vulnerable	6 plants	90	90	Yes
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically endangered	24.44 ha of foraging habitat	1,882	OEH has determined that the offset requirement for the species will be met by the ecosystem credit requirement for the site.	Yes

3.2 Offsets secured under the Framework for Biodiversity Assessment

The credits purchased by Roads and Maritime represent about 99 per cent of the ecosystem credits required, and about 32 per cent of the species credits required for the project.

The credits listed in Table 3-3 and Table 3-4 were secured in accordance with Section 11.2.1.1 of the FBA, specifically (a) *retirement of biodiversity credits from the biodiversity register established under Part 7A of the TSC Act*. Where credits were not able to be directly sourced (i.e. HN 627 and HN 526), credits were secured in accordance with Section 10.5.4.1 of the FBA, specifically (a) *a variation of the offset rules for matching ecosystem credits, by allowing ecosystem credits created for a PCT from the same vegetation formation as the PCT to which the required ecosystem credit relates to be proposed as an offset*. The alternative purchases of HN529 (as a substitute for HN627) were made in conjunction with purchases made for the M12 Motorway project.

In relation to Roads and Maritime's biodiversity offset obligations under the NSW Infrastructure Approval, Roads and Maritime has secured most of its credit obligations for the project, apart from the following TSC Act listed biodiversity matters:

- *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (HN 630) – 133 ecosystem credits still required to be secured
- *Marsdenia viridiflora* subsp. *viridiflora* in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas – 4,560 species credits still required to be secured.

Table 3-3 Summary of TSC Act ecosystem credits required

Plant community type	TSC Act	Credits required	Direct credits secured	Alternative approved credits secured	Offset obligation satisfied?
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN 526)	Endangered River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	161	160	18 credits of HN528	Yes

Plant community type	TSC Act	Credits required	Direct credits secured	Alternative approved credits secured	Offset obligation satisfied?
Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN 528)	Critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion	347	347	0	Yes
Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN 529) (includes HN627 as reassigned in the SPIR)	Critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion	685	685	0	Yes
<i>Phragmites australis</i> and <i>Typha orientalis</i> coastal freshwater wetlands of the Sydney Basin Bioregion (HN 630)	Not listed	139	9	0	No

Table 3-4 Summary of TSC Act species credits required

Common name	Scientific name	TSC Act	Extent of impact (ha or individuals)	Number of species credits required	Credits secured	Offset obligation satisfied?
<i>Pultenaea parviflora</i>	<i>Pultenaea parviflora</i>	Endangered	6 plants	90	90	Yes
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	Endangered population	114 plants	4,560	0	No
Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	Endangered	12.56 ha	163	163	Yes
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically endangered	24.44 ha of foraging habitat	1,882	OEH has determined that the offset requirement for the species will be met by the ecosystem credit requirement for the site.	Yes - refer section 3.1

4. Adequacy of the offset for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

The offsets proposed for the project in this BOS has been developed in accordance with the FBA. The FBA has been endorsed by the Commonwealth, so the BOS prepared according to the FBA is adequate to offset the impacts to EPBC Act listed biodiversity from the project. Additional discussion is provided regarding the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest as this ecological community is considered likely to be significantly impacted by the Project.

The EPBC Act Environmental Offsets Policy recognises an offset package is a suite of actions that a proponent undertakes in order to compensate for the residual significant impact of a project. An offset package can include a combination of direct offsets and other compensatory measures, but offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain.

The EPBC Act Environmental Offsets Policy (Department of Sustainability Environment Water Population and Communities, 2012) outlines eight requirements for a suitable offset and the BOS is compared to each of these below:

- 1) *Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter:*

Through the purchase of biodiversity credits, this BOS will directly contribute to the ongoing viability of the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community. The BOS will deliver an overall conservation outcome that improves or maintains the viability of the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community compared to what is likely to have occurred under the status quo. The proposed offset is tailored specifically to the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community and is a direct 'like for like' offset.

- 2) *Suitable offsets must be built around direct offsets but may include other compensatory measures:*

This BOS provides for a direct offset for the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community (in the form of ecosystem credits) in order to compensate for the residual significant impact of the project. The offset proposed for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community is a 100 percent direct offset. No other compensatory measures will be used, and supplementary measures are not permitted.

- 3) *Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter:*

The offsets required for those protected matters with higher conservation status must be greater than those with a lower status. As the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community is listed as Critically Endangered, it has a very high probability of extinction. The proposed offset is a 100 percent direct 'like for like' offset in the form of ecosystem credits.

- 4) *Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter:*

Offsets must be proportionate to the size and scale of the residual impacts arising from the action to deliver a conservation gain that adequately compensates for the impacted matter. Through calculation of offsets through the BioBanking credit calculator, the type and number of credits required to offset the residual impacts to the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community has been calculated. The BioBanking credit calculator outputs a credit requirement that is of a size and scale appropriate to the impact.

- 5) *Suitable offsets must effectively account for and manage the risks of the offset not succeeding:*

The level of risk considered here relates to whether individual offsets are likely to be successful in compensating for the residual impacts of a particular action over a period of time (Department of Sustainability, Environment, Water, Population and Communities 2012). This risk has a bearing on the scale of offset required. As a direct offset in the form of ecosystem credits is proposed, this approach presents a lower risk than other compensatory measures and is considered likely to result in a conservation gain. The direct offset means that the offset strategy is deemed suitable and successfully manages the risks of the offset failing. Importantly, no perverse outcomes relating to social or economic factors are considered likely to occur.

- 6) *Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs:*

Offsets must deliver a conservation gain for the impacted protected matter, and that conservation gain must be new, or additional to what is already required by a duty of care or to any environmental planning laws at any level of government (Department of Sustainability Environment Water Population and Communities, 2012). It is important to note however that this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action (Department of Sustainability Environment Water Population and Communities, 2012). All the required state assessment and approval processes have been followed (i.e. the FBA). As such, the proposed offset is considered appropriate.

- 7) *Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable:*

Efficient and effective offsets are those that maintain or improve the viability of a protected matter through the sound allocation of resources (Department of Sustainability Environment Water Population and Communities, 2012). The proposed offset delivers a streamlined combined offset for state and commonwealth matters in the form of ecosystem credits. This is considered a sound allocation of resources and therefore an efficient and effective offset.

Offsets should be implemented either before, or at the same point in time as, the impact arising from the action (Department of Sustainability Environment Water Population and Communities, 2012). The proposed offset strategy is a vital component of the EIS and under the FBA the offsets must be in place before works begin.

Offsets must be based on both scientifically robust and transparent information that sufficiently analyses and documents the benefit to a protected matter's ecological function or values (Department of Sustainability Environment Water Population and Communities, 2012). The use of ecosystem credits under the FBA is considered a scientifically robust and transparent approach.

- 8) *Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced:*

Offsets must be delivered within appropriate and transparent governance arrangements and proponents must report on the success of the offsets so that conditions of approval can be varied if the offsets are not delivering the desired outcome (Department of Sustainability Environment Water Population and Communities, 2012). The offsets for the project will be registered with the OEH under the BioBanking framework and the establishment costs of the offsets will be borne by Roads and Maritime.

5. Options to meet remaining NSW biodiversity offset requirements

Through the credit purchases made to date, Roads and Maritime have satisfied their offset obligation under the Commonwealth conditions of approval. However, the credits purchased only represent about 99 per cent of the required ecosystem credits, and about 32 per cent of the species credits required to satisfy Roads and Maritime's biodiversity offset obligations under the NSW Infrastructure Approval. The priorities for finalising the offset package for the project are to secure the following outstanding credit requirements:

- 133 ecosystem credits of *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (HN630).
- 4,560 species credits of *Marsdenia viridiflora* subsp. *viridiflora* – endangered population.

Roads and Maritime are investigating other avenues for securing the outstanding offset requirements, including:

- An EOI in local newspapers circulating in the Cumberland – Hawkesbury/Nepean IBRA subregion for expressions of interest from landholders interested in establishing a biodiversity stewardship site that will protect the above credits in perpetuity
- Engaging with existing biodiversity credit holders who may have suitable habitat for *Marsdenia viridiflora* subsp. *viridiflora* to discuss undertaking additional species credit surveys
- Undertaking desktop assessment of potential offset sites and, where feasible, conduct surveys of potential offset sites for species credits and progress stewardship site agreements on suitable sites.

If credits cannot be sourced it may be possible to satisfy the offset obligation for these species through a payment into the Biodiversity Conservation Fund, managed by the Biodiversity Conservation Trust.

6. Conclusion

This BOS outlines the offsets required for unavoidable (residual) biodiversity impacts associated with the project and demonstrates that appropriate offsets are generally available (in the form of credits) and can be delivered for the project. The BOS was updated in October 2019 following the completion of all design changes that have resulted in increases to the final impact of the project. The preferred approach for this BOS is the purchase of credits available on the BioBanking Credit Register which would result in a direct 'like for like' offset.

The offsets proposed for the project in this BOS have been developed in accordance with the FBA. The FBA has been endorsed by the Commonwealth, so the BOS prepared according to the FBA is adequate to offset the impacts to EPBC Act listed biodiversity from the project, including the critically endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CPSWSGTF) ecological community.

Roads and Maritime began sourcing credits in Western Sydney in early 2016 and has attempted to source credits from the Biobanking Public Register, Biobank expressions of interest (EOI) register and held two EOI processes seeking interest in selling credits to Roads and Maritime, some of which were in the process of registration on the public register. In addition, Roads and Maritime ran an expression of interest program for landholders in Western Sydney during 2017. Through this process, Roads and Maritime has purchased 1,201 suitable ecosystem credits and 1,309 suitable species credits to be retired as offsets for the project.

Pursuant to Condition 3(e), Roads and Maritime has secured the EPBC Act prescribed ecosystem and species offset credits detailed in Section 3.2. Through the credit purchases undertaken to date, Roads and Maritime have met their offset obligations as stipulated by the Commonwealth conditions of approval.

In relation to Roads and Maritime's biodiversity offset obligations under the NSW Infrastructure Approval, Roads and Maritime has secured about 99 per cent of the ecosystem credits, and about 32 per cent of the species credits required for the project. The following credits for TSC Act listed biodiversity are still outstanding:

- *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion (HN 630) – 133 credits still required to be secured
- *Marsdenia viridiflora* subsp. *viridiflora* in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas – 4,560 credits still required to be secured.

Roads and Maritime are investigating other avenues for securing the outstanding offset requirements, including:

- An EOI in local newspapers circulating in the Cumberland – Hawkesbury/Nepean IBRA subregion for expressions of interest from landholders interested in establishing a biodiversity stewardship site that will protect the above credits in perpetuity
- Engaging with existing biodiversity credit holders who may have suitable habitat for *Marsdenia viridiflora* subsp. *viridiflora* to discuss undertaking additional species credit surveys
- Undertaking desktop assessment of potential offset sites and, where feasible, conduct surveys of potential offset sites for species credits. Progress stewardship site agreements on suitable sites.
- If credits cannot be sourced it may be possible to satisfy the offset obligation for these species through a payment into the Biodiversity Conservation Fund, managed by the Biodiversity Conservation Trust.

7. References

DEPARTMENT OF SUSTAINABILITY ENVIRONMENT WATER POPULATION AND COMMUNITIES 2012. Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. Canberra: Australian Government.

ECO LOGICAL AUSTRALIA 2015. WSIP – Biodiversity Offset Requirements Stage 2/3 Report, prepared for Roads and Maritime Services.

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