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APRIL 2018

Biodiversity Offset Strategy

New Intercity Fleet Maintenance Facility, Kangy Angy

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Biodiversity Offset Strategy
New Intercity Fleet Maintenance Facility, Kangy Angy

Transport for NSW

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GLOSSARY

Construction Environmental Management Plan	A site or project specific plan developed to ensure that appropriate environmental management practices are followed during the construction phase of a project (Department of Infrastructure, Planning and Natural Resources, 2004).
Condition of Approval	Obligations imposed on an activity assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (Department of Infrastructure, Planning and Natural Resources, 2004).
Commonwealth Department of the Environment and Energy	This Commonwealth Department develops and implements national policy, programs and legislation to protect and conserve Australia's natural environment and cultural heritage and administers the *Environment Protection and Biodiversity Conservation Act 1999*.
Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time. Refer to Clause 228(2) of the EP&A Regulation 2000 for cumulative impact assessment requirements.
Ecosystem credit	Measure the offset requirement for impacts on threatened ecological communities, threated species habitat for species that can be reliably predicted to occur with a plant community type and other plant community types. These are created or required for all impacts on biodiversity values (including threatened species that can be reliably predicted by habitat surrogates), except the threatened species or populations that require species credits.
Habitat	An area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community, including any biotic or abiotic components.
Likely	Taken to be a real chance or possibility.
Mitigation	Action to reduce the severity of an impact.
NSW Office of Environment & Heritage	Following the 2010 NSW elections the NSW Department of Environment Climate Change and Water (DECCW) was abolished and is now known as the Office of Environment and Heritage. It has been incorporated into the Department of Premier and Cabinet. Broadly, the Office of Environment and Heritage work towards a healthy environment cared for and enjoyed by the whole NSW community: manages the state's natural resources, including biodiversity, soils and natural vegetation: manages natural and cultural heritage across the state's land and waters: acts to minimise the impact of climate change: promotes sustainable consumption, resource use and waste management: regulates activities to protect the environment: and conducts biodiversity, plant, environmental and cultural heritage research to improve decision making.
Species credit	These measure the offset requirement for impacts on threatened species individuals or their area of habitat. These are created or required for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates.

Swamp Sclerophyll Forest on Coast Floodplains	A Threatened Ecological Community listed as Endangered under the *Biodiversity Conservation Act 2016*.
Threatened Ecological Community	An ecological community listed as Vulnerable, Endangered or Critically Endangered (collectively referred to as Threatened) under the Biodiversity Conservation Act 2016, Fisheries Management Act 1994 or the Environment Protection and Biodiversity Conservation Act 1999. Capitalisation of the terms 'threatened', 'vulnerable', 'endangered' or 'critically endangered' in this report refers to listing under the relevant state and/or Commonwealth legislation.
Viable local population	A population that has the capacity to live, develop, and reproduce under normal conditions, unless the contrary can be conclusively demonstrated through analysis of records and references.

ABBREVIATIONS

BACI	Before After Control Impact
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BOP	Biodiversity Offset Package
BOS	Biodiversity Offset Strategy (this document)
CEMP	Construction Environmental Management Plan
CMP	Conservation Management Plan
CoA	Condition of Approval
DoEE	Commonwealth Department of the Environment and Energy
EOI	Expression of Interest
EP&A Act	*Environmental Planning and Assessment 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
FBA	Framework for Biodiversity Assessment 2014
IBRA	Interim Biogeographic Regionalisation for Australia
OEH	NSW Office of Environment & Heritage
REF	Review of Environmental Factors
SIS	Species Impact Statement
SSFCF	Swamp Sclerophyll Forest on Coast Floodplains
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TSC Act	*Threatened Species Conservation Act 1995* (NSW) (now repealed)

EXECUTIVE SUMMARY

The NSW Government is delivering a New Intercity Fleet to replace the trains carrying customers from Sydney to the Central Coast, Newcastle, the Blue Mountains and the Illawarra. A new purpose-built maintenance facility will be built at Kangy Angy to service and maintain the new fleet of trains. Although the project will avoid and minimise impacts, removal of up to 27.1 hectares of native vegetation is required, including habitat for threatened species and ecological communities.

APPROVAL CONDITIONS

To support the project determination, a Species Impact Statement (SIS) and an Additional SIS was prepared to address significant impact issues on biodiversity. Transport for NSW (TfNSW) is required to provide biodiversity offsets for these residual biodiversity impacts in accordance with the project conditions of approval. To address this, the project conditions of approval 40 and 41 of the New Intercity Fleet Maintenance Facility Determination Report (TfNSW, 2017) requires the preparation of a Biodiversity Offset Strategy and Biodiversity Offset Package.

The following government agency approvals must be satisfied within the BOP:

- Chief Executive of NSW Office of Environment & Heritage concurrence approval conditions for the SIS issued on 22 August 2016
- Chief Executive of NSW Office of Environment & Heritage concurrence approval conditions for the Additional SIS on 29 August 2017; and
- EPBC Act approval conditions (EPBC 2016/7681) issued 05 May 2017.

BIODIVERSITY OFFSET STRATEGIES AND OBJECTIVES

This report, the Biodiversity Offset Strategy, has been developed using the OEH guidelines for developing biodiversity offsets to achieve conservation outcomes, where there will be an unavoidable loss of biodiversity and was quantified using the BioBanking Assessment Methodology (BBAM) 2014.

The Biodiversity Offset requirement involves off-site biodiversity offsets i.e. established BioBanking sites (Biodiversity Offsets Scheme) and establishment of Biodiversity Stewardship Agreements (Biodiversity Offset Scheme).

ADOPTED OFF-SITE STRATEGY

The project off-site biodiversity offset requirements are comprised of ecosystem credits and species credits. The project required species credits for Biconvex Paperbark (*Melaleuca biconvexa*), Wallum Froglet (*Crinia tinnula*) and Mahony's Toadlet (*Uperoleia mahonyi*) and ecosystem credits for Regent Honeyeater (*Anthochaera phrygia),* Swift Parrot *(Lathamus discolor)* habitat *Swamp Sclerophyll Forest on Coastal Floodplains,* PCT 1528 and PCT 1568.

Biodiversity offsets are required to compensate for the residual biodiversity impacts associated with the project. The process for identifying, prioritising and meeting project biodiversity credit requirements consists of three methods:

- the purchase and retirement of existing suitable Biobanking biodiversity credits
- progressing Biodiversity Stewardship Agreements on candidate properties; and/or
- the use of supplementary measures if suitable credits cannot be identified..

This Biodiversity Offset Strategy seeks to purchase established available Biobanking biodiversity credits and to establish Biodiversity Stewardship Agreements on candidate properties.

A review of the BioBanking Expression of Interest (EOI) credit register identified 32 Swamp Sclerophyll Forest on Coastal Floodplains potential suitable ecosystem credits.

Two additional sites, that have current Biobanking Agreement applications submitted with OEH, have been identified as having 263 Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits and 80 Wallum Froglet species credits available for purchase as well as having potential habitat for Mahony's Toadlet (require targeted surveys to confirm).

Within the Central Coast Council LGA broadscale vegetation mapping and Swamp Sclerophyll Forest equivalent vegetation types were examined as part of a high-level desk based site evaluation. Candidate properties were identified and inspected to confirm the presence of Swamp Sclerophyll Forest on Coastal Floodplains and to record any opportunistically observed threatened species.

In total, the 14 candidate site options within the Central Coast Council LGA would provide approximately 121.9 hectares of Swamp Sclerophyll Forest on Coastal Floodplains which would equate to approximately 1,134 ecosystem credits (based on an estimated average of [redacted] However, allowing for credit discounting due to existing conservation obligations, the estimated credit yield for Swamp Sclerophyll Forest on Coastal Floodplains is expected to be approximately 907 ecosystem credits. Similarly, the two additional tentative sites are likely to contain approximately 31.09 ha of Swamp Sclerophyll Forest on Coastal Floodplains, based on broadscale mapping (Bell 2008; Bell 2009), which would approximately equate to an additional 289 ecosystem credits or 231 ecosystem credits after the [redacted] is applied.

Most of the candidate Central Coast Council reserves are currently unfunded and lack ongoing strategic conservation management actions. The vegetation within many of these reserves are of high quality and are subject to varying levels of weed incursions. The establishment of these reserves under a Biodiversity Stewardship Agreement will enable an additional level of conservation certainty over these areas and provide site specific in-perpetuity management funding for on ground conservation management actions and would allow TfNSW to meet their offsetting obligations under the Part 5 CoA, concurrence conditions and EPBC approval.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The NSW Government is delivering a New Intercity Fleet to replace the trains carrying customers from Sydney to the Central Coast, Newcastle, the Blue Mountains and the Illawarra. A new purpose-built maintenance facility will be built at Kangy Angy to service and maintain the new fleet of trains.

The project is in the suburb of Kangy Angy, within the Central Coast Council Local Government Area. The project is generally bordered by the Main North Rail Line to the south, and Orchard Road to the north-west. Residential rural properties surround the site to the north, south and west, with industrial precincts to the south east and north-east (on the opposite side of the rail corridor to the study area). The M1 Pacific Motorway is located about 0.85 kilometres to the north-west, and Tuggerah Lake is about 3.5 kilometres to the east. Chittaway Creek crosses the project at the southern end and Ourimbah Creek is to the north (Figure 1.1).

To support the project determination, a Species Impact Statement (SIS) and an Additional SIS was prepared to address significant impact issues on biodiversity. Although the project will avoid and minimise impacts, removal of up to 27.1 hectares of native vegetation is required, including habitat for threatened species and ecological communities. Transport for NSW (TfNSW) is required to provide biodiversity offsets for these residual biodiversity impacts in accordance with the project conditions of approval.

This Biodiversity Offset Strategy (BOS) outlines how biodiversity offsets can be provided for the project to ensure compliance with the conditions of approval whilst adequately addressing the legislative framework and principles covering biodiversity offsets in NSW.

1.2 PROJECT DESCRIPTION

TfNSW is delivering a new train maintenance facility at a site in Kangy Angy on the Central Coast of NSW to support the procurement of the New Intercity Fleet. The facility would undertake light and heavy train maintenance activities for the new fleet, including but not limited to:

- regular maintenance/servicing
- repair/replacement of train components
- interior and exterior cleaning.

The facility includes approximately six kilometres of electrified railway (in total), would be seven tracks wide at its widest point, covering an area of approximately 500,000 square metres, and would be bounded by a perimeter fence (area identified as the ‘subject site’ in Figure 1.2) and would comprise:

Maintenance facility elements:

- fleet maintenance building
- four enclosed maintenance tracks for undertaking maintenance on the train sets and three external standing racks for holding trains within the maintenance facility to accommodate the new trains within the site
- auxiliary workshops
- electronic clean room (to undertake testing and cleaning of electronic train components)
- material storage, including flammable liquid storage
- wheel lathe
- automatic train wash
- site access roads.

Miscellaneous buildings:

- administration (including training rooms)
- facilities for presentation and train maintenance staff
- signalling buildings
- security
- mobile train simulator
- substation building
- power supply (traction power, bulk power, signalling power supply and backup generators).

Other infrastructure including:

- new railway track infrastructure on the western side of the existing rail corridor to allow for trains to enter and exit the maintenance facility site from the Main North Line
- a new rail bridge (consisting of two separate structures) over Chittaway Creek and Turpentine Road
- a new access roadway and bridge to the maintenance facility site off Enterprise Drive
- a new flood access road between Orchard Road and the new access roadway
- a series of drainage detention ponds
- staff car park
- relocation of the existing high voltage (HV) power transmission lines and combined services route.

A Review of Environmental Factors (REF) was prepared by WSP on behalf of TfNSW in accordance Part 5 of the *Environmental Planning and Assessment 1979* (EP&A Act) and Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

Preliminary ecological investigations for the project identified potential significant impacts to biodiversity, particularly on the threatened ecological community Swamp Sclerophyll Forest and the threatened flora species Biconvex Melaleuca (*Melaleuca biconvexa*), which were both listed under the *Threatened Species Conservation Act 1995* (TSC Act). Considering this and pursuant to Section 111(1) of the TSC Act, Chief Executive Requirements (CER's) were formally requested for the preparation of a Species Impact Statement (SIS) to support an approval pathway for this project under Part 5 of the EP&A Act.

The SIS was prepared by WSP, on behalf of TfNSW in accordance with the Chief Executive Requirements (for the NSW Office of Environment and Heritage (OEH)) issued 11 February 2016, and detailed the ecological impacts associated with the project.

The Additional SIS was later prepared by WSP, on behalf of TfNSW, to specifically target Mahony's Toadlet (*Uperoleia mahonyi*). Mahony's Toadlet, which was identified in the previous SIS as an undescribed species of Uperoleia, Mahony's Toadlet, was formally described in November 2016 (Clulow et al., 2016) and subsequently given a provisional listing as an 'endangered species' under the TSC Act on 10 March 2017.

In accordance with the New Intercity Fleet Maintenance Facility Project Determination Report (TfNSW 2017), the project was recommended to be determined under Part 5 of the EP&A Act subject to the environmental measures included in the Combined Submissions Report, the Conditions of Approval; the OEH Conditions of Concurrence for the SIS and Additional SIS and the conditions of approval imposed by the Department of the Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Conditions associated.

This BOS addresses condition of approval 40 (TfNSW 2017), OEH concurrence conditions 2 and 3 (OEH 2016) and condition 6 of the EPBC Act conditions of approval (EPBC 2016/7681). In addition, a Biodiversity Offset Package (BOP) will be prepared within 12 months of the commencement of construction.

1.3 BIODIVERSITY OFFSET STRATEGY OBJECTIVES

The overall objective of the BOS is to detail how the residual biodiversity impacts that will result from the project and how these impacts will be offset.

The need for biodiversity offsets is founded in the theory of 'avoid, minimise and mitigate' the impacts of projects. The accepted approach to environmental assessment requires that, in the first instance, environmental impacts are avoided or minimised as far as possible and subsequently reduced to acceptable levels through appropriate mitigation techniques. Where measures to avoid and mitigate impacts are not feasible or cost effective, then offset strategies can be used to compensate the residual impacts of the development on biodiversity.

Specifically, the objectives of the BOS are to:

- to address the project conditions of approval with specific reference to biodiversity offset requirements outlined in the SIS and Additional SIS concurrence conditions and the EPBC Act conditions of approval
- prepare a BOS generally in accordance OEH principles for the use of biodiversity offsets in NSW and/or address offsetting requirements under the *Biodiversity Conservation Act 2016* (BC Act)
- identify residual biodiversity impacts to be offset
- identify the offset strategy specific to the project
- identify the ecological values of the proposed offsets
- outline the compliance of the offset strategy with NSW OEH offsetting principles.

1.4 BIODIVERSITY OFFSET POLICY AND GUIDELINES

This BOS has been developed using the OEH guidelines for developing biodiversity offsets to achieve conservation outcomes, where there will be an unavoidable loss of biodiversity (Office of Environment & Heritage 2016). Although not a defined requirement under legislation, these guidelines provide a list of 13 principles to be followed when developing biodiversity offsets:

1. Impacts must be avoided first by using prevention and mitigation measures
2. All regulatory requirements must be met
3. Offsets must never reward ongoing poor performance
4. Offsets will complement other government programs
5. Offsets must be underpinned by sound ecological principles
6. Offsets should aim to result in a net improvement in biodiversity over time
7. Offsets must be enduring and they must offset the impact of the development for the period that the impact occurs
8. Offsets should be agreed prior to the impact occurring
9. Offsets must be quantifiable (the impacts and benefits must be reliably estimated)
10. Offsets must be targeted
11. Offsets must be located appropriately
12. Offsets must be supplementary
13. Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.

Each of these principals is specifically addressed within Section 4 of the BOS and will underpin the final Biodiversity Offset Package for this project.

In terms of actual offset delivery, biodiversity credits will be sourced from credits generated under the following NSW offset schemes:

- Biobanking Scheme – *Threatened Species Conservation Act 1995* (TSC Act) (repealed 25 August 2017)
- Biodiversity Stewardship Agreement – *Biodiversity Conservation Act 2016* (BC Act).

As of 25 August 2017, the TSC Act was repealed and replaced by the BC Act. Subsequently, BioBanking Agreements prepared in accordance with the TSC Act NSW BioBanking Scheme and BioBanking Assessment Methodology (BBAM) (Office of Environment & Heritage 2014) where replaced by Biodiversity Stewardship Agreements to be prepared in accordance with the Biodiversity Offset Scheme and BC Act Biodiversity Assessment Methodology (BAM). Biodiversity credits generated under each scheme are still valid for use in offsetting although OEH is currently working on establishing a conversion ratio to ensure that credits under both schemes are weighted equally in terms of offset quantum.

It should be noted that the biodiversity offsets required to compensate for the project's residual impacts were quantified in accordance with BioBanking Scheme and BioBanking Assessment Methodology (BBAM) (Office of Environment & Heritage 2014) using the Biobanking Credit Calculator (Version 4.1) as requested by OEH (refer to Section 2.1 and 2.2). Due to legislative reform, many of the credits generated by the proposed off-site offsets will be quantified using the Biodiversity Assessment Methodology (BAM) (Office of Environment & Heritage 2017) by means of establishing a Biodiversity Stewardship Agreement. It is acknowledged that the use of the two different methodologies for determining biodiversity credits will make it difficult to reliably determine whether offset requirements are to be met.

To overcome this issue, the credits generated by the proposed offset sites would be subject to a credit ratio conversion with OEH approval. In the interim, for this BOS, a credit ratio conversion of 9.3 credits per hectare is considered appropriate and has been used to determine whether this BOS will adequately compensate for residual impacts associated with the project and as required in accordance with the conditions of approval (refer to Section 2.1).

Further details regarding these two NSW offset schemes are provided below.

1.4.1 BIOBANKING SCHEME

The NSW government developed the Biodiversity Banking and Offsets Scheme (BioBanking) to help address the loss of biodiversity values, including threatened species. This scheme was established under Part 7A of the TSC Act and used offsets (where appropriate) to assist in addressing the cumulative impacts of development in NSW and to help meet the goal of maintaining or improving biodiversity. This approach was intended to allow development to occur in a sustainable way without placing extra stress on the environment (Department of Environment and Climate Change 2007b).

BioBanking consisted of the following main components:

- Establishment of BioBank sites on private land through 'BioBanking agreements' with the Minister for the Environment. A BioBanking agreement is similar to a covenant and is attached to the land title. It stays with the land, and lasts in perpetuity to ensure that the BioBank site is managed for biodiversity conservation.
- Calculation of biodiversity credits through either:
  - creation of biodiversity credits for the gain in biodiversity values from taking management actions on a BioBank site
  - measuring the biodiversity credits required to offset the loss of biodiversity values due to the impacts of a development
  - the trading of biodiversity credits between development sites and BioBank sites to offset the impact of development on biodiversity.

The BBAM established two classes of biodiversity credits that may be created:

- Ecosystem credits – these are created or required for all impacts on biodiversity values (including threatened species that can be reliably predicted by habitat surrogates), except for threatened species or populations that require species credits.
- Species credits – these are created or required for impacts on threatened species that cannot be reliably predicted by using an area of land based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database.

The OEH maintains the BioBanking public register which lists biodiversity credits generated at BioBank sites for sale, BioBank site expressions of interest (EOI) register and lists of biodiversity credits which are required to offset development impacts.

1.4.2 BIODIVERSITY STEWARDSHIP AGREEMENTS

Biodiversity stewardship agreements were established under recent legislative changes under Part 5, Division 2 of the BC Act. Biodiversity stewardship agreements allow landholders to enter an agreement with the Minister to establish funded conservation outcomes on private land. These agreements generate biodiversity credits that may be sold to land developers and landholders that who undertake development or clearing, generating a credit obligation which must be retired to offset their activity (Office of Environment & Heritage 2017).

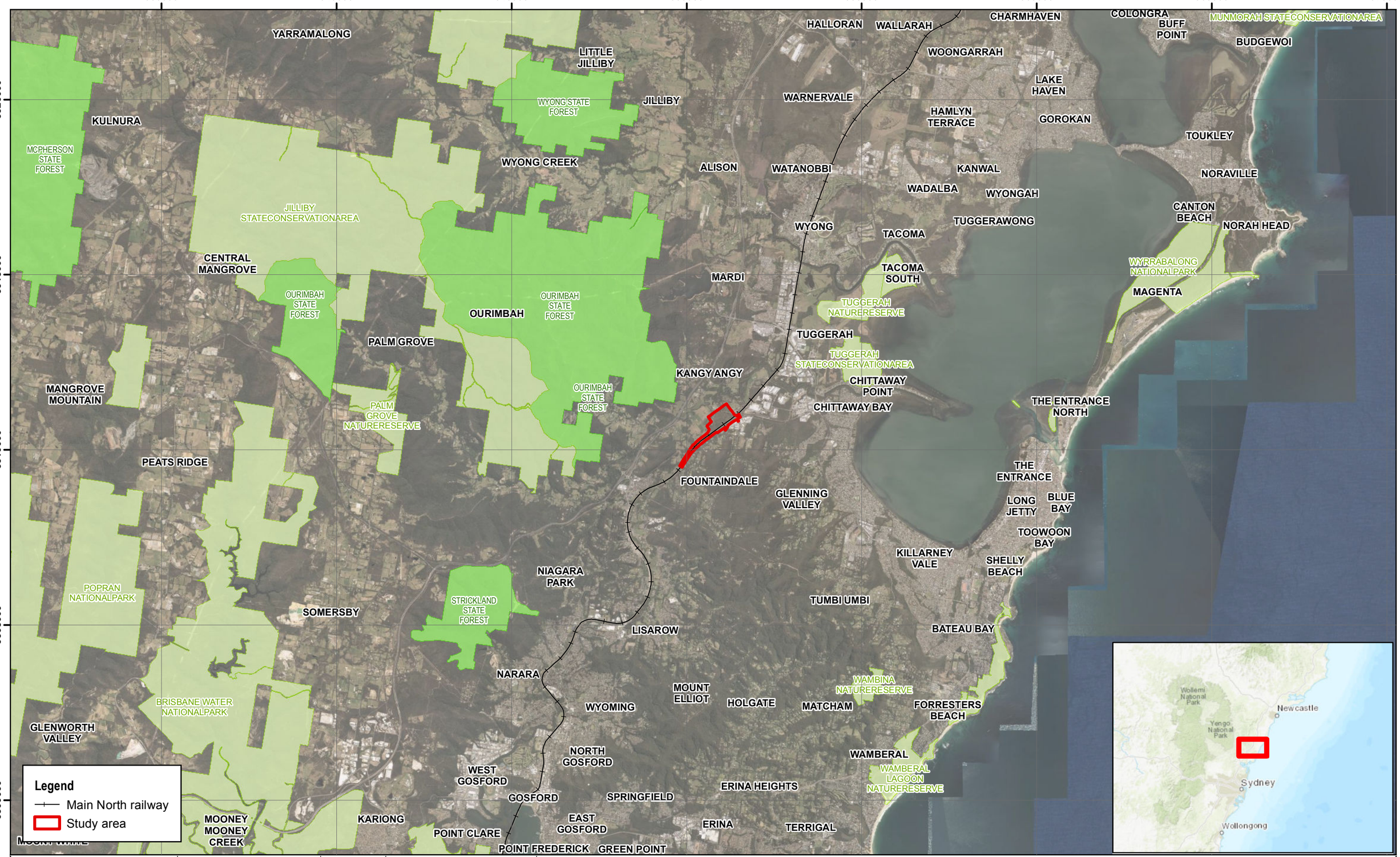
Like the Biobanking scheme, two classes of biodiversity credits may be created:

- Ecosystem credits – which measure the offset requirement for impacts on threatened ecological communities, threated species habitat for species that can be reliably predicted to occur with a plant community type and other plant community types generally.
- Species credits – which measure the offset requirement for impacts on threatened species individuals or their area of habitat.

Again, the credits generated under this scheme are maintained on a public register that is administered by the OEH.

The long-term objective of Biodiversity stewardship agreements includes an increase in future condition across an offset site achieved through management and monitoring actions.

Within the Biodiversity Stewardship Agreements, monitoring strategies (such as quantifying ecological attributes/function) are developed to measure the environmental condition, identify condition targets and inform detailed management actions. These actions and timeframes for implementation are developed following detailed site inspection and during the preparation of the Biodiversity Stewardship Agreement Report.



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New Intercity Fleet Maintenance Facility Project - Biodiversity Offset Strategy
EPBC 2016/7681

Figure 1.1
Regional locality

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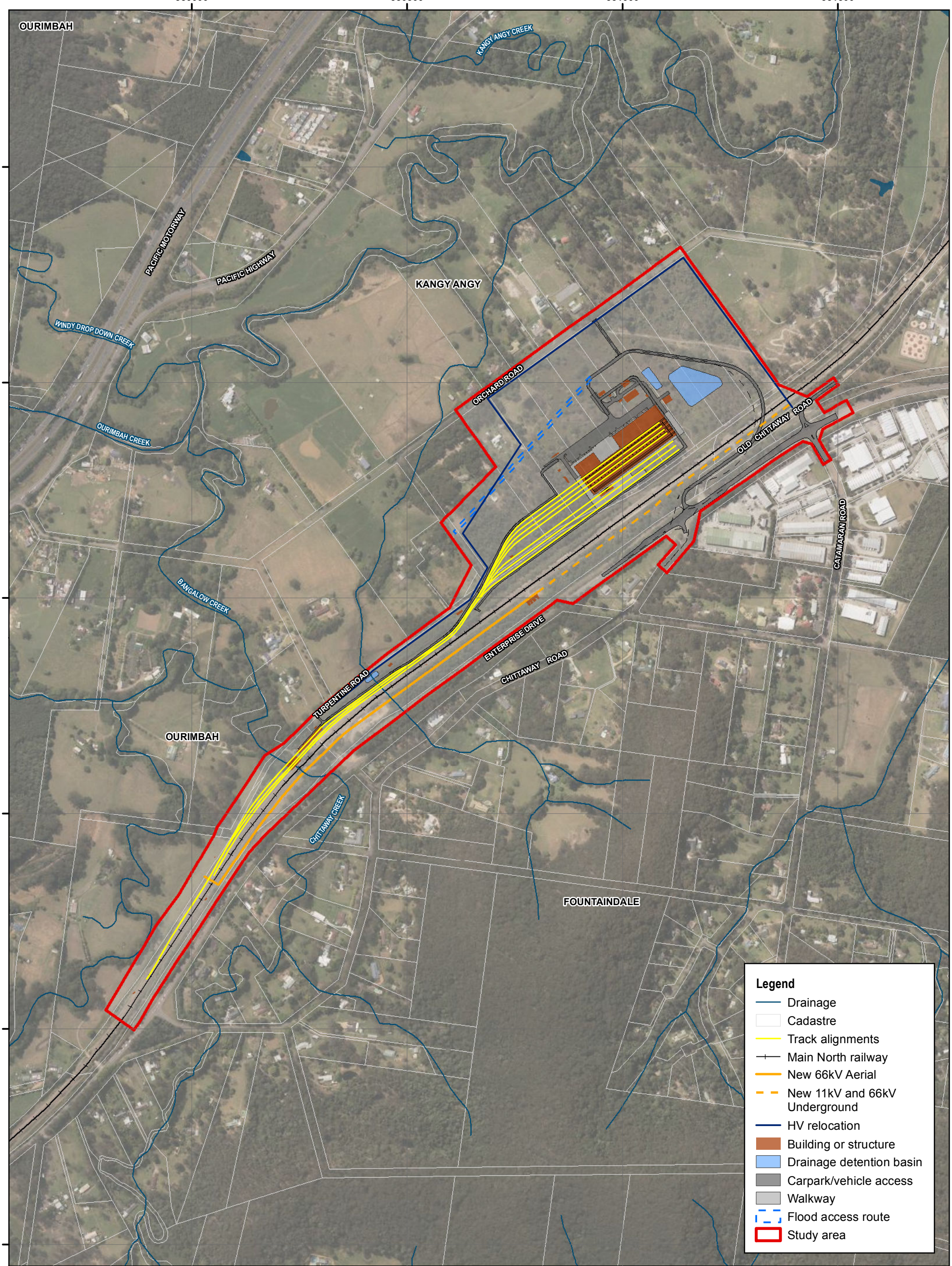

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Data source: © Department of Finance, Services & Innovation 2017

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New Intercity Fleet Maintenance Facility Project - Biodiversity Offset Strategy
EPBC 2016/7681

Figure 1.2
The project

2 OFFSET REQUIREMENTS

2.1 CONDITIONS OF APPROVAL REQUIREMENTS

The project conditions of approval 40 and 41 of the New Intercity Fleet Maintenance Facility Determination Report (TfNSW, 2017) require the preparation of a BOS and BOP as outlined in Table 2.1 below.

Table 2.1 Summary of project Conditions of Approval relating to biodiversity offsetting

CONDITION OF APPROVAL NUMBER	OBJECTIVE	DETAIL	COMPLIANCE WITH CONDITION
Conditions of Approval			
40	Biodiversity Offset Strategy	A Biodiversity Offset Strategy will be prepared and approved (prior to construction works commencing) in accordance with the requirements of the NSW Office of Environment and Heritage (OEH) Conditions of Concurrence (for both the Species Impact Statement and Additional Species Impact Statement), and the EPBC Approval.	Forms the basis of this BOS
41	Biodiversity Offset Package	A Biodiversity Offset Package will be prepared in accordance with the requirements of the NSW Office of Environment and Heritage (OEH) Conditions of Concurrence (for both the Species Impact Statement and Additional Species Impact Statement), and the EPBC Approval.	To be prepared following approval of the BOS

The biodiversity offset requirements for the project that are outlined under Conditions 40 & 41 specifically relate to the following government agency approvals:

- Chief Executive of NSW Office of Environment & Heritage concurrence approval for the SIS issued on 22 August 2016
- Chief Executive of NSW Office of Environment & Heritage concurrence approval for the Additional SIS on 29 August 2017; and
- EPBC Act approval (EPBC 2016/7681) issued 05 May 2017.

The biodiversity offsetting conditions associated with the above approvals are outlined further in sections 2.1.1 to 2.1.3.

2.1.1 OEH SIS BIODIVERSITY OFFSET CONCURRENCE CONDITIONS ISSUED 22 AUGUST 2016

Biodiversity offset requirements set out under OEH concurrence conditions for the SIS (issued 22 August 2016) are presented in Table 2.2.

Table 2.2 OEH concurrence conditions for the SIS issued 22 August 2016

CONDITION OF APPROVAL NUMBER	OBJECTIVE	DETAIL	COMPLIANCE WITH CONDITION
2	Biodiversity offset	The proponent must provide an appropriate biodiversity offset strategy, and subsequent biodiversity offset package to the satisfaction of OEH, noting that OEH's preference is physical land based offsets and/or the retirement of biodiversity credits in accordance with either (i) fully implementing the Biobanking Scheme for the project in accordance with Part 7A of the *Threatened Species Conservation Act 1995*; OR (ii) implementing the 'OEH principles for the use of biodiversity offsets in NSW'. [http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm] OR (iii) as otherwise agreed by OEH. Under the 'principles based' option, OEH understands that such an offset package may include a mix of: the provision of an offsite offset; the retirement of an appropriate number and type of biodiversity credits (both ecosystem and species credits) in accordance with Biobanking, or supplementary measures, such as the payment of sufficient funds into the 'Saving Our Species' program for Biconvex Paperbark. However, any supplementary will be capped at no more than 10% of the monetary value of the overall offset package.	Section 2.2.2 Section 2.3 Section 3 (i) Section 4 (ii)
3	Biodiversity offset	The proponent must provide an (i) appropriate biodiversity offset strategy before construction work on the proposed development site can commence, and (ii) appropriate biodiversity offset package (including the purchase of any land based offsets, the retirement of appropriate biodiversity credits and/or implementation of supplementary measures) within 12 months of the commencement of construction works. Both the strategy and package must be undertaken to the satisfaction of and approved by the Senior Team Leader Planning, Hunter Central Coast Region, OEH within the above timeframes. Reason: To enable the proponent to quantify that the offset package is able to fully and appropriately offset impacts described for the proposal described in the SIS and effectively incorporates amelioration measures for threatened species as agreed to by the Minister administering the TSC Act in this Concurrence Report.	This report addresses component (i) and will provide a framework for the successful delivery of the BOP (ii).

2.1.2 OEH ADDITIONAL SIS BIODIVERSITY OFFSET CONCURRENCE CONDITIONS ISSUED 29 AUGUST 2017

Biodiversity offset requirements set out under OEH concurrence conditions for the Additional SIS (issued 29 August 2017) are presented in Table 2.3.

Table 2.3 OEH concurrence conditions for the Additional SIS issued 29 August 2017

CONDITION OF APPROVAL NUMBER	OBJECTIVE	DETAIL	COMPLIANCE WITH CONDITION
2	Biodiversity offset package	The proponent must provide a biodiversity offset package to the satisfaction of OEH Senior Team Leader Planning, Hunter Central Coast Region for impacts to Mahony's Toadlet. The biodiversity offset package may include one or more of the following: A. Purchase and retirement of Mahony's Toadlet species credits B. Off-site offsets containing known Mahony's Toadlet habitat secured as biodiversity stewardship sites C. Financial contribution to the Saving Our Species Conservation Project for Mahony's Toadlet.	This BOS will guide the preparation of the BOP
3	Biodiversity offset package	The proponent must demonstrate to the satisfaction of the OEH Senior Team Leader Planning, Hunter Central Coast Region that the proponent is able to secure and implement a biodiversity offsetting package within 24 months of the commencement of construction works.	This BOS will provide the framework for effective and timely delivery of the BOP
4	Biodiversity offset – Mahony's Toadlet	Where any proportion of the offset package utilises the purchase and retirement of Mahony's Toadlet (*Uperoleia mahonyi*) species credits (as per Condition 2a), any land-based offsets must be provided in known Mahony's Toadlet habitat. OEH's assessment is that the development footprint will affect about 18.7 ha of suitable habitat for this species. Mahony's Toadlet is a species-credit species with a Tg value of 0.125. A total of 1,496 credits to be retired for Mahony's Toadlet.	This requirement has been included within Sections 2 and 3 of the BOS
5	Biodiversity offset – Wallum Froglet	The proponent must provide an offset for the Wallum Froglet that provides 31 Wallum Froglet credits to be retired.	This requirement has been included within Sections 2 and 3 of the BOS

2.1.3 EPBC ACT APPROVAL CONDITIONS (EPBC 2016/7681) ISSUED 5 MAY 2017

Biodiversity offset requirements set out under EPBC Act conditions of approval (EPBC 2016/7681) issued 5 May 2017 are presented in Table 2.4.

Table 2.4 Biodiversity offsetting EPBC Act conditions of approval

CONDITION OF APPROVAL NUMBER	OBJECTIVE	DETAIL	COMPLIANCE WITH CONDITION
3	Base offset requirement	The person taking the action must not clear more than 19.6 ha of high quality swamp forest and 3.6 ha of wet open forest that is foraging habitat for the Swift Parrot and Regent Honeyeater within the impact area.	Does not form part of this report
4	Swift Parrot offset requirement	To compensate for the impacts to foraging habitat for the Swift Parrot, the person taking the action must provide an offset package in accordance with the offset requirements calculated under BioBanking for the relevant plant community types, and: A. Must meet at least 90% of the offset requirement through direct offsets, which must be located in the Central Coast region or Lake Macquarie region and must be consistent with the on-ground actions identified in the national recovery plan for the Swift Parrot to manage and protect Swift Parrot habitat at the landscape scale. B. May meet up to 10% of the offset requirement through supplementary measures, which must be consistent with actions identified in the national recovery plan for the Swift Parrot.	Section 2.2.2 Section 2.3 Section 3.2 Section 3.3 (A) Section 3.4 (B)
5	Regent Honeyeater offset requirement	To compensate for the impacts to foraging habitat for the Regent Honeyeater, the person taking the action must provide an offset package in accordance with the offset requirements calculated under BioBanking for the relevant plant community types, and: A. Must meet at least 90% of the offset requirement though direct offsets, which must be located in the Central Coast region or Lake Macquarie region and must be consistent with the on-ground actions identified in the national recovery plan for the Regent Honeyeater to improve the extent and quality of Regent Honeyeater habitat. B. May meet up to 10% of the offset requirement through supplementary measures, which must be consistent with actions identified in the national recovery plan for the Regent Honeyeater.	Section 2.2.2 Section 2.3 Section 3.2 Section 3.3 (A) Section 3.4 (B)

CONDITION OF APPROVAL NUMBER	OBJECTIVE	DETAIL	COMPLIANCE WITH CONDITION
6	Biodiversity Offset Strategy	To quantify the offset requirements under BioBanking and the equivalent offset package for the protected matters referred to in conditions 4 and 5, the person taking the action must implement conditions 2 and 3 of the OEH conditions of concurrence, and: A. The Biodiversity Offset Strategy must be submitted to the Department at least 1 month before construction commences, and construction cannot commence until the strategy is approved by the Minister. B. The Biodiversity Offset Strategy must: i. demonstrate how the proposed offset package will meet the requirements of conditions 4 and 5 ii. identify and describe the proposed offset sites, and include maps clearly depicting Swift Parrot and Regent Honeyeater habitat within the offset sites iii. identify how the offset sites will be legally secured in perpetuity iv. identify the long term objectives for future condition of the offset sites, management and monitoring actions, and timeframes for implementation v. provide details of proposed supplementary measures, and the monetary value of each component of the offset package vi. be implemented if approved.	A B i. Section 2.2.2 Section 2.3 Section 3.2 Section 3.3 (A) Section 3.4 (B) ii. Section 3.3 and Figure 3.1 iii. Section 1.4 iv. Section 1.4 v. Section 3 vi. Section 3

2.2 BIODIVERSITY OFFSET REQUIREMENT

The project off-site biodiversity offset requirements have been quantified using BBAM 2014 and comprise of ecosystem credits and species credits.

- Ecosystem credits – these are created or required for all impacts on biodiversity values (including threatened species that can be reliably predicted by habitat surrogates), except for those threatened species or populations which require species credits. EPBC Act offset requirements for the Swift Parrot and Regent Honeyeater will be delivered under appropriate ecosystem credits.
- Species credits – these are created or required for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates as identified in the Threatened Species Profile Database. Species credits required by the project include:
  - *Melaleuca biconvexa* (Biconvex Paperbark)
  - Mahony's Toadlet (*Uperoleia mahonyi*)
  - Wallum Froglet (*Uperoleia mahonyi*).

For each offset credit type, the number of credits required have been calculated based on the maximum extent of the approved project impact and are outlined within Table 2.5 and Table 2.6.

The project will use a vegetation tracker to keep record of the extent of native vegetation removal (i.e. project's residual impact requiring off-site offsets).

ECOSYSTEM CREDIT OFFSET REQUIREMENTS

Table 2.5 Ecosystem credit offset requirement summary

PLANT COMMUNITY TYPE	VEGETATION FORMATION	VEGETATION CLASS	THREATENED ECOLOGICAL COMMUNITY	PROJECT IMPACT (ha)[1]	ECOSYSTEM CREDIT REQUIREMENT[2]
PCT 1723 – Melaleuca biconvexa – Swamp Mahogany – Cabbage Palm swamp forest of the Central Coast	Forested Wetlands	Coastal Swamp Forests	Yes Swamp Sclerophyll Forest on Coastal Floodplains	22.6	1,416*
PCT 1528 – Jackwood – Lilly Pilly – Sassafras riparian warm temperate rainforest of the Central Coast	Rainforests	Northern Warm Temperate Rainforests	No	1.2	52
PCT 1568 – Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forests	No	3.3	171*
Total area of native vegetation impact and ecosystem credits required for offset				**27.1**	**1640**

(1) Ecosystem credit estimates are based on maximum allowable vegetation clearing extent as modified (through impact reduction) under the Additional SIS (WSP | Parson Brinckerhoff, May 2017).

(2) Ecosystem credit requirement was calculated using Biobanking credit calculator (tool version 4.1). It should be noted that any credits sourced that are created under Biodiversity Assessment Methodology 2017 will be subject to a credit ratio conversion with OEH approval.

* Ecosystem credit offsets also provide EPBC Approval offset requirements for Swift Parrot and Regent Honeyeater habitat. Based on a 19.6 ha offset requirement for Swamp Sclerophyll Forest, it is estimated that 1,228 ecosystem credits are needed for this habitat offset. For the required 3.6 ha habitat offset for Wet Sclerophyll Forest, it is estimated that 171 ecosystem credits are required for this habitat offset.

SPECIES CREDIT OFFSET REQUIREMENTS

Table 2.6 Species credit offset requirement summary

SCIENTIFIC NAME	COMMON NAME	NUMBER OF INDIVIDUALS OR AREA (ha) TO BE REMOVED	NUMBER OF CREDITS REQUIRED
Melaleuca biconvexa	Biconvex Paperbark	3,984	52,000
Crinia tinnula	Wallum Froglet	2.4	31
Uperoleia mahonyi	Mahony's Toadlet	18.7	1,496
Total species credits			**53,527**

EPBC ACT APPROVAL (EPBC 2016/7681) OFFSET REQUIREMENTS

EPBC Act biodiversity offset requirements for the project have been assigned for the Regent Honeyeater and Swift Parrot and have been based on the project impacting on potential foraging habitat for the species which is comprised of 19.6 hectares of Swamp Forest and 3.6 hectares of Wet Open Forest vegetation (Table 2.7).

Table 2.7 Project impact on EPBC Act the Regent Honeyeater and Swift Parrot

SCIENTIFIC NAME	COMMON NAME	HABITAT	AREA
Regent Honeyeater	*Anthochaera phrygia*	Swamp Forest	19.6
Swift Parrot	*Lathamus discolor*	Wet Open Forest	3.6

Conditions 4 and 5 of the EPBC Act approval require 90% of the ecosystem credit offset for these two species to be delivered through direct offsets which must be located within the Central Coast region or Lake Macquarie region and must be consistent with the on-ground actions identified in the national recovery plan for these species. A summary of these on-ground actions are provided below.

ON-GROUND ACTIONS IDENTIFIED IN THE NATIONAL RECOVERY PLAN FOR THE SWIFT PARROT AND REGENT HONEYEATER

SWIFT PARROT

The establishment of biodiversity offsets for the project will fulfil the on-ground recovery actions for the Swift Parrot, which foster the management and protection of Swift Parrot foraging habitat (Action 2.1 of the National Recovery Plan for the Swift Parrot *Lathamus discolor* (Saunders, D.L. and Tzaros, C.L. 2011) (Appendix B).

Action 2 in the Swift Parrot National Recovery Plan is to manage and protect Swift Parrot habitat at the landscape scale. The establishment of offsets for the project meets the recovery criteria of Action 2.1a in Table 7 of the Swift Parrot National Recovery Plan as it fulfils the action to encourage and support the protection, conservation management and restoration of Swift Parrot foraging habitat through agreements with landowners, incentive programs and community projects. Specifically, the project's offsets portfolio fulfils the detailed on-ground actions of Action 2.1a by:

- retaining and expanding mature and mixed age habitat and protecting and managing it by fencing and providing a buffer zone from disturbances
- enabling natural regeneration by fencing off and managing remnant vegetation and buffer zones to control grazing and other impacts caused by uncontrolled access (such as in urban areas). Revegetating areas and connecting

remnant habitats by planting feed and nest tree species, fencing them off and managing them, where natural regeneration is not possible.

Further to the on-ground strategies of Action 2.1a the project's Swift Parrot habitat offset strategies will provide ongoing management of all the above fenced off areas, including pest, weed and fire management.

REGENT HONEYEATER

The following on ground actions for Strategy 1 have been outlined in Section 7 of the National Recovery Plan for the Regent Honeyeater (Commonwealth of Australia, 2016) (Appendix B) to improve the extent and quality of Regent Honeyeater habitat:

- protect intact (high quality) areas of Regent Honeyeater breeding and foraging habitat (as described in '3.4.6 Habitat critical to survival'). Section 3.4.6 of the plan outlines that any breeding or foraging habitat in areas where the species is likely to occur (as defined by the distribution map provided in Figure 2); Central Coast is included in the list of regular and subsidiary areas used by regent honeyeaters for foraging and breeding habitat
- rehabilitate degraded areas that were previously commonly used by the Regent Honeyeater
- habitat patches or corridors are enhanced in order to facilitate landscape scale movements
- protect, maintain and improve Travelling Stock Routes (TSRs) in areas where regent honeyeaters are known or likely to occur
- noisy miner *(Manorina melanocephala)* control actions undertaken
- limit the impact of competition with commercial honeybee operations at key sites
- ecological thinning of dense regrowth forests.

The project Regent Honeyeater offset lands establishes the above on-ground actions for Strategy 1 through the following performance criteria:

- increasing the extent of quality habitat through land covenants
- providing offsets that protect and/or rehabilitate habitat of equivalent or better quality
- key habitat patches and corridors are identified and expanded and or rehabilitated.

2.3 BIODIVERSITY OFFSET SITE SELECTION CRITERIA

Biodiversity and landscape characteristics are important in the identification and securing process of appropriate offsets. The following characteristics have been used in selecting the preferred offset strategy for the project:

- presence of relevant threatened biodiversity
- distance from the project
- current condition and potential for improvement; and
- connectivity.

These characteristics are described in detail below.

2.3.1 PRESENCE OF RELEVANT THREATENED BIODIVERSITY

When determining offsets, they must be targeted and offset the impacts on a 'like for like' or 'better' basis. Given the project includes the clearing of a Threatened Ecological Community (TEC) and habitat for threatened species, the offsets will, provide direct offsets that align to the impacted TEC. The project has direct impacts on one TEC listed under the BC Act, being:

- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

This TEC also provides habitat for the Swift Parrot and Regent Honeyeater, with EPBC approval conditions requiring ecosystem based offsets for loss of potential habitat for these species.

The remaining ecosystem credits to be sourced for non-threatened vegetation types will be sourced from the impacted NSW vegetation formation and class type. This approach is consistent with offset trading rules under the Framework for Biodiversity Assessment 2014 (FBA) and BC Act.

2.3.2 DISTANCE FROM THE PROJECT

Biodiversity offsets will be located within the region of the project i.e. the project offsets will be sourced from within the Wyong sub-region of the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion. Choosing offsets locations within the region of the project is consistent with the need to provide compensatory habitat or similar type and quality vegetation / habitat to that being removed. The integrity of the habitat network and biodiversity values of the locality will be retained, habitat secured and existing corridors consolidated for local flora and fauna populations.

Under the former BBAM 2014 and FBA 2014, the project was located within the Hunter Central Rivers Major Catchment Area and trading was permissible with adjoining IBRA sub-regions such as the Karuah Manning. These trading options have been included within the BOS due to the vegetation type and threatened species impacts being of similar like for like occurrences.

Additionally, the EPBC Act ecosystem credit offset requirements which will deliver potential foraging habitat for the Swift Parrot and Regent Honeyeater will be sourced so that at least 90% of the offset requirement is located in the Central Coast or Lake Macquarie regions.

2.3.3 CURRENT CONDITION AND POTENTIAL FOR IMPROVEMENT

Several factors influence the condition of remnant vegetation and potential habitat for threatened species, these include; weed invasion, fragmentation, pollution and disturbances including clearing, fire and grazing. The condition of vegetation/potential habitat provides an index of a site's potential to support threatened species, populations and communities. Although it is preferable that the vegetation condition/habitat quality of offset areas exceeds or matches that of the habitat being removed, this is not always achievable. Where the condition or quality of the offset is not equivalent to that of the area being cleared, a greater area of offset may be required.

Where the condition of habitats can be improved through changes in the land management practices (for example the stopping grazing activities and improving weed control), this improvement in habitat condition can be used to offset a development.

A major component of this BOS is the establishment of a Biodiversity Stewardship Agreement [redacted] within the Central Coast Council Local Government Area. These reserves are relatively small, exhibit high edge area ratios and form a mosaic within generally residential and rural residential areas. The vegetation within many of these reserves are of high quality although the reserves are subject to varying levels of weed incursions and are currently mostly unfunded and lack ongoing strategic conservation management actions.

The establishment of a Biodiversity Stewardship Agreement [redacted] will enable an enduring in-perpetuity conservation outcome within the local area that will directly benefit the impacted biodiversity values of the project.

2.3.4 CONNECTIVITY

Connectivity of habitats is essential for the long-term survival of many species because it facilitates the movement on a local scale, for foraging and sheltering, as well as on a regional and national scale as a wildlife corridor for dispersal and migration. Remnant vegetation with habitat linkages are more likely to maintain their biodiversity values in the long-term because wildlife corridors:

- provide increased foraging area for wide-ranging species
- provide cover for movement between habitat patches, particularly for cover-dependent species and species with poor dispersal ability and enhance the movement of animals through sub-optimal habitats

- reduce genetic isolation
- facilitate access to mix of habitats and successional stages to those species which require them for different activities (for example foraging or breeding)
- provide refuge from disturbances such as fire
- provide habitat in itself; and
- link wildlife populations and maintain immigration and re-colonisation between otherwise isolated patches. This is turn may help reduce the risk of population extinction (Wilson & Lindenmayer 1995).

Offsets are likely to be of greater biodiversity value where they are located adjacent to remnant vegetation creating a larger patch of vegetation or where they provide linkages within an otherwise fragmented landscape. Connectivity of habitats creates larger remnants that are likely to be of higher quality and support higher biodiversity. Compensatory habitats act to consolidate existing corridors or, occur adjacent to existing areas of native vegetation in order to maintain or increase their habitat quality and long-term viability.

3 PROPOSED BIODIVERSITY OFFSET STRATEGY

Offset strategies can include both on-site and off-site or local area schemes that contribute to the long-term conservation of threatened species and communities. This offset strategy has committed to securing all offset requirements as off-site offsets. This section provides an overview of the process undertaken to identify, prioritise and secure offsets required for the project.

3.1 PROPOSED OFF-SITE OFFSET SITES

Biodiversity offsets are required to compensate for the residual biodiversity impacts associated with the project. The process for identifying, prioritising and meeting project biodiversity credit requirements consists of three methods:

- the purchase and retirement of existing suitable Biobanking biodiversity credits
- progressing Biodiversity Stewardship Agreements on candidate properties; and/or
- the use of supplementary measures if suitable credits cannot be identified.

3.1.1 PURCHASE AND RETIREMENT OF EXISTING BIODIVERSITY CREDITS

The OEH maintains a number of BioBanking public registers, including:

- Biobanking agreements register – provides the location of each biobank site, the number and type of credits generated and a copy of the biobanking agreement.
- Biodiversity credits register – provides ownership information in relation to each credit, and their status.
- Biobank site expressions of interest (EOI) register – landowners who are interested in establishing biobank sites, but have not entered into a biobanking agreement.

Biodiversity credits that are currently available on the Biobanking public register are listed based on credit type and major catchment area. The recent legislative changes under the BC Act have amended the listing of biodiversity credits from IBRA subregions associated with major catchment areas to IBRA regions. At the time of preparing this BOS, all existing biodiversity credits listed on the biodiversity credits register are still assigned to major catchment areas and subsequent IBRA subregions and have been listed as such within this BOS.

A review of existing credits currently available on the biodiversity credits register was undertaken on 4 October 2017 and the results of this search are detailed in sections 3.2.1.1 – 3.2.1.4 of this BOS.

3.1.1.1 SWAMP SCLEROPHYLL FOREST ON COASTAL FLOODPLAINS

One existing BioBanking site contains suitable Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits which are available for purchase within the relevant major catchment area (Hunter Central Rivers). An additional site located within the Hawkesbury Nepean Major Catchment Area also contains Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits which are available for purchase. Details of these sites and credits available are outlined in Table 3.1 below.

Table 3.1 Existing Swamp Sclerophyll Forest on Coastal Floodplains Biobanking credits available on the credit register

AGREEMENT ID	CMA	IBRA SUB-REGION	VEGETATION ID	THREATENED ECOLOGICAL COMMUNITY	TOTAL AREA	NUMBER OF CREDITS AVAILABLE
214	Hunter Central Rivers	Karuah Manning[1]	PCT 1718 – Swamp Mahogany – Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast	Swamp Sclerophyll Forest on Coastal Floodplains	unknown	68
38	Hawkesbury Nepean	Yengo[1]	PCT 923 – Melaleuca lineariifolia – Swamp Mahogany swamp forest in drainage lines of the edges of the Cumberland Plain, Sydney Basin Bioregion	Swamp Sclerophyll Forest on Coastal Floodplains	unknown	159
Total Swamp Sclerophyll Forest on Coastal Floodplains credits available						**227**

(1) These credits do not meet locality requirements for EPBC Act offset conditions.

As ecosystem credits in the Table 3.1 do not met the EPBC Act offset conditions (i.e. for at least 90% of offset requirements to be fulfilled through direct offsets located within the Central Coast and/or Lake Macquarie regions) these options are not being considered further at this stage. These ecosystem credits will only be considered further should the remaining 10% of the offset requirements not be able to be sourced from within the Central Coast and/or Lake Macquarie regions. If required to fulfil offset obligations, an investigation into whether these credits are consistent with the actions identified in the national recovery plans for the Swift Parrot and Regent Honeyeater will be undertaken to ensure that they meet with the EPBC Act offset conditions.

Whilst these do not occur within the regions required, they would add value to an overall offset package and have the advantage of no set up costs or time delay in the establishment of a Biodiversity Stewardship Agreement.

3.1.1.2 WET SCLEROPHYLL FOREST (SHRUBBY SUB-FORMATION)

Four Biobanking sites currently have suitable North Coast Wet Sclerophyll Forest ecosystem credits available for purchase; however do not fall within the locality requirements required under the EPBC Act offsetting conditions. Details of these sites and credits available are outlined in Table 3.2 below.

Table 3.2 Existing North Coast Wet Sclerophyll Forest Biobanking credits available on the credit register

AGREEMENT ID	MAJOR CATCHMENT AREA	IBRA SUB-REGION	VEGETATION ID	VEGETATION CLASS	TOTAL AREA	NUMBER OF CREDITS AVAILABLE
96	Hunter Central Rivers	Karuah Manning[1]	PCT 1257 – Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern NSW North Coast	North Coast Wet Sclerophyll Forests	unknown	259
214	Hunter Central Rivers	Karuah Manning[1]	PCT 1566 – White Mahogany – Turpentine moist shrubby tall open forest	North Coast Wet Sclerophyll Forests	unknown	71
214	Hunter Central Rivers	Karuah Manning[1]	PCT 1579 – Smooth-barked Apple – Turpentine – Blackbutt open forest on ranges of the Central Coast	North Coast Wet Sclerophyll Forests	unknown	42
223	Hunter Central Rivers	Karuah Manning[1]	PCT 1566 – White Mahogany – Turpentine moist shrubby tall open forest	North Coast Wet Sclerophyll Forests	unknown	16
Total North Coast Wet Sclerophyll Forests credits available						**388**

(1) These credits do not meet locality requirements for EPBC Act offset conditions and as such are not being considered further at this stage.

3.1.1.3 RAINFORESTS

No suitable Northern Warm Temperate Rainforests ecosystem credits are currently available on the biodiversity credits register.

3.1.1.4 SPECIES CREDITS

No species credits are currently listed on the biodiversity credits register for *Melaleuca biconvexa*, Wallum Froglet or Mahony's Toadlet within the Hunter Central Rivers Major Catchment Area.

3.1.2 REVIEW OF BIOBANKING EOI REGISTER

3.1.2.1 ECOSYSTEM CREDITS

A review of the BioBanking Expression of Interest (EOI) credit register identified a small number of Swamp Sclerophyll Forest on Coastal Floodplains potential suitable ecosystem credits (>32 credits) available subject to the establishment of Biodiversity Stewardship Agreements. Details of these sites and potential ecosystem credits available are outlined in Table 3.3 below.

Table 3.3 Existing BioBanking expression of interest credits potentially available

EOI ID	CMA	IBRA SUB-REGION	VEGETATION ID	THREATENED ECOLOGICAL COMMUNITY	TOTAL AREA	NUMBER OF POTENTIAL CREDITS AVAILABLE
122	Hunter Central Rivers	Wyong	HU633/Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Swamp Sclerophyll Forest on Coastal Floodplains	5.86	32
254	Hunter Central Rivers	Karuah Manning[1]	Forested Wetlands	Swamp Sclerophyll Forest on Coastal Floodplains	**	**
295	Hunter Central Rivers	Karuah Manning[1]	HU939/Swamp Mahogany – Broad-leaved Paperbark – Swamp Water Fern – Plume Rush swamp forest on coastal lowlands of the Central Coast and Lower North Coast	Swamp Sclerophyll Forest on Coastal Floodplains	**	**
Total Swamp Sclerophyll Forest on Coastal Floodplains credits available						**>32**

(1) These credits do not meet locality requirements for EPBC Act offset conditions and as such are not being considered further at this stage.

** The total vegetation area and number of potential credits available are currently unknown.

3.1.2.2 SPECIES CREDITS

No EOI species credits are currently listed for *Melaleuca biconvexa*, Wallum Froglet or Mahony's Toadlet within the Central Coast and Lake Macquarie regions.

3.1.3 ADDITIONAL SITES THAT HAVE PENDING BIOBANKING AGREEMENT CURRENTLY LODGED WITH OEH FOR APPROVAL

Two additional sites, that have current Biobanking Agreement applications submitted with OEH, have been identified as providing Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits, Wallum Froglet species credits and potential habitat for Mahony's Toadlet (require targeted surveys to confirm) (Table 3.4). Once these sites are established ecosystem credits will become available for purchase like those identified Table 3.3 which aid in fulfilling the project biodiversity offset obligation. The two sites are:

- [redacted] and
- [redacted]

Table 3.4 Additional sites that have pending biobanking agreements currently lodged with OEH for approval

SITE ID	MAJOR CATCHMENT AREA	IBRA SUB-REGION	VEGETATION ID	THREATENED ECOLOGICAL COMMUNITY	TOTAL AREA (HA)	NUMBER AND TYPE OF POTENTIAL CREDITS AVAILABLE
[redacted]	Hunter Central Rivers	Wyong	HU633/Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Swamp Sclerophyll Forest on Coastal Floodplains	10.90	152 ecosystem credits
			Wallum Froglet	N/A – listed as a Vulnerable species under the BC Act	11.25	80 species credits
[redacted]	Hunter Central Rivers	Wyong	PCT 1720/BVT HU931 Broad-leaved Paperbark – Swamp Mahogany – Swamp Oak swamp forest	Swamp Sclerophyll Forest on Coastal Floodplains	8.30	111 ecosystem credits
Total Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits available					**19.20**	**263**
Total Wallum Froglet species credits available					**11.25**	**80**

3.2 PROGRESSING BIOBANKING/BIODIVERSITY STEWARDSHIP AGREEMENTS ON CANDIDATE SITES

3.2.1 CANDIDATE OFFSET SITES WITHIN THE CENTRAL COAST COUNCIL LOCAL GOVERNMENT AREA

A key component of this BOS is the establishment of a Biodiversity Stewardship Agreement [redacted] within the Central Coast Local Government Area (LGA) (Figure 3.1). The rationale for this approach was to enable an additional level of conservation certainty over these areas and provide site specific in-perpetuity management funding for on ground conservation management actions. This approach also ensures that positive conservation outcomes

are delivered within the LGA impacted by the project and meets the specific requirements of both the State and Commonwealth conditions of approval.

3.2.1.1 DESK BASED ASSESSMENT

Given the large number of biodiversity credits required to offset impacts on the TEC listed as Swamp Sclerophyll Forest on Coastal Floodplains and the threatened plant species *Melaleuca biconvexa*, Swamp Sclerophyll Forest vegetation type was the primary focus of preliminary investigations into potential candidate sites.

Within the Central Coast Council LGA the following vegetation mapping and Swamp Sclerophyll Forest equivalent vegetation types were examined as part of a high-level desk based site evaluation:

The natural vegetation of the Gosford Local Government Area, Central Coast, NSW (Bell 2009):

- E5a – Alluvial Bluegum-Paperbark Forest
- E37a-e Swamp Mahogany – all E37 vegetation community types
- E42 – Narrabeen Alluvial Sedge Woodland; and
- E43a – Estuarine Paperbark.

The natural vegetation of the Wyong Local Government Area, Central Coast, NSW (Bell 2008):

- Mu16 – Alluvial Bluegum – Paperbark Mesic Palm Forest
- Mu17 – Alluvial Robusta – Paperbark Sedge – Palm Forest
- Mu18 – Alluvial Floodplain Swamp Paperbark Thicket
- Mu19 – Alluvial Wollybutt – Melaleuca Sedge Forest
- Mu20 – Alluvial Floodplain Shrub Swamp Forest
- Mu25 – Munmorah Palm – Apple Dry Drainage Line Forest, and
- Mu26 – Narrabeen Alluvial Drainage Line Complex.

Fourteen suitable candidate sites and two tentative sites are summarised in Table 3.5. These candidate and tentative sites, based on detailed field surveys and broad scale vegetation mapping, are likely to represent a total of approximately 152.99 hectares of Swamp Sclerophyll Forest on Coastal Floodplains (SSFCF) which would likely generate approximately 1,138 ecosystem credits (Table 3.5).

Table 3.5 Candidate reserve areas within the Central Coast Council Local Government Area

[redacted] ID	[redacted]	SWAMP SCLEROPHYLL FOREST	NORTH COAST WET SCLEROPHYLL FORESTS	NORTHERN WARM TEMPERATE RAINFORESTS	*MELALEUCA BICONVEXA*	MAHONY'S TOADLET	WALLUM FROGLET	TOTAL RESERVE AREA (HA)	TOTAL MAPPED AREA OF SSFCF (ha)
[redacted]	[redacted]	yes	–	–	–	unknown	unknown	8.24	6.33
[redacted]	[redacted]	yes	yes	–	known	unknown	unknown	4.74	1.74
[redacted]	[redacted]	yes	–	–	-	unknown	unknown	17.35	9.02
[redacted]	[redacted]	yes	–	–	-	unknown	unknown	2.09	0.67
[redacted]	[redacted]	yes	–	–	known	unknown	unknown	30.73	11.71
[redacted]	[redacted]	yes	yes	–	known	unknown	unknown	33.72	12.87
[redacted]	[redacted]	yes	yes	yes	known	unknown	unknown	14.26	5.36
[redacted]	[redacted]	yes	yes	–	known	unknown	unknown	7.14	5.50
[redacted]	[redacted]	yes	yes	–	known	unknown	unknown	15.86	7.88
[redacted]	[redacted]	yes	yes	yes	known	unknown	unknown	18.31	6.44
[redacted]	[redacted]	yes	–	–	–	unknown	unknown	26.94	5.26
[redacted]	[redacted]	yes	–	–	–	unknown	unknown	50.74	8.90
[redacted]	[redacted]	yes	–	–	known	unknown	unknown	17.37	16.09

RESERVE ID	RESERVE NAME	SWAMP SCLEROPHYLL FOREST	NORTH COAST WET SCLEROPHYLL FORESTS	NORTHERN WARM TEMPERATE RAINFORESTS	*MELALEUCA BICONVEXA*	MAHONY'S TOADLET	WALLUM FROGLET	TOTAL RESERVE AREA (HA)	TOTAL MAPPED AREA OF SSFCF (ha)
[redacted]	[redacted]	yes	–	–	known	unknown	unknown	31.81	24.13
Additional tentative [redacted] for investigation									
[redacted]	[redacted]	yes	–	–	unknown	unknown	unknown	TBC	11.50
[redacted]	[redacted]	yes	–	–	unknown	unknown	unknown	TBC	19.59
Total area								**>335.44**	**152.99**
Estimated ecosystem credits generated[1]									[redacted]
[redacted]									[redacted]
Total Swamp Sclerophyll Forest on Coastal Floodplain ecosystem credit estimate									**1,138 credits**

(1) Estimate of biodiversity credit yield has been based on BBAM 2014 adopting an average [redacted]. BBAM 2014 credit estimates have been used within the BOS as the offset credit requirements for the project have been calculated using this methodology.

(2) [redacted] This will be further refined as part of the Biodiversity Stewardship Agreement assessment in accordance with Section 13.11 and Table 10 of BAM 2017.

(3) SSFCF estimated based on broadscale mapping (Bell 2008; Bell 2009) and not subject to detailed survey.

3.2.1.2 SITE INSPECTIONS

Site inspections of the candidate reserves were undertaken to confirm the presence of Swamp Sclerophyll Forest on Coastal Floodplains, undertake stem counts of *Melaleuca biconvexa* and to record any opportunistically observed threatened species. The site inspections of the candidate sites confirmed the presence of 121.9 ha of Swamp Sclerophyll Forest on Coastal Floodplains and a preliminary *Melaleuca biconvexa* stem count estimate of greater than 12,000 at three of the 14 sites. Site inspections of the tentative sites are yet to be completed and the total stem counts and population densities of *Melaleuca biconvexa* are still yet to be finalised however the relatively high densities of immature to mature age class specimens of *Melaleuca biconvexa* identified at these sites are likely to provide the required species credits in conjunction with a large proportion of the required ecosystem credits for Swamp Sclerophyll Forest on Coastal Floodplains.

Most of the candidate Central Coast Council reserves are currently unfunded and lack ongoing strategic conservation management actions. The vegetation within many of these reserves are of high quality and are subject to varying levels of weed incursions. The establishment of these reserves under a Biodiversity Stewardship Agreement would enable an additional level of conservation certainty over these areas and provide site specific in-perpetuity management funding for on ground conservation management actions.

In total, the 14 candidate site options within the Central Coast Council LGA would provide approximately 121.9 hectares of Swamp Sclerophyll Forest on Coastal Floodplains which would equate to approximately 1,134 ecosystem credits ([redacted]). However, [redacted], the estimated credit yield for Swamp Sclerophyll Forest on Coastal Floodplains is expected to be approximately 907 ecosystem credits. Similarly, the two additional tentative sites are likely to contain approximately 31.09 ha of Swamp Sclerophyll Forest on Coastal Floodplains, based on broadscale mapping (Bell 2008; Bell 2009), which would approximately equate to an additional 289 ecosystem credits or 231 ecosystem credits after the [redacted] is applied.

An example of Swamp Sclerophyll Forest on Coastal Floodplains vegetation within several of the candidate area reserves is shown in Photo 3.1–Photo 3.6. Details of broad scale vegetation mapping for each site is presented in Appendix A.

Detailed investigations are being undertaken in late 2017 and early 2018 to formally establish a Biodiversity Stewardship Agreement including targeted threatened species surveys for Mahony's Toadlet and *Melaleuca biconvexa* at each of the candidate and tentative sites. These investigations will confirm the nature and condition of vegetation within each site; determine the final ecosystem/species credits generated by each site and inform the site-specific management measures which will be required in perpetuity in accordance with BAM 2017.

During the preparation of the project BOP further candidate sites for the establishment of Biodiversity Stewardship Agreements will be explored with the Central Coast Council and other public and private landholders.

Photo 3.1 [redacted]

Photo 3.2 [redacted]

Photo 3.3 [redacted]

Photo 3.4 [redacted]

Photo 3.5 [redacted]

Photo 3.6 [redacted]

3.3 USE OF SUPPLEMENTARY MEASURES

The use of supplementary measures will only be considered where ecosystem or species credit deficiencies are unavoidable.

In accordance with conditions of approval, supplementary measures for *Melaleuca biconvex*, Swift Parrot and Regent Honeyeater will be capped at 10% of the required offset.

Supplementary measures could include:

- the use of on-site offsets
- funding of threatened species recovery, education research or conservation
- payment into a dedicated offset fund (see section 3.5)
- funding of restoration or land management activities by others for conservation.

3.3.1 SUPPLEMENTARY MEASURES FOR ECOSYSTEM CREDITS

The use of supplementary measures for ecosystem credits are considered unlikely as the establishment of a Biodiversity Stewardship Agreement between the Central Coast Council and the Minister for OEH, will provide a large quantum of the required offset credits. In addition, existing or pending credits under the Biobanking scheme are potentially available and ongoing negotiations towards credit purchase will further reduce the need for supplementary measures.

3.3.2 SUPPLEMENTARY MEASURES FOR SPECIES CREDITS

3.3.2.1 MELALEUCA BICONVEXA

Condition 2 of the OEH SIS concurrence approval (issued 22 August 2016) limits supplementary measures to 10% of the offset requirement for this species.

If supplementary measures for *Melaleuca biconvex* are required, these will be targeted to OEH's Saving Our Species conservational program or involve payment into the Biodiversity Conservation Fund.

3.3.2.2 MAHONY'S TOADLET AND WALLUM FROGLET

TfNSW is committed to undertaking targeted surveys on existing or potential biobanking / biodiversity stewardship offset sites. These surveys are currently being undertaken during the seasonal required survey periods for these species.

If chosen, supplementary offset measures would include financial (or other) contributions to the Saving our Species sites for Mahony's Toadlet and/or Wallum Froglet, in particular to the Porters Creek Management site and/or the Wyrrabalong National Park.

TfNSW is investigating the possibility of contributions that can be used to facilitate restoration of Mahony's Toadlet and/or Wallum Froglet habitats. Contributions would be targeted at known habitats sites for these species and ongoing consultation with OEH will be undertaken.

3.3.2.3 SWIFT PARROT AND REGENT HONEYEATER

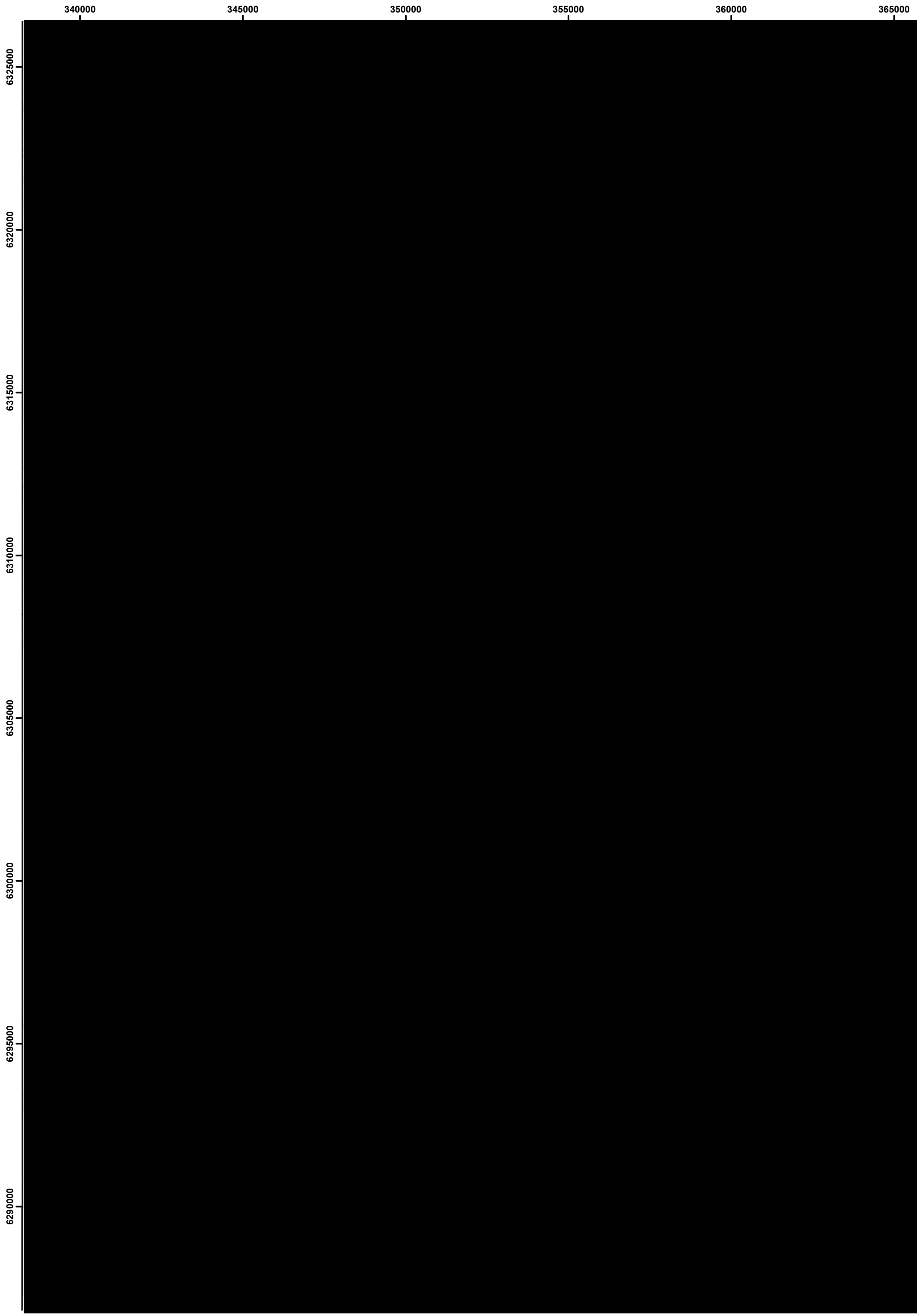
Condition 4 and 5 of the EPBC Act offset conditions (EPBC 2016/7681) limits supplementary measures to 10% of the offset requirement for these species.

If supplementary measures for these species are required, they will be consistent with the actions identified in the national recovery plans for the Swift Parrot and Regent Honeyeater (Appendix B)

3.4 PAYMENT INTO BIODIVERSITY CONSERVATION FUND

Under the new BC Act and associated Biodiversity Offsets Scheme, offset obligations can be met by paying into the Biodiversity Conservation Fund. This is an alternative to retiring credits. By doing this, the responsibility of finding an offset is transferred to the Biodiversity Conservation Trust.

As impacts to EPBC Act matters cannot be offset using the Biodiversity Conservation Fund this option will not be considered further.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4 COMPLIANCE WITH NSW OFFSETTING PRINCIPLES

The '*Principles for the use of Biodiversity Offsets in NSW'* (Department of Environment and Climate Change 2008) provides guidance and 13 offsetting principles to assist in developing biodiversity offsets that achieve conservation outcomes, particularly for projects where there will be an unavoidable loss of biodiversity. The 13 principles in relation to the biodiversity impacts of the project and the proposed BOP are addressed below.

1 Impacts must be avoided first by using prevention and mitigation measures

The project has followed the 'avoid, minimise and mitigate' theory by avoiding impacts to 10.1 hectares of native vegetation (Table 4.1) which includes more than 1000 plant stems of the threatened flora species *Melaleuca biconvexa*, 6.72 hectares of Mahony's Toadlet habitat and 0.6 hectares of Wallum Froglet habitat.

Table 4.1 Project biodiversity impact avoidance

PLANT COMMUNITY TYPE	INITIAL PROJECT IMPACT (ha)	SIS IMPACT REDUCTION (ha)	ADDITIONAL SIS IMPACT REDUCTION (ha)[1]
PCT 1723 – Melaleuca biconvexa – Swamp Mahogany – Cabbage Palm swamp forest of the Central Coast	31.8	25.5	22.6
PCT 1528 – Jackwood – Lilly Pilly – Sassafras riparian warm temperate rainforest of the Central Coast	1.5	1.1	1.2
PCT 1568 – Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast	3.9	3.6	3.3
Total area of native vegetation impact	**37.2**	**30.2**	**27.1**
Total area of native vegetation avoidance	**0**	**7**	**10.1**

2 All regulatory requirement must be met

This BOS forms part of the CoA for the project. A summary of where this BOS addresses the specific requirements of Condition B8 is provided in Table 2.1-Table 2.4.

This BOS outlines the offset measures and the strategy proposed to offset any impacts of the actions on matters of state and national environmental significance.

3 Offsets must never reward ongoing poor performance

TfNSW has a history of delivering biodiversity offsets for projects to ensure positive conservation outcomes. TfNSW is committed to providing biodiversity offsets for the residual impacts to native vegetation and has in place procedures to ensure appropriate management of land under their control.

4 Offsets will complement other government programs

This BOS has incorporated and will complement other government programs as it will provide offsets under the NSW Biodiversity Offset Scheme in accordance with the BC Act. This BOS includes provisions to utilise OEH's Saving Our Species conservational program and Biodiversity Conservation Fund to source appropriate credits.

5 Offsets must be underpinned by sound ecological principles

This BOS has been developed with direct reference to the likely impacts of the project and to improve or maintain the ecological values of the local area. Other considerations that will be addressed as part of the final offset package will include:

- the types and areas of habitat and vegetation types that will be offset
- the size and shape of the offsets
- the relationship of the offsets to other areas of vegetation
- the role the offset areas play in the wider vegetation/habitat network
- the contribution of the offset areas towards reservation targets for vegetation communities; and
- the ability of the offset areas to contribute towards maintaining and improving biodiversity values including viable populations and viable examples of terrestrial ecosystems throughout their range.

6 Offsets should aim to result in a net improvement in biodiversity over time

The long-term protection of habitats and species in off-site areas will contribute to an overall net improvement in biodiversity values over time, as long as the areas protected contain suitable habitats and the target species and/or ecological communities. The offset approach of using the NSW Biodiversity Scheme (combining long-term protection of existing habitat and restoration, rehabilitation and re-establishment of the degraded habitats) will protect, actively manage, and create habitat for the range of threatened species and ecological communities impacted by the project. This will result in a net improvement in biodiversity over time.

7 Offsets must be enduring and they must offset the impact of the development for the period that the impact occurs

This BOS incorporates offsets under the NSW Biodiversity Scheme which will place legal restrictions on the future use and management of the land that would exist within the title for the land in perpetuity.

8 Offsets should be agreed prior to the impact occurring

This BOS describes the biodiversity offsets required to compensate for the identified residual impacts of the project in the medium to long term to improve ecological outcomes.

A BOP (including the purchase of any land based offsets, the retirement of appropriate biodiversity credits and/or implementation of supplementary measures) is required under the projects conditions of approval to be submitted within 12 months of the commencement of construction and within 24 months for the Mahony's Toadlet.

9 Offsets must be quantifiable (the impacts and benefits must be reliably estimated)

The biodiversity offsets required to compensate for the project's residual impacts were quantified in accordance with BioBanking Assessment Methodology (BBAM) (Office of Environment & Heritage 2014) using the Biobanking Credit Calculator (Version 4.1). Due to legislative reform, many of the credits generated by the proposed off-site offsets will be quantified using the Biodiversity Assessment Methodology (BAM) (Office of Environment & Heritage 2017). It is acknowledged that the use of the two different methodologies for determining biodiversity credits will make it difficult to reliably determine whether offset requirements are to be met.

To overcome this issue, the credits generated by the proposed offset sites maybe subject to a credit ratio conversion with OEH approval. In the interim, for this BOS, a [redacted] is considered appropriate and has been used to determine whether this BOS will adequately compensate for residual impacts associated with the project and as required in accordance with the conditions of approval.

10 Offsets must be targeted

The offset areas nominated in this BOS have been targeted as they contain the specific species, habitat and vegetation requirements as that being impacted by the project. The proposed off-site offset sites generally contain vegetation types of similar or greater conservation value, located in the same IBRA subregion and contain similar habitat values for threatened species and threatened ecological communities listed on the BC Act.

11 Offsets must be located appropriately

Biodiversity offset habitat areas will be located within the region of the project i.e. for the project offsets will be located within the Wyong sub-region of the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion where possible.

For this project, the majority of the offsetting options available are located within the Central Coast and Lake Macquarie regions as outlined in the EPBC Act conditions of approval. In addition, all sites, contain similar habitat values for threatened species and threatened ecological communities listed on the BC Act and EPBC Act, and contribute to locally important conservation priority areas.

Under the former BBAM and FBA, the project was located within the Hunter Central Rivers Major Catchment Area and trading was permissible with adjoining IBRA sub-regions such as the Karuah Manning. These trading options have been included within the BOS due to the vegetation type and threatened species impacts being of similar like for like occurrences.

12 Offsets must be supplementary

The areas currently proposed for offsetting have not been proposed as offsets for any other project. The enhancement of these areas of land will be supplementary to the current management arrangements. The nominated Central Coast Council sites do not form part of existing flora reserves or public open space.

13 Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract

To ensure the conservation of land in-perpetuity, the offset package will provide for the purchase of ecosystem credits in accordance with the NSW Biodiversity Scheme and will require the dedication of the identified offsets under a secure conservation arrangement.

5 COMPLIANCE WITH EPBC ACT ENVIRONMENTAL OFFSETS POLICY

The EPBC Act Environmental Offset Policy sets out several overarching requirements to ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act (SEWPC 2012). Each of these specific requirements is addressed below with respect to the project offset requirements for the Swift Parrot and Regent Honeyeater. Suitable candidate sites have been selected for the delivery of the required offsets within several Central Coast Council areas (Appendix A).

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

This BOS has identified several public and private landholdings that contain like for like potential foraging habitat for the Swift Parrot and Regent Honeyeater. These candidate sites are either established Biobanking sites with credits available for sale; are in the process of being approved as a Biobanking sites or are currently being developed as a Biodiversity Stewardship site (refer section 3).

These direct offset sites will deliver long-term protection and management of potential foraging habitat for the Swift Parrot and Regent Honeyeater and will lead to an improved long-term conservation outcome for these species.

2 Suitable offsets must be built around direct offsets but may include other compensatory measures

TfNSW is committed under this BOS to deliver at least 90% of the required offsets for the Swift Parrot and Regent Honeyeater as direct offsets through the purchase and retirement of established Biobanking sites or Biodiversity Stewardship ecosystem credits being established. In the event of a short fall in available credits as part of the final BOP, other compensatory measures for ecosystem credits (that provide potential foraging habitat for the Swift parrot and Regent Honeyeater) will be limited to 10% of the required offset.

Other compensatory measures could include:

- funding of threatened species recovery, education research and/or conservation
- funding of restoration or land management activities by others for conservation.

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

The direct offset sites will have a like for like potential foraging habitat for the Swift Parrot and Regent Honeyeater that are proportional to the level of statutory protection that applies to the protected matters.

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

EPBC approval offset requirements for Swift Parrot and Regent Honeyeater is based on impacts to 19.6 ha of Swamp Sclerophyll Forest and 3.6 ha habitat offset of Wet Sclerophyll Forest (refer section 2.1.3). This offset requirement equates to approximately 1,228 Swamp Sclerophyll Forest ecosystem credits and 171Wet Sclerophyll Forest ecosystem credits.

Given the ecosystem credits will be sourced from direct offset sites that contain potential foraging habitat for these species, it is deemed that the proposed offset is in size and scale to the residual impact.

5 Suitable offsets must effectively account for and manage the risks of the offset not succeeding

The EPBC offsets will be delivered as direct offsets and given these will be delivered under the NSW Biobanking Scheme which provides in-perpetuity funding for management actions that are tied to a strong regulatory framework of monitoring and auditing. Therefore, the offsets proposed are deemed to be low risk of not succeeding.

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

The direct offset sites to be established under a Biodiversity Stewardship Agreement. The candidate sites are not subject to any existing environmental offset or conservation agreement under any local, State or Commonwealth law or planning regulation and therefore are suitable for establishment as Biodiversity Stewardship sites.

Local Government community and/or operational lands can be established although credit yields [redacted] in accordance with Section 13.11 and Table 10 of BAM 2017.

7 Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable

Through the delivery of direct offsets using the former NSW Biobanking Scheme and the NSW Biodiversity Stewardship Scheme it is considered that this approach is effective, timely, transparent, scientifically robust and reasonable.

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

All direct offset sites that are established under the NSW Biobanking Scheme will be subject to annual monitoring and independent auditing by NSW OEH. The framework for the scheme was established under Part 7A of the former TSC Act and is supported by the former *Threatened Species Conservation (Biodiversity Banking) Regulation 2008*, BioBanking Assessment Methodology (BBAM 2014) and Compliance Assurance Strategy.

The Compliance Assurance Strategy underpins Biobanking and Biodiversity Stewardship Agreements and outlines how NSW OEH will guarantee that it is implemented lawfully, equitably and transparently and ensures that biodiversity values at the site are conserved and improved.

This process of annual monitoring and independent auditing of Biobanking and Biodiversity Stewardship sites is enforceable under the BC Act.

6 STRATEGY SUMMARY

The process for identifying, prioritising and meeting project biodiversity offset requirements under this strategy and conditions for the New Intercity Fleet Maintenance Facility Project consists of three methods:

- the purchase and retirement of available suitable Biobanking biodiversity credits
- progressing Biobanking/Biodiversity Stewardship agreements on candidate properties; and/or
- the use of the variation criteria or supplementary measures if suitable credits cannot be identified.

The New Intercity Fleet Maintenance Facility Project biodiversity offset strategy includes off-site offsets which will contribute to the long-term conservation of threatened species and communities.

The residual impact offset obligations will be fulfilled by off-site offsets which will be sourced through a combination of the following methods:

- Purchasing and retiring 263 Swamp Sclerophyll Forest on Coastal Floodplains ecosystem credits and 31 Wallum Froglet species credits available from two private landholder sites which have pending BioBanking Agreements currently lodged with OEH for approval.
- Progressing Biodiversity Stewardship Agreements on up to 14 [redacted]. Surveys of these sites have confirmed the presence of 121.9 ha of Swamp Sclerophyll Forest on Coastal Floodplains which equates to 1,134 ecosystem credits (based on an [redacted]). However, allowing for credit discounting due to [redacted], the estimated credit yield for Swamp Sclerophyll Forest on Coastal Floodplains is expected to be approximately 907 ecosystem credits. In addition, preliminary surveys of these sites also confirmed the presence of greater than 12,000 *Melaleuca biconvexa* stems which would equate to more than 85,000 species credits or greater than 68,000 credits after the [redacted]
- An additional two [redacted] are to be investigated for inclusion into the Biodiversity Stewardship Agreement. Broadscale mapping indicates that these sites may contain up to 31.09 ha of Swamp Sclerophyll Forest on Coastal Floodplains which would equate to approximately 289 ecosystem credits or 231 ecosystem credits after the [redacted]
- Over the next 24 months targeted Mahony's Toadlet surveys will be undertaken on BioBanking and Biodiversity Stewardship Sites identified for inclusion in the Biodiversity Offset Package to try and locate direct Mahony's Toadlet species credits. If Mahony's Toadlet species credits cannot be located and if no credits are available on the BioBanking register then funding will be provided as part of the OEH Saving Our Species program or other applicable research grants to aid in the conservation of the species.

EPBC REQUIREMENTS

EPBC Act offset conditions provided in Table 2.4 require 90% of Swift Parrot and Regent Honeyeater offset requirements through direct offsets being delivered within the Central Coast region or Lake Macquarie region. Additionally, up to 10% of the offset requirements may be meet with supplementary measures however these must be consistent with the actions identified in the national recovery plans for the Swift Parrot and Regent Honeyeater.

The above methods will support the delivery of the BOP to ensure an in-perpetuity conservation outcome within the local area is achieved that will directly benefit the impacted biodiversity values of the project. Additionally, the project BOP will be delivered in accordance with the State and Commonwealth offset principles referred to in this BOS, and delivered using an appropriate combination of the above listed offset methods.

CONCLUSION

A summary of preliminary direct offsets which will be pursued as part of this BOS is provided in Table 6.1 below and shows both the establishment of Biodiversity Stewardship Agreements and purchasing of existing Biobanking biodiversity credits.

This strategy will allow TfNSW to meet their offsetting obligations under the Part 5 CoA, concurrence conditions and EPBC approval (EPBC 2016/7681).

Table 6.1 Summary of suitable biodiversity credits available

OFFSET ID	OFFSET TYPE	CENTRAL COAST AND LAKE MACQUARIE REGIONS (EPBC APPROVAL)	IBRA SUBREGION	SWAMP SCLEROPHYLL FOREST	NORTH COAST WET SCLEROPHYLL FORESTS	NORTHERN WARM TEMPERATE RAINFORESTS	MELALEUCA BICONVEXA	MAHONY'S TOADLET	WALLUM FROGLET
[redacted]	Biodiversity Stewardship Agreement	Yes	Wyong	1,138	128	45	>68,000	TBC	TBC
[redacted]	Biobanking credits	Yes	Wyong	152	–	–	–	TBC	80
[redacted]	Biobanking credits	Yes	Wyong	111	–	–	–	TBC	–
214	Biobanking credits	No	Karuah Manning	68	–	–	–	–	–
38	Biobanking credits	No	Yengo	159	–	–	–	–	–
96	Biobanking credits	No	Karuah Manning	–	259	–	–	–	–
214	Biobanking credits	No	Karuah Manning	–	71	–	–	–	–
214	Biobanking credits	No	Karuah Manning	–	42	–	–	–	–
223	Biobanking credits	No	Karuah Manning	–	16	–	–	–	–
Offset required				**1,416**	**171**	**52**	**52,000**	**1,496**	**31**
Offset available				**1,628**	**516**	**45**	**>68,000**	**TBC**	**80**
Offset surplus+/- deficit				**+212**	**+345**	**-7**	**Potential surplus (TBC)**	**TBC**	**+46**

7 LIMITATIONS

7.1 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

7.2 ENVIRONMENTAL CONCLUSIONS

In accordance with the scope of services, WSP has relied upon the data and has conducted environmental field surveys in the preparation of the report. The nature and extent of survey conducted is described in the report.

Varying degrees of non-uniformity are encountered across all natural areas. Hence no sampling technique can eliminate the possibility that results are not totally representative of conditions encountered. The conclusions are based upon the data and the ecological surveys and are therefore merely indicative of the environmental condition of the study area at the time of preparing the report.

Also, it should be recognised that conditions, including the presence of threatened biodiversity, can change with time. No sampling technique can eliminate the possibility that a species is present within the proposal area. For example, some flora may be present in the soil seed bank and some fauna species use habitats on a sporadic or seasonal basis and may not be present within the study areas during surveys.

Within the limitations imposed by the scope of services, the surveys and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

7.3 REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the client (and no other party). WSP assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of WSP or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Except as provided below parties other than the client should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

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APPENDIX A

[redacted]

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[redacted]

[redacted]

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[redacted]

[redacted]

[redacted]

APPENDIX B

ON GROUND RECOVERY ACTIONS FOR SWIFT PARROT AND REGENT HONEYEATER

B1 SWIFT PARROT

National Recovery Plan
for the
Swift Parrot *Lathamus discolor*

Birds Australia
CONSERVATION THROUGH KNOWLEDGE

Tasmania
Explore the possibilities

State Government Victoria
Department of Sustainability and Environment

Queensland Government

NSW GOVERNMENT
Office of Environment & Heritage

Australian Government

Government of South Australia

ACT PARKS CONSERVATION AND LANDS

National Recovery Plan for the Swift Parrot *Lathamus discolor*

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Disclaimer

The Australian Government, in partnership with Birds Australia, the New South Wales Office of Environment and Heritage, the Victorian Department of Sustainability and Environment, the Queensland Department of Environment and Resource Management, the Tasmanian Department of Primary Industries, Parks, Water and the Environment, the South Australian Department for Environment and Natural Resources and the Australian Capital Territory Department of Parks, Conservation and Lands facilitates the publication of recovery plans to detail the actions needed for the conservation of threatened native wildlife. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved, and may also be constrained by the need to address other conservation priorities. Approved recovery actions may be subject to modification due to changes in knowledge and changes in conservation status.

Publication reference

Saunders, D.L. and Tzaros, C.L. 2011. *National Recovery Plan for the Swift Parrot Lathamus discolor*, Birds Australia, Melbourne.

ISBN: 978-0-646-57238-3

Cover Photo: Swift Parrot © Chris Tzaros

Recovery objectives

The achievements of the recovery program from 1995-2009 have resulted in positive conservation outcomes for the Swift Parrot and its habitat, and have identified new directions for the ongoing conservation of this species (Saunders 2005). However, as the recovery program reveals more about the Swift Parrot ecology, knowledge gaps also become evident. The following recovery strategy aims to address knowledge gaps and ongoing conservation issues to ensure the Swift Parrot population is self-sustainable in the long term.

Overall objectives

To prevent further decline of the Swift Parrot population.

To achieve a demonstrable sustained improvement in the quality and quantity of Swift Parrot habitat to increase carrying capacity.

Recovery actions and performance criteria

The following actions are designed to achieve the overall objectives of this plan, as detailed in Table 7 and Table 8.

Recovery actions

Action 1 - Identify the extent and quality of habitat.

Action 2 - Manage and protect Swift Parrot habitat at the landscape scale.

Action 3 - Monitor and manage the impact of collisions, competition and disease.

Action 4 - Monitor population and habitat.

Supporting actions

Action 5 - Increase community involvement in, and awareness of, the recovery program.

Action 6 - Coordinate, review and report on recovery process.

Table7: Swift Parrot Recovery Actions, Performance Criteria and Potential Contributors

	Description	Priority	Performance Criteria	Potential Contributors
Action 1	*Identify the extent and quality of habitat.*			
1.1	**Identify and map foraging and nesting habitat throughout the breeding range and prioritise sites.**	1	Annual monitoring program undertaken to determine breeding distribution under different climatic conditions. Mapping and update report on distribution of nesting habitats and prioritisation completed annually. Report disseminated to relevant natural resources management and land-use planning and approvals bodies in Tasmania. Assessment of habitat loss since 1996 and pre-1760 determined for potential nesting and foraging habitat.	DPIPWE
1.2	**Identify and map foraging and roosting habitat**			
1.2a	Identify and map foraging habitat throughout the range of the species: • Victoria – refine and update existing foraging habitat mapping (when information becomes available) and map priority sites • New South Wales – refine and update habitat mapping as more vegetation mapping becomes available, including priority sites • Queensland/ACT/SA – identify and map the extent of foraging habitat	2 2 1	GIS mapping on foraging habitats and priority sites throughout the range of the species provided to DSEWPaC and each relevant local government and CMA by Year 3. Review, and if necessary update, mapping by Year 5.	DSE, OEH, DERM, PCL, SADENR.
1.2b	Identify and map roosting habitat throughout the range of the species with an emphasis on communal and repeatedly used roosting sites.	3	GIS mapping on communal and repeatedly used roosting sites throughout the range of the species provided to DSEWPaC and each relevant local government and CMA by Year 5.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

	Description	Priority	Performance Criteria	Potential Contributors
1.2c	Establish habitat phenology data collection in existing research and monitoring studies, analyse findings and incorporate into recovery program.	2	Consult with phenology experts on the most effective and economic way to collect useful habitat phenology data relevant to Swift Parrot habitat use by Year 3. Incorporate the collection of habitat phenology data in all relevant recovery program research and monitoring studies by Year 3. Analyse and incorporate findings into recovery program	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
1.3	Identify and map movement patterns throughout the range of the species.	2	GIS mapping on movement patterns throughout the range of the species, provided to DSEWPaC and each relevant local government and CMA by Year 5.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
Action 2	*Manage and protect Swift Parrot habitat at the landscape scale.*			
2.1	**Manage and protect nesting and foraging habitat.**			
2.1a	Encourage and support the protection, conservation management and restoration of Swift Parrot nesting and foraging habitat through agreements with landowners, incentive programs and community projects. Relevant on-ground actions include (but are not limited to): • Retaining and expanding mature and mixed age habitat and protecting and managing it by fencing and providing a buffer zone from disturbances. • Enabling natural regeneration by fencing off and managing remnant vegetation and buffer zones to control grazing and other impacts caused by uncontrolled access (such as in urban areas). Re-vegetating areas and connecting remnant habitats by planting feed and nest tree species, fencing them off and managing them, where natural regeneration is not possible. Ongoing management of all the above fenced off areas would also be required, including pest, weed and fire management.	1	At least 5 incentive projects established each year for the protection, restoration or conservation management of Swift Parrot habitat. At least 5 conservation/management agreements initiated on private properties with Swift Parrot habitat by Year 5. At least 5 community project applications submitted for funding each year for the protection, restoration or conservation management of Swift Parrot habitat. Reports on the protection, restoration and management of Swift Parrot habitat provided at recovery team meetings.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

	Description	Priority	Performance Criteria	Potential Contributors
2.1b	Provide recommendations for the revision and update of forestry prescriptions to reflect the most recent habitat information available in Victoria and New South Wales.	2	Provide recommendations for revision of prescriptions for Swift Parrots when forestry licence agreements are due for renewal in each state.	DSE, OEH
2.1c	Develop a strategic management plan for Swift Parrot breeding habitat in Tasmania. Strategic management plan for Swift Parrot to include landscape and operational level planning guidelines and prescriptions for protection of important breeding habitat. Review and update management prescriptions for Swift Parrots for use in the Forest Practices System and Local Government landuse planning and approvals processes in Tasmania.	1	Threatened Fauna Advisory reviewed and updated to reflect new information and recognised threats. Strategic management plan for Swift Parrot prepared and endorsed by stakeholders. A set of management prescriptions for landscape level planning and operation or development level application prepared and endorsed for use by stakeholders. Spatial data on the known and predicted occurrence of foraging and nesting resources, and important breeding areas prepared and disseminated to relevant stakeholders including Forest Practices Authority, Natural Resource Management regions and Local Governments.	DPIPWE
2.1d	Provide Swift Parrot conservation information for consideration during the New South Wales. Local Government Local Environmental Planning (LEP) review process.	2	Swift Parrot conservation information provided to at least three key Local Government Areas for consideration during the LEP review process.	OEH
2.2	**Monitor and manage for climate change**			
2.2a	Establish a climate change monitoring program to provide a basis for future adaptive conservation management.	3	Swift Parrot monitoring sites identified and established in association with climate monitoring stations throughout the range of the species to provide a basis for adaptive climate change conservation management plans.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
2.2b	Investigate the potential impact of climate change on the Swift Parrot and its habitat.	1	Spatial and temporal climate change models produced for the Swift Parrot based on species records, habitat mapping and bio-climatic models throughout the range of the species. Review the potential influence of climate change on the species and identify future management strategies to address this issue.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

	Description	Priority	Performance Criteria	Potential Contributors
Action 3	*Monitor and manage the incidence of collisions, competition and diseases.*			
3.1	**Monitor and manage the incidence of collisions**			
3.1a	Establish and maintain a database for all reported injuries and deaths.	2	Collision database established. Ongoing maintenance of collision database as a component of the Swift Parrot Recovery Program database. Report on number and type of collisions throughout the range of the species at recovery team meetings annually.	DPIPWE, DSE, OEH
3.1b	Continue to raise public awareness of the risks of collisions and how these can be minimised. Awareness campaigns to target known high risk areas such as the greater Hobart, Melbourne and Western Sydney areas, and the central coast region of New South Wales (Wyong, Gosford, Lake Macquarie and Penrith Local Government areas).	2	Produce and distribute a further 5000 copies of the collision prevention brochure. Produce at least two media releases per year on collision prevention for public awareness in high risk areas.	DPIPWE, DSE, OEH
3.1c	Develop and distribute guidelines on collision risk management to relevant planning authorities.	2	Guidelines on collision risk management distributed to relevant state/territory governments, as well as local governments, NRMs and CMAs in high risk areas by Year 3.	DPIPWE, DSE, OEH
3.2	**Monitor the incidence of competition from large aggressive honeyeaters as well as introduced birds and bees for nesting and foraging resources.**	2	Establishment of monitoring program to determine the extent of competition from larger aggressive honeyeaters as well as introduced birds and bees for nesting and foraging resources, to inform management.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
3.3	**Develop and implement a Psittacine Beak and Feather Disease management protocol.**	3	PBFD monitoring protocol developed based on the DSEWPaC PBFD Threat Abatement Plan and distributed to all fauna rescue and State conservation organisations by Year 4. Protocol to include rescue and quarantine housing requirements for rehabilitated birds. All rehabilitated birds tested for PBFD prior to release. Details of the number of rehabilitated birds and their disease tests reported annually at recovery team meetings. Test all deceased specimens of Swift Parrots for PBFD.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

	Description	Priority	Performance Criteria	Potential Contributors
Action 4	*Monitor population and habitat*			
4.1	**Develop and implement an effective population monitoring program during the breeding season.**			
4.1a	Develop an effective population monitoring program during the breeding season.	1	Effective population monitoring program developed and implemented.	DPIPWE
4.1b	Undertake monitoring of breeding distribution on an annual basis to develop a better understanding of the extent and number of important breeding areas in Tasmania and the relative importance of non-aggregated breeding behaviour to conservation of the Swift Parrot.	1	Breeding distribution maps produced following each breeding season. New and reviewed information published annually and included in the strategic management plan for the Swift Parrot	DPIPWE
4.2	**Collect and analyse information on population dynamics and viability**			
4.2a	Undertake research on breeding success, survival and mortality, as well as genetic structure to provide insight into currently unknown population regulation parameters.	1	Establishment of an ongoing research and monitoring program investigating nesting distribution and success by Year 3. Proportions of flocks containing juveniles throughout the winter range reported annually at recovery team meetings and on the web page.	DPIPWE, DSE, OEH, DERM, PCL, SADENR
4.2b	Conduct population viability analysis (PVA) using data obtained from above research to provide a greater understanding of the dynamics and long-term viability of the population.	2	PVA conducted by Year 5, following the acquisition of essential population data.	DPIPWE, OEH, DSE, ANU
4.3	**Establish and maintain coordination of volunteer surveys**			
4.3a	Establish coordination of volunteer surveys throughout breeding habitats to complement existing mainland monitoring program.	1	Volunteer coordinator position established by Year 3 and maintained on an ongoing basis. Annual volunteer surveys conducted, survey results compiled and provided on web page, in newsletters and at recovery team meetings.	DPIPWE

	Description	Priority	Performance Criteria	Potential Contributors
4.3b	Maintain coordination of the existing long-term volunteer monitoring throughout mainland habitats.	1	Existing volunteer coordinator position maintained on an ongoing basis. Bi-annual volunteer surveys conducted across eastern Australia, survey results compiled and provided on web page, in newsletters and at recovery team meetings.	DSE, OEH, DERM, PCL, SADENR.

Objectives and actions are listed according to subject matter, not according to order of significance

Table 8: Supporting Actions for recovery plan objectives.

	Description	Priority	Performance Criteria	Potential Contributors
Supporting Actions				
Action 5	*Increase community involvement in, and awareness of, the recovery program.*			
5.1	Provide advice, education and support to volunteers, community members, landowners, local governments and regional NRM organisations (includes presentations and workshops).	2	Summary of community and landowner information and education program implementation across the range of the species provided at recovery team meetings. At least one full day community education and awareness workshop held each year. At least 5 presentations to interest groups each year. Information distributed to all relevant regional NRM organisations at least twice a year to keep them informed of the recovery program. Swift Parrot information produced and distributed to community groups, management agencies, schools and other education institutions on request.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
5.2	Assess the level of indigenous interest in the recovery program by consulting relevant indigenous people and organisations that occur within the species' range.	2	Indigenous representatives from throughout the species range consulted to gauge their level and type of interest in the recovery program. Consultation to commence in Year 4. Given the large number of potential indigenous groups and people to consult, this process would be incremental throughout the recovery program. Updates on consultation and interest to be provided at each recovery team meeting. Indigenous parties identified as having interest in the program are included in the recovery program mailing list. Interested indigenous parties consulted to determine what involvement they would like to have, and if there is any relevant traditional knowledge available on the species or its habitats, should it be appropriate to document this knowledge for recovery program purposes.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

	Description	Priority	Performance Criteria	Potential Contributors
5.3	Produce and distribute the annual recovery program newsletter *Swifts Across the Strait.*	2	Newsletters produced and distributed to recovery program volunteers, community groups and NRM organisations each year.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
5.4	Develop a Swift Parrot Recovery Program web page providing access to recovery plans, audio and visual identification information, survey forms, links with other conservation programs and on-line volunteer survey data entry.	3	Web page designed and established on the internet by Year 3. Web page reviewed, and if necessary, updated annually.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.
Action 6	*Coordinate, review and report on recovery process.*			
6.1	Maintain a recovery team that effectively organises, implements, reviews and reports on the recovery outcomes.	1	Volunteer program coordinators (Tasmania, Victoria, New South Wales), and breeding researchers (Tasmania) employed each year to implement recovery actions. Recovery team meetings held and minutes produced bi-annually, with the location allocated on a rotational basis between the range States. Recovery outcomes and resultant changes to recovery program reported bi-annually.	DSEWPaC, DPIPWE, DSE, OEH, DERM, PCL, SADENR.
6.2	Develop and manage a central database for all data collected as part of the recovery program.	1	Swift Parrot recovery database (SPRD) developed and made accessible for on-line data entry on recovery program web page by Year 3. SPRD maintained and updated annually. All Swift Parrot records from SPRD provided to relevant Commonwealth, state and territory government departments and Birds Australia on an annual basis for inclusion in their respective atlas databases.	DPIPWE, DSE, OEH, DERM, PCL, SADENR.

Objectives and actions are listed according to subject matter, not according to order of significance.

B2 REGENT HONEYEATER

Australian Government
Department of the Environment

National Recovery Plan for the Regent Honeyeater *(Anthochaera phrygia)*

April 2016

The Species Profile and Threats Database pages linked to this recovery plan is obtainable from: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Disclaimer

Image credits

Front Cover: Regent honeyeaters in the Capertee Valley, NSW. (© Copyright, Dean Ingwersen).

6 Objectives and strategies

The objectives of this recovery plan are to:

- Reverse the long-term population trend of decline and increase the numbers of regent honeyeaters to a level where there is a viable, wild breeding population, even in poor breeding years; and to
- Enhance the condition of habitat across the regent honeyeater range to maximise survival and reproductive success, and provide refugia during periods of extreme environmental fluctuation.

The strategies to achieve the plans' objectives are:

- Improve the extent and quality of regent honeyeater habitat.
- Bolster the wild population with captive-bred birds until the wild population becomes self-sustaining.
- Increase understanding of the size, structure, trajectory and viability of the wild population.
- Maintain and increase community awareness, understanding and involvement in the recovery program.

7 Actions to achieve specific objectives

Actions identified for the recovery of the regent honeyeater are described below.
It should be noted that some of the objectives are long-term and may not be achieved prior to the scheduled five-year review of the recovery plan. Priorities assigned to actions should be interpreted as follows:

Priority 1:	Taking prompt action is necessary in order to mitigate the key threats to the regent honeyeater and also provide valuable information to help quantify long-term population trends.
Priority 2:	Action would provide a more informed basis for the long-term management and recovery of the regent honeyeater.
Priority 3:	Action is desirable for, but not critical to, the recovery of the regent honeyeater or assessment of trends in recovery.

Strategy 1: Improve the extent and quality of regent honeyeater habitat

Research actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)
1a	Construct a spatial prioritisation model to determine suitable sites for habitat protection or restoration.	1	• Sites identified for protection and targeted restoration works in suitable landscapes.	**Universities** Research agencies	$50,000
1b	Limit the impact of competition with commercial honeybee operations at key sites.	2	• The impacts of competition with commercial honeybees on regent honeyeaters has been evaluated and understood.	**BirdLife Australia Recovery Team** **State agencies** **Universities**	

On-ground actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)
1c	Protect intact (high quality) areas of regent honeyeater breeding and foraging habitat (as described in '3.4.6 Habitat critical to survival').	1	• The extent of quality habitat protected has increased (e.g., through land covenants and state/national parks). • Developments avoided in any known regent honeyeater breeding areas (breeding areas shown in Figure 1) • Clearing of mature foraging trees in areas of habitat critical to the survival of the species (as described in 3.4.6) has been limited. • Any developments in areas of mapped breeding habitat (figure 1), or areas critical to survival (section 3.4.6) have incorporated suitable threat mitigation	**BirdLife Australia Recovery Team** **State agencies** **Australian Gov.**	$575,000

			measures. • If avoidance or mitigation were not possible, any developments that proceeded provided offsets that protected and/or rehabilitated habitat of equivalent or better quality.		
1d	Rehabilitate degraded areas that were previously commonly used by the regent honeyeater.	1	• Appropriate restoration plantings have been undertaken in degraded habitat that was formerly used by the regent honeyeater. • The characteristics of rehabilitated sites that are known to be used by regent honeyeaters (e.g., Lurg and Capertee) are investigated and the knowledge is applied to new and ongoing restoration planting activities.	**BirdLife Australia** **Recovery Team** **State agencies** **Australian Gov.**	$200,000
1e	Habitat patches or corridors are enhanced in order to facilitate landscape scale movements.	1	• Key habitat patches and corridors are identified and expanded and/or rehabilitated.	**BirdLife Australia** **Australian Gov.** **Recovery Team** **State agencies** Research agencies	$500,000
1f	Protect, maintain and improve Travelling Stock Routes (TSRs) in areas where regent honeyeaters are known or likely to occur.	1	• TSRs in areas that are used by regent honeyeaters identified. • Conservation efforts – including establishing appropriate grazing regimes that promote natural regeneration, replanting, weed control and control of noisy miners – undertaken in identified TSRs. • The value of TSRs for the regent honeyeater is captured in any future review of their ownership and management arrangements.	**State agencies** **Local Land Services**	Core government business
1g	Noisy miner control actions undertaken.	1	• Indentify key areas important to regent honeyeaters for noisy	**BirdLife Australia** **Recovery Team** **State agencies**	$190,000

			miner control and implement control programs. • Assess the impacts and benefits of any noisy miner control program.	**Research agencies**
1h	Limit the impact of competition with commercial honeybee operations at key sites.	2	• Competition with commercial honeybees is limited to a level that does not threaten the survival of regent honeyeater populations.	**BirdLife Australia Recovery Team** **State agencies** **Universities**
1i	Ecological thinning of dense regrowth forests.	2	• Thin select areas of habitat to encourage development of understorey and crown density.	**BirdLife Australia Recovery Team** **State agencies** Australian Gov.

Strategy 2: Bolster the wild population with captive-bred birds until the wild population becomes self-sustaining.

Research actions

	Action	Priority	Performance Criteria	Responsible **Agencies** and potential partners	Indicative Cost (priority 1)
2a	Develop a Population Response Model for the regent honeyeater.	1	• A population response model is designed to achieve the following objectives: - a realistic recovery timeframe and trajectory, informed by knowledge of species biology and threats, is identified, - the outcomes of observed population fluctuations can be predicted, and - the effectiveness of recovery actions can be assessed.	**Research agencies**	$70,000

On-ground actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)

2b	Maintain a captive population of regent honeyeaters in order to:
	
	• provide a level of insurance against further declines in the wild population.
	
	• supplement the wild population in line with the captive management release strategy.
		1	• Captive management plan implemented.
			
			Key plan objectives to include:
			- A captive population with at least 90% wild heterozygosity retained. *Note: This may require collection from the wild to augment the captive population*.
			- On the advice from the Species Co-coordinator of the captive program, the Recovery Team will endorse application to collect from the wild.
			- Captive release strategy that incorporates:
			  - level of genetic diversity of individuals and groups.
			  - selection of individuals predicted to have best opportunity to survive and reproduce in wild.
			  - a target of at least five releases between 2015 and 2025 of an optimum number of birds determined by the Recovery Team, that is reviewed annually.
			  - Releases to occur at sites where population supplementation might be most necessary or effective.
			  - Released birds should be
				BirdLife Australia Recovery Team
				State agencies
				Taronga Zoo
					$500,000

			monitored, especially with regard to any subsequent movements away from the release area and survival over future years. - Disease risk management protocols for the movement and release of birds, which are annually reviewed.		

Strategy 3: Increase understanding of the size, structure and population trends of the wild population of regent honeyeaters

Research actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)
3a	Design a range-wide systematic monitoring program.	1	• Range-wide annual monitoring survey sites selected using contemporary habitat suitability modelling. • Habitat suitability models provided to Recovery Team and made available through publication.	**Universities** **BirdLife Australia** **State agencies** Local Land Services	$100,000
3b	Trend analysis performed on long-term monitoring data.	1	• Trend profiles generated and population indices calculated for the regent honeyeater. • Findings reported to Recovery Team and made available through publication.	**Universities**	$50,000
3c	Determine contemporary causes of breeding success/failure at key sites.	1	• Formal analysis performed on nest monitoring data. • Findings reported to Recovery Team and made available through publication.	**Universities** **BirdLife Australia**	$250,000

3d	Update genetic information on the regent honeyeater population.	1	• Historic genetic data made available and used in analysis to inform future population viability analyses.	**Universities** **BirdLife Australia** State agencies	$75,000
3e	Investigate alternative methods (e.g., genetic) to assess wild population size.	2	• Opportunities to use genetic techniques to analyse regent honeyeater population size and trends have been investigated.	**BirdLife Australia** **Recovery Team** **Research agencies** State agencies Australian Gov.	

On-ground actions

	Action	Priority	Performance Criteria	Responsible **Agencies** and potential partners	Indicative Cost (priority 1)
3f	Implement range-wide monitoring program.	1	• Surveys undertaken at monitoring sites annually for the life of the recovery plan. • Distribution maps updated to any include new information.	**BirdLife Australia** **State agencies** **Universities** Local Land Services	$240,000
3g	Continuation of long term regent honeyeater monitoring program at key sites, including the Capertee Valley; Bundarra-Barraba; Hunter Valley & Chiltern.	1	• Continuation of bi-annual national volunteer surveys. • Regular effective monitoring of abundance, using a standardised method, is conducted at key sites. • Population trends are assessed for each site and reported annually to the Recovery Team and made publicly available through relevant websites.	**BirdLife Australia** **Recovery Team** State agencies	$150,000
3h	Undertake intensive nest monitoring to evaluate breeding success at key sites.	1	• Study of breeding individuals will be undertaken at sites where regent honeyeaters predominate. • All new individuals captured as part of research are colour-banded.	**Universities** **BirdLife Australia** State agencies	$50,000
3i	Undertake regular monitoring at other known or suspected	2	• Other known and likely areas, including	**BirdLife Australia** **Recovery Team** State agencies	

	regent honeyeater sites.		patches, are surveyed. • Reported sightings in new locations verified. • Any additional areas found to regularly have regent honeyeaters re-surveyed at least annually to better understand ongoing use. • Distribution maps updated to include any new information.		
3j	Investigate movement patterns of wild regent honeyeaters.	2	• Radio or satellite tracking of surrogate species (e.g. noisy friarbird) trialled to better understand movement patterns of regent honeyeaters.	**Universities** **BirdLife Australia** **Recovery Team** **Research agencies** State agencies	
3k	Explore relationship between nectar availability / variability and regent honeyeater movement and breeding effort.	3	• Nectar samples collected throughout the range over multiple years, aligning with monitoring surveys and concentrating in key breeding areas.	**Universities**	

Strategy 4: Maintain and increase community awareness, understanding and involvement in the recovery program

Research actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)
4a	Develop and implement a broad strategy to raise awareness and educate the general public about regent honeyeater conservation.	2	• Articles about regent honeyeater conservation are published in newsletters, local bulletins, and on the web. • Informative displays are developed to educate the community. • Newsletter detailing recovery plan implementation produced and disseminated on at least an annual basis.	**BirdLife Australian** **Recovery Team** **State agencies**	

- On-ground actions

	Action	Priority	Performance Criteria	Responsible Agencies and potential partners	Indicative Cost (priority 1)
4b	Maintain and support regent honeyeater operations groups.	1	• Regent honeyeater operations groups maintained in key areas. • Operations groups undertake regular regent honeyeater monitoring.	**BirdLife Australia Recovery Team** State agencies	$125,000
4c	Continue to inform, support and encourage landholders and other community members to be involved in the conservation of the regent honeyeater.	2	• All landholders with regent honeyeater habitat are aware of the species and its management requirements and have been encouraged to manage their native woodland for biodiversity outcomes.	**BirdLife Australian Recovery Team** **State agencies** **ZAA**	
4d	Conduct community training and monitoring workshops.	3	• Community training workshops undertaken detailing ways to restore regent honeyeater habitat and identify regent honeyeaters in the field.	**BirdLife Australian Recovery Team**	
4e	Maintain captive exhibit to educate public.	2	• A captive exhibit of regent honeyeaters maintained with conservation themes. • Exhibit assessed for effectiveness in increasing understanding of regent honeyeaters conservation requirements.	**ZAA** BirdLife Australia Recovery Team State agencies	

ABOUT US

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MEMO

TO: [redacted]

FROM: [redacted]

SUBJECT: **Response to DoEE on revised BOS areas**

OUR REF: MEM-ECO NIF update

DATE: [redacted]

The NSW Government is delivering a New Intercity Fleet to replace the trains carrying customers from Sydney to the Central Coast, Newcastle, the Blue Mountains and the Illawarra. A new purpose-built maintenance facility will be built at Kangy Angy to service and maintain the new fleet of trains. Although the project will avoid and minimise impacts, removal of up to 27.1 hectares of native vegetation is required, including habitat for threatened species and ecological communities.

To support the project determination, a Species Impact Statement (SIS) and an Additional SIS was prepared to address significant impact issues on biodiversity. Transport for NSW (TfNSW) is required to provide biodiversity offsets for these residual biodiversity impacts in accordance with the project conditions of approval.

To address this, the project conditions of approval 40 and 41 of the New Intercity Fleet Maintenance Facility Determination Report (TfNSW, 2017) requires the preparation of a Biodiversity Offset Strategy (BOS) and Biodiversity Offset Package (BOP).

The following government agency approvals must be satisfied within the BOS and BOP:

- Chief Executive of NSW Office of Environment & Heritage (OEH) concurrence approval conditions for the SIS issued on 22 August 2016
- Chief Executive of NSW OEH concurrence approval conditions for the Additional SIS on 29 August 2017; and
- EPBC Act approval conditions (EPBC 2016/7681) issued 05 May 2017.

A BOS, has been developed using the OEH guidelines for developing biodiversity offsets to achieve conservation outcomes, where there will be an unavoidable loss of biodiversity and was quantified using the BioBanking Assessment Methodology (BBAM) 2014. The BOS was subsequently approved by OEH.

The Commonwealth Department of the Environment and Energy (DoEE) are currently reviewing the BOS prior to approval. As part of the review DoEE have requested clarification that the proposed BOS adequately meets the Part 5 CoA, concurrence conditions and EPBC approval (EPBC 2016/7681).

A key component to the BOS identified most of the required offsets can be delivered through

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the establishment of a Biodiversity Stewardship Agreement under the *Biodiversity Conservation Act 2016* over 14 sites and two tentative site options within the Central Coast Council LGA.

Transport for NSW have been working with the [redacted] to ensure that these offsets are delivered within the project locality and benefit conservation outcomes for the Central Coast region and meets the Part 5 CoA, concurrence conditions and EPBC approval (EPBC 2016/7681).

A summary of the biodiversity values within these sites was presented in Table 3.5 of the BOS and identified approximately 152.99 hectares of Swamp Sclerophyll Forest on Coastal Floodplains which would equate to approximately 1,138 ecosystem credits to be conserved. This summary was prior to finalisation of detailed field surveys and finalisation of the additional two tentative sites. DoEE also requested that Table 3.5 within the BOS specifically identify the area of Wet Sclerophyll Forest offsets within the candidate sites.

Following completion of the detailed surveys supporting the Biodiversity Stewardship Agreement and confirmation of the inclusion of the two-tentative sites a revised Table 3.5 providing the summary of biodiversity values within the final 16 Central Coast candidate sites is provided below;

Table 3.5 Revised summary biodiversity values within candidate sites within the [redacted]

RESERVE ID	SWAMP SCLEROPHYLL FOREST (SSFCF)	NORTH COAST WET SCLEROPHYLL FORESTS (WSF)	NORTHERN WARM TEMPERATE RAINFORESTS (RF)	*MELALEUCA BICONVEXA*	MAHONY'S TOADLET	WALLUM FROGLET	TOTAL SITE AREA (HA)	TOTAL MAPPED AREA OF SSFCF (HA)	TOTAL MAPPED AREA OF WSF (HA)
[redacted]	yes	–	–	–	unknown	unknown	8.24	6.25	0
[redacted]	yes	yes	–	known	unknown	unknown	4.74	1.74	1.79
[redacted]	yes	–	–	-	unknown	unknown	17.35	9.02	0
[redacted]	yes	–	–	-	unknown	unknown	2.09	0.67	0
[redacted]	yes	–	–	known	unknown	unknown	30.73	11.71	0
[redacted]	yes	yes	–	known	unknown	unknown	33.72	12.87	5.24
[redacted]	yes	yes	yes	known	unknown	unknown	14.26	4.99	2.84
[redacted]	yes	yes	–	known	unknown	unknown	7.14	5.5	1.63
[redacted]	yes	yes	–	known	unknown	unknown	15.86	7.88	3.54

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[redacted]	yes	yes	yes	known	unknown	unknown	18.31	6.44	3.32
[redacted]	yes	–	–	–	unknown	unknown	26.94	5.26	0
[redacted]	yes	–	–	–	unknown	unknown	50.74	8.9	0
[redacted]	yes	yes	–	known	unknown	unknown	17.37	14.15	0.55
[redacted]	yes	yes	–	known	unknown	unknown	31.81	24.13	3.81
Additional tentative site for investigation									
[redacted]	yes	yes	–	unknown	unknown	unknown	TBC	6.2	13.35
[redacted]	yes	–	–	unknown	unknown	unknown	TBC	17.15	0
Total area							**>335.44**	**142.86**[2]	**36.07**[2]
Estimated ecosystem credits generated[1]								**1328**	**335**
Existing conservation obligation discount estimate ([redacted])								**-265**	**-67**
Total Swamp Sclerophyll Forest on Coastal Floodplain and Wet Sclerophyll ecosystem credit estimate								**1062**	**268**

(1) Estimate of biodiversity credit yield has been based on BBAM 2014. BBAM 2014 credit estimates have been used within the BOS as the offset credit requirements for the project have been calculated using this methodology.

(2) The revised total area identified a slight reduction in the areas of Swamp Sclerophyll Forest on Coastal Floodplains from 152.99 ha presented in the BOS to 142.86 ha and an increase in Wet Sclerophyll Forest by approximately 20 ha. These relatively minor changes in area were principally the result of changes in vegetation mapping following detailed field validation of broad scale vegetation mapping used initially within the BOS to describe the two tentative sites 64 and 123.

Based on this revised summary of biodiversity values within the 16 Central Coast candidate sites, a summary of direct offsets which will be pursued as part of this BOS is provided in a revised Table 6.1 below and shows both the establishment of Biodiversity Stewardship Agreements and purchasing of existing Biobanking biodiversity credits.

The revised Table 6.1 confirms the proposed BOS will allow TfNSW to meet their offsetting obligations under the Part 5 CoA, concurrence conditions and EPBC approval (EPBC 2016/7681).

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Table 6.1 Summary of suitable biodiversity credits available

OFFSET ID	OFFSET TYPE	CENTRAL COAST AND LAKE MACQUARIE REGIONS (EPBC APPROVAL)	IBRA SUBREGION	SWAMP SCLEROPHYLL FOREST (CREDITS)	NORTH COAST WET SCLEROPHYLL FORESTS (CREDITS)	NORTHERN WARM TEMPERATE RAINFORESTS (CREDITS)	MELALEUCA BICONVEXA (CREDITS)	MAHONY'S TOADLET (CREDITS)	WALLUM FROGLET
[redacted]	Biodiversity Stewardship Agreement	Yes	Wyong	1,062	268	45	>68,000	TBC	TBC
[redacted]	Biobanking credits	Yes	Wyong	152	-	-	-	TBC	-
[redacted]	Biobanking credits	Yes	Wyong	111	–	–	–	TBC	–
214	Biobanking credits	No	Karuah Manning	68	–	–	–	–	–
38	Biobanking credits	No	Yengo	159	–	–	–	–	–
96	Biobanking credits	No	Karuah Manning	–	259	–	–	–	–
214	Biobanking credits	No	Karuah Manning	–	71	–	–	–	–
214	Biobanking credits	No	Karuah Manning	–	42	–	–	–	–

223	Biobanking credits	No	Karuah Manning	–	16	–	–	–	–
Total Offset available				**1,552**	**656**	**45**	**>68,000**	**TBC**	**80**
Total Offset available in Central Coast (EPBC APPROVAL)				**1,325**	**268**	**-**	**-**	**-**	**-**
EPBC APPROVAL									
Offset required (19.6 ha of SSFCF and 3.6 ha of WSF)				**1,228**	**171**	**-**	**-**	**-**	**-**
Offset surplus+/- deficit				**+97**	**+97**	**-**	**-**	**-**	**-**
STATE APPROVAL									
Offset required (22.6 ha of SSFCF and 3.3 ha of WSF)				**1,416**	**171**	**52**	**52,000**	**1,496**	**31**
Offset surplus+/- deficit				**+136**	**+485**	**-7**	**Potential surplus (TBC)**	**TBC**	**+46**

[redacted]