Prepared for Department of Infrastructure, Transport, Regional Development, Communications and the Arts ABN: 86 267 354 017



Biodiversity Offset Delivery Plan Implementation Report 2020-2021

10-Jan-2023 Western Sydney International (Nancy-Bird Walton) Airport



Delivering a better world

Biodiversity Offset Delivery Plan Implementation Report 2020-2021

Client: Department of Infrastructure, Transport, Regional Development, Communications and the Arts

ABN: 86 267 354 017

Prepared by

AECOM Australia Pty Ltd Ngunnawal Country, Civic Quarter, Lvl 4, 68 Northbourne Avenue, GPO Box 1942, Canberra ACT 2601, Australia T +61 2 6100 0551 www.aecom.com ABN 20 093 846 925

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Executive Summary

The Western Sydney International Airport Plan (Airport Plan) provides the authorisation for Stage 1 of the airport under the *Airports Act 1996* (Cth), and includes a number of environmental conditions the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (Infrastructure) must comply with. Under condition 30 of the Airport Plan, Infrastructure was required to prepare and submit a Biodiversity Offset Delivery Plan (BODP) for approval to compensate for residual significant impacts associated with Stage 1 of the development. The purpose of this report is to provide detail on the implementation activities associated with the BODP that have been undertaken in the 2020-21 reporting period (25 August 2020 to 24 August 2021).

A substantial portion of the direct offsets required for the airport development have been secured through undertaking conservation and restoration activities at Defence Establishment Orchard Hills (DEOH). The Orchard Hills Offset Area is being managed by the Department of Defence (Defence) through a Memorandum of Understanding (MOU) between Defence and Infrastructure. The Offset Area is being managed in accordance with the draft Offset Plan to improve the quality of habitat for affected threatened biota and plants over a period of 20 years.

By value, Infrastructure has secured over 80% of its offset obligations to date. During this reporting period Infrastructure undertook a procurement process to engage biodiversity expertise to aid in securing its outstanding offset obligations. Implementation activities undertaken in the 2021 reporting period include:

- an independent audit of BODP implementation for the 18 month period from August 2019 through to February 2021;
- the maintenance, restoration, and management activities within the Orchard Hills Offset Area;
- a revision of the draft Orchard Hills Offset Plan;
- the identification of 458 Southern Myotis biodiversity offset credits. These credits were secured, under the NSW Biodiversity Offset Scheme in September 2021, subsequent to this reporting period;
- the Greening Australia (GA) seed collection and production program new site establishment and operation; and
- the Australian Botanic Gardens Mount Annan (ABGMA) Threatened Flora Propagation Program (TFPP) Stage 2 operations.

At the conclusion of the 2021 reporting period, outstanding credits obligations to be considered in the following reporting period are shown in **Table ES-1**.

Credit type	Credits required (BBAM)	Equivalent BAM credits	Credits secured in 2020-21	Outstanding credit (BBAM)	Outstanding credit (BAM)				
Ecosystem credits									
River Flat Eucalypt Forest (HN526 / PCT 835)	2,661	n/a	0	428	n/a				
Freshwater wetland (NH630 / PCT 1071)	926	545	0	881	519				
Species Credits									
Spiked Rice- flower <i>Pimelea</i> <i>spicata</i>	107,068	53	0	107,068	53				

Revision 4 - 10-Jan-2023

Credit type	Credits required (BBAM)	Equivalent BAM credits	Credits secured in 2020-21	Outstanding credit (BBAM)	Outstanding credit (BAM)
Dillwynia tenuifolia	540	n/a	0	102	n/a
Southern Myotis Myotis macropus	1,617	1,617	0(1)	858 ⁽¹⁾	858 ⁽¹⁾

 458 Southern Myotis credits secured in September 2021, outside of the 2020-21 reporting period, and not included in this amount. These credits would be reported in the 2021-22 reporting period.

1.0 Introduction

The Western Sydney (Nancy-Bird Walton) International Airport (WSI) is currently under construction at Badgerys Creek, NSW, with the Stage 1 development including a 3.7 kilometre runway, an integrated domestic and international terminal, and initial capacity for 10 million passengers annually.

The Western Sydney Airport Plan (Airport Plan) provides the authorisation for Stage 1 of the airport under the *Airports Act 1996* (Cth), and includes a number of environmental conditions to mitigate the biodiversity impacts caused by Stage 1 development. Under condition 30 of the Airport Plan, the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (Infrastructure) was required to prepare and submit a Biodiversity Offset Delivery Plan (BODP) for approval to compensate for residual significant impacts associated with Stage 1 of the development, specifically to offset impacts on threatened species and communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and threatened plants, animals and their habitat listed under the New South Wales (NSW) *Biodiversity Conservation Act 2017* (BC Act).

Under Condition 47(3)¹ of the Airport Plan, Infrastructure is required to report to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) annually on the implementation of the BODP until all biodiversity offsets (including other compensatory measures) have been secured or implemented. The purpose of this report is to provide detail on the implementation activities associated with the BODP that have been undertaken in the 2020-21 reporting period (25 August 2020 to 24 August 2021). This includes:

- A description of activities undertaken to identify, secure and quantify direct offsets.
- A description of the other compensatory measures that have been delivered and steps taken to identify additional measures.

Figure 1 shows locations where offsets have been investigated or secured, including direct offsets and other compensatory measures, to the end of this reporting period.

1.1 Reference documentation

Given the volume of previous reporting and publicly available information, this report does not provide extensive background information. Further information on the development and approval of the BODP, offset requirement, and implementation activities in previous periods can be sourced in relevant reference documentation, available on the Western Sydney Airport web page:

- Western Sydney Airport Environmental Impact Statement (EIS) 2016, Appendix K2 Offset Strategy²
- Western Sydney Airport Plan, as approved in 2016 (Commonwealth of Australia 2016) and varied in 2020 and 2021³
- Biodiversity Offset Delivery Plan (Commonwealth of Australia 2018), as approved 24 August 2018⁴
- BODP Implementation Reports⁵:
 - 2019: Reporting period 25 August 2018 to 25 August 2019 (GHD 2020)
 - 2020: Reporting period 25 August 2019 to 25 August 2020 (GHD 2021).

This report (2021) is required to be published on the website under Condition 47(3) of the Airport Plan.

¹ This was previously condition 39(3) under the 2016 and 2020 Airport Plans, varied to condition 47(3) in September 2021

² https://www.westernsydneyairport.gov.au/sites/default/files/WSA-EIS-Volume-4-Appendix-K2-Offset-strategy.pdf

³ https://www.westernsydneyairport.gov.au/about/airport-plan

⁴ https://www.westernsydneyairport.gov.au/environment-heritage/environment/biodiversity-offset-delivery-plan

⁵ https://www.westernsydneyairport.gov.au/environment-heritage/environment/biodiversity-offset-delivery-plan

Figure 1 **BODP** implementation offset areas





1.2 Overview of offset requirement

Biodiversity values identified in the BODP as requiring offsetting as a result of Stage 1 of the Development are summarised in **Table 1**.

Threatened species and communities							
EPBC Act							
 Habitat for Grey-headed Flying fox (<i>Pteropus poliocephalus</i>) (187.8 hectares) Potential winter foraging habitat for the critically endangered Swift Parrot (<i>Lathamus discolour</i>) (187.8 hectares) Habitat for the endangered Spiked Rice-flower (<i>Pimelea spicata</i>) (4,118 clumps over 2.94 hectares). Cumberland Plain Woodland (141 hectares) 							
BC Act							
 Ecosystem-specific offsets: Grey Box – Forest Red Gum grassy woodland on flats in varying condition (224.1 hectares) Grey Box – Forest Red Gum grassy woodland on shale in varying condition (48.7 hectares) Forest Red Gum – Rough-barked Apple grassy woodland in varying condition (47.6 hectares) Broad-leaved Ironbark – Grey Box – (<i>Melaleuca decora</i>) grassy open forest in varying condition (5.9 hectares), and Good condition artificial freshwater wetland on floodplain (32.7 hectares). 	 Species-specific offsets: Cumberland Land Snail (<i>Meridolum</i> corneovirens)(183.2 hectares of habitat) <i>Dillwynia tenuifolia</i> (30 individuals) <i>Marsdenia viridiflora subsp. viridiflora</i> (145 stems) <i>Pultenaea parviflora</i> (4 individuals) Southern Myotis (<i>Myotis macropus</i>) roosting habitat (71.7 hectares of habitat), and Spiked Rice-flower (<i>Pimelea spicata</i>) (4,118 clumps over 2.94 hectares). 						

In accordance with the EPBC Act Environmental Offsets Policy October 2012, a minimum of 90% of required offsets are required to be 'direct offsets' providing a measurable conservation gain for an impacted protected matter. This includes securing management and conservation of equivalent sites, securing of biodiversity credits from existing sites and acquisition of suitable land. Up to 10% of the offsets can be delivered through 'other compensatory measures' which are actions that lead to benefits for the impacted protected matter such as the funding of research or educational programs.

1.3 Biodiversity credit terminology

The NSW Biodiversity Offsets Scheme (BOS) relies on the Biodiversity Assessment Method (BAM) under the BC Act to consistently assess impacts on biodiversity values from a proposed development, as well as improvements in biodiversity values from management actions undertaken at a stewardship site. Prior to the BC Act commencing in August 2017, the NSW BioBanking Scheme similarly relied on the BioBanking Assessment Methodology (BBAM), under the now repealed *Threatened Species Conservation Act 1995* (TSC Act), to consistently assess impacts and improvements on biodiversity values.

'Biodiversity credits' is the standard unit of measure used under both the former BioBanking scheme and the current BOS. Due to changes in the assessment process supporting NSW offsetting schemes between BioBanking and the BOS, the same offset requirement can be expressed as a different number of credits depending on the scheme being referenced. A conversion of an offset requirement between schemes is termed an Assessment of Reasonable Equivalence and is undertaken by NSW Department of Planning and Environment (DPE).

As outlined in the 2020 BODP Implementation Report (GHD 2021), DCCEEW has provided endorsement of the project's offset requirement to be expressed in terms of 'biodiversity credits'. The offset requirement for the project was calculated in accordance with the former Framework for Biodiversity Assessment (FBA) (the assessment methodology previously adopted to quantify offsets for major NSW projects), under the BioBanking Scheme. An Assessment of Reasonable Equivalence was undertaken for certain components of the project's offset requirements in February 2020 to convert these credits to the current BOS scheme. The subsequent Statement of assessment of reasonable equivalence of biodiversity credits is included as Appendix B of the 2020 BODP Implementation Report (GHD 2021). As such, the project's residual offset requirement, in biodiversity credits, is expressed herein as both:

- BioBanking (BBAM) credits for biodiversity values established under the TSC Act; and,
- Biodiversity Assessment Method (BAM) for biodiversity values established under the BC Act, determined through an Assessment of Reasonable Equivalence

Furthermore, both BBAM and BAM biodiversity credits can be expressed as either ecosystem or species credits:

- Ecosystem credit: The class of biodiversity credits created or required for the impact on Endangered ecological communities (EECs), Critically Endangered ecological communities (CEECs) and threatened species habitat for species that can be reliably predicted to occur within a vegetation type according to the BBAM, FBA and BAM.
- Species credit: The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates according to the BBAM, FBA and BAM. The number of species credits is calculated based on targeted surveys.

1.4 Summary of the quantum of secured offsets prior to reporting period

BODP implementation reports were published for the 2018-19 and 2019-20 reporting periods (**Section 1.1**). The following section provides a brief summary of the status of offsets secured prior to the current reporting period and forms the baseline of residual offset obligations discussed in this report.

A substantial portion of the direct offsets required for the airport development have been secured through undertaking conservation and restoration activities at Defence Establishment Orchard Hills (DEOH). The Department of Defence (Defence) has set aside 978.83 hectares of land at DEOH to provide biodiversity offsets for the development of WSI. This offset area, comprises 938.48 hectares of managed vegetation and 40.35 hectares of supporting land uses such as tracks and easements. These arrangements have been formalised through a Memorandum of Understanding (MOU) between Defence and Infrastructure and will be managed under an Offset Plan to improve the quality of habitat for affected threatened biota and plants over a period of 20 years until 2038, with ongoing maintenance thereafter.

Direct offsets have also been secured through purchasing biodiversity credits through both the NSW BOS and the now repealed NSW BioBanking Scheme. Once purchased, the biodiversity credits generated through these schemes are transferred to Infrastructure. Upon securing the full offset requirement and obtaining greater clarity regarding the precise quantum of offsets, Infrastructure will retire biodiversity credits securing the offset in perpetuity. EPBC Act offset to be generated at DEOH (expressed in BBAM) are available for Infrastructure to retire in full, in places exceeding the requirement identified in the BODP.

The quantum of direct offsets secured to date through DEOH and purchase of biodiversity credits are provided in **Table 2**. This table is adapted from Table 7 of the 2020 Implementation Report. The offset obligation had not been reached for five credit types by the end of the 2020 reporting period. These obligations are discussed in **Section 1.5**.

Ongoing indirect offsets (other compensatory measures) have not been quantified to date. These measures, including the Australian Botanic Gardens Mount Annan (ABGMA) Threatened Flora Propagation Program (TFPP) and Greening Australia seed collection and production program, are discussed in **Section 2.4**. These programs have been funded by Infrastructure and details on their progress and operations provided in this report.

Table 2 Quantum of biodiversity offsets secured over previous reporting periods (at August 2020) (BBAM credits)

		EPBC Act offset to be credits credits		Biodiversity	Secured credits available for retirement for the Development			
Credit type	Credits required	generated at DEOH (expressed in BBAM) ¹	secured at BSA sites in 2018-19	secured at BSA sites in 2019-20	Total credits	% of total offset requirement	Offset obligation met?	
Ecosystem credits								
Cumberland Plain Woodland (HN528 high, medium, poor and low condition and HN529 high and poor condition)	12,746	9,351	3,805	0	13,156	103%	Yes	
River Flat Eucalypt Forest (HN526 high, poor and low condition)	2,661	1,979	245	0	2,233	84%	No	
Shale-gravel Transition Forest (HN512 high and poor condition and HN513 high condition)	359	709	0	0	709	197%	Yes	
Equivalent ecosystem credits for Grey- headed Flying-fox habitat and Swift Parrot foraging habitat.	15,766	12,039	0	4,059	16,098	102%	Yes	
Freshwater wetland (HN630)	926	41	0	4	45	5%	No	
Species Credits								
Spiked Rice-flower Pimelea spicata	107,068	0	0	0	107,068	0%	No	
Cumberland Plain Land Snail Meridolum corneovirens	2,441	2,799	0	0	2,799	115%	Yes	
Dillwynia tenuifolia	540	409	0	29	438	81%	No	
Marsdenia viridiflora subsp. viridiflora	5,800	14,512	0	0	14,512	250%	Yes	
Pultenaea parviflora	60	7,486	0	0	7,486	12,477%	Yes	
Southern Myotis Myotis macropus	1,617	759	0	0	759	47%	No	

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(1) DEOH credits consistent with 2020 update, as updated to reflect addition of land to the Offset Area and discounting of credit generation rates for existing management obligations

1.5 Overview of current outstanding offsets

Progress towards securing the required offsets under the BODP has been made in the previous two reporting periods for most direct offset requirements. Outstanding offsets are calculated using the total generated and secured biodiversity credit amount following the 2020 period. The offsets are then compared with the direct offset requirement identified in the BODP and are shown in **Table 3**. This table is adapted from Table 12 of the 2020 Implementation Report, with a correction (increase) in outstanding Southern myotis credits.

As described in **Section 1.3**, the project's residual offset requirement is expressed as both BioBanking (BBAM) credits and Biodiversity Assessment Method (BAM) credits, following an Assessment of Reasonable Equivalence undertaken for certain components of the project's offset requirements.

Credit type	Credits required (BBAM)	Equivalent BAM credits	Outstanding credit (BBAM)	Outstanding credit (BAM)
Ecosystem credits				
River Flat Eucalypt Forest (HN526 / PCT 835)	2,661	n/a ⁽¹⁾	428	n/a ⁽¹⁾
Freshwater wetland (NH630 / PCT 1071)	926	545	881	519
Species Credits				
Spiked Rice- flower <i>Pimelea</i> spicata	107,068	53	107,068	53
Dillwynia tenuifolia	540	n/a ⁽¹⁾	102	n/a ⁽¹⁾
Southern Myotis	1,617	1,617	858 ⁽²⁾	858 ⁽²⁾

Table 3 Outstanding biodiversity credit requirements following the 2019-20 reporting period

 Assessment of reasonable equivalence not yet undertaken for this credit requirement, Assessment would be undertaken upon identification of available BSA site and apply to the credit requirement following securing of those credits.

(2) This reflects a correction (increase) in the number outstanding Southern Myotis credits from 2020 report. Outstanding credit value is calculated as total credits required (1,617) less credits secured to date at DEOH (759).

2.0 Implementation activities undertaken in the 2021 reporting period

2.1 Report scope

This report covers activities in the 2021 reporting period, between 25 August 2020 and 24 August 2021, including:

- Independent audit of the implementation of the BODP (Section 2.2)
- A description of activities undertaken to identify, secure and quantify direct offsets, including activities associated with DEOH (Section 2.3)
- A description of the other compensatory measures that have been delivered and steps taken to identify additional measures (**Section 2.4**)

2.2 Independent Audit

Infrastructure is required to ensure that independent audits of BODP implementation are conducted every 18-months until all offset requirements by the BODP have been implemented, under Condition 30(11) of the Airport Plan for WSI.

During this reporting period an independent auditor was engaged by Infrastructure to undertake an independent audit of the implementation of the BODP. The audit covered an 18 month period from August 2019 through to February 2021. The audit report can be found attached to the 2020 BODP implementation report found on Infrastructure's website.

The auditor found Infrastructure was compliant with its regulatory requirements however made some findings and recommendations that were subsequently adopted by Infrastructure in this reporting period. Most of these focused on the Orchard Hills Offset site, and were subsequently addressed in the offset plan for the site (**Section 2.3.2.1**).

The next independent audit will be carried out for the February 2021 to August 2022 period.

2.3 Direct biodiversity offset actions

This section outlines the activities undertaken by Infrastructure to secure direct offsets through the NSW BOS and Defence Establishment Orchard Hills.

Biodiversity credits are categorised below as ecosystem credits and species credits as identified in **Table 2**.

2.3.1 NSW BOS

2.3.1.1 Ecosystem credits

No potential ecosystem credits in the NSW BOS were identified or secured during the reporting period.

2.3.1.2 Species credits

Infrastructure investigated the potential to purchase offsets for Southern Myotis at Sydney Water Corporation's Picton farm site. These credits were secured, under the NSW Biodiversity Offset Scheme in September 2021, subsequent to this reporting period.

2.3.2 Defence Establishment Orchard Hills

A substantial portion of the direct offsets required for the airport development have been secured through undertaking conservation and restoration activities at DEOH. Defence has set aside 978.83 hectares of land at DEOH to provide biodiversity offsets for the development of WSI. This offset area, comprises 938.48 hectares of managed vegetation and 40.35 hectares of supporting land uses such as tracks and easements. These arrangements have been formalised through a Memorandum of Understanding (MOU) between Defence and Infrastructure and will be managed under an Offset Plan to improve the quality of habitat for affected threatened biota and plants over a period of 20 years until 2038, with ongoing maintenance thereafter.

The following sections describe activities at DEOH during the reporting period, including:

- the development of the Orchard Hills Offset Plan;
- the engagement of specialists offset management contractor; and
- conservation and restoration management actions.



Figure 2 Photograph in the Orchard Hills Offset Area (source: Ecoplanning)

2.3.2.1 Orchard Hills Offset Area Offset Plan

During this reporting period Infrastructure worked with Defence to progress the Orchard Hills Offset Area Offset Plan (Offset Plan). This progress included an update to the draft Offset Plan in response to the findings and recommendations of the Independent Audit (**Section 2.2**). While the Offset Plan was being updated, Defence used a base services contractor to deliver on-ground offset works and management actions (**Section 2.3.2.2**) prior to engagement of a specialist contractor to take over management of offset actions (**Section 2.3.2.2**).

As per the Memorandum of Understanding between Defence and Infrastructure, the draft Offset Plan:

- is based on an initial ecological survey of what was, at the time, the proposed offset site;
- sets out the relevant biodiversity values in the offset area;
- describes the management actions Defence will undertake to achieve an offset for the Stage 1 development of WSI; and
- describes how Defence will manage the offset site after the 20-year offset period.

The objective of the Offset Plan is to achieve an intensification of the level of management of biodiversity values at the Offset Area beyond that required under the Commonwealth Heritage listing⁶ and EPBC Act. The objectives are mainly related to improving the quality of habitat for threatened biota listed under the EPBC Act. Specifically, the Offset Plan aims to improve site quality scores associated

⁶ The Orchard Hills Offset Area is owned by the Commonwealth and most of the site is entered on the Commonwealth Heritage List (CHL) as 'Orchard Hills Cumberland Plain Woodland, The Northern Rd'. It is subject to the environmental protection framework set out in the EPBC Act under the control of the Environment Minister or approved delegate. The Memorandum of Understanding (MOU) entered into between the Department of Defence (Defence) and Infrastructure in September 2018 includes provisions that are additional to any Commonwealth Heritage Listing requirements (refer to Section 1.3 of the BODP).

with various areas of habitat over the period of the Offset Plan through implementation of the management measures. The site quality score of habitats is measured on a scale of 1-10 under the offsets assessment guide that supports the Environmental Offsets Policy, and provides a repeatable and objective measures against which to quantify improvements at the site. The following are listed as objectives of the Offset Plan:

- a. 'Future quality with offset' score that is two (2) greater than the 'Start quality' score that is defined in the Initial Ecological Survey for the area of Cumberland Plain Woodland;
- b. 'Future quality with offset' score that is one (1) greater than the 'Start quality' score that is defined in the Initial Ecological Survey for the area of habitat for the Swift Parrot and Grey-headed Flyingfox in the Offset Area;
- c. 'Future quality with offset' score for the area of poorer quality Cumberland Plain Woodland in the Offset Area that is at least:
 - i. as high as the quality score for the Cumberland Plain Woodland in the Stage 1 Construction Impact Zone (6 out of 10); and
 - ii. two (2) greater than the 'Start quality' score that is defined in the Initial Ecological Survey for the area of poorer quality Cumberland Plain Woodland in the Offset Area.
- d. Site value scores with active restoration and management at least equal to the scores defined in the Initial Ecological Survey to confirm the quantum of offset for plants, animals and their habitat as calculated with the BBAM (OEH 2014);
- e. Averted risk, management of threats and site context score improvements that would contribute to achieving the Offset Objectives a-d listed above.

The objective to improve the site quality of poorer quality Cumberland Plain Woodland (Objective c) is a particularly notable increase in the current management of this vegetation type. The Draft Heritage Management Plan (relevant to the Commonwealth Heritage Listing at DEOH) only requires the maintenance and avoidance of significant impacts to Cumberland Plain Woodland and other values in the Heritage List Area and does not require the restoration of degraded areas (GML 2013). Improvement of these areas, therefore, represents a substantially enhanced conservation outcome.

The draft Offset Plan details management actions to be undertaken on the Offset site to achieve the above objectives (**Table 4**). Each management action includes specific outcomes, timing and completion criteria which are not reproduced in this document.

ID	Management Action	Offset Objective
1	Woodland and forest management	
1.1	Develop woodland and forest management strategy	a, b, d
1.2	Woodland and forest stand health mapping	a, b, d
1.3	Develop and implement techniques to improve stand quality	a, b, d
1.4	Targeted tree species richness planting	a, b, d
1.5	Management of overabundant Native Blackthorn scrub	a, b, d
2	Regeneration and revegetation	
2.1	Develop regeneration and revegetation strategy	a, c, d
2.2	Targeted shrub and ground cover species richness planting	a, c, d
2.3	Broad area over-storey / mid-storey planting	a, c, d
2.4	Full structural revegetation	a, c, d
3	Habitat enhancement	
3.1	Develop habitat enhancement strategy	a, c, d

 Table 4
 Draft Offset Plan Management Actions and associated Objectives

ID	Management Action	Offset Objective
3.2	Installation of supplementary habitat resources	a, c, d
3.3	Aquatic habitat mapping and planning	d
3.4	Implement measures to improve aquatic habitat	d
3.5	Identify significant sources of light pollution and management actions to minimise their impact	a, b, c, d
4	Weed control	
4.1	Develop weed control strategy	a, b, c, d
4.2	Primary weed control followed by weed control rounds as required to achieve maintenance level	a, b, c, d
4.3	Maintenance weed control	a, b, c, d
4.4	Supress weeds	е
5	Ecological fire management	
5.1	Review DEOH Bushfire Risk Management Plan and develop supplementary ecological fire management strategy	a, b, c, d
5.2	Support the implementation of the DEOH Bushfire Risk Management Plan	a, b, c, d
5.3	Implement the ecological fire management actions	a, b, c, d
6	Pest fauna and overabundant native fauna control	
6.1	Develop fauna management strategy	a, b, c, d
6.2	Maintain exclusion fencing around Offset Area	a, b, c, d
6.3	Implement pest fauna controls	a, b, c, d
6.4	Review and implement overabundant macropod controls	a, c, d
7	Fauna reintroduction	
7.1	Develop fauna reintroduction strategy	a, c, d
7.2	Maintain pest-proof fencing around fauna reintroduction area	a, b, c, d
7.3	Exclude pest fauna from fauna reintroduction area	a, b, c, d
7.4	Introduce fauna in line with the strategy developed including monitoring and adaptive management	a, c, d
8	Contamination and human activities	
8.1	Identify and report significant sources of contamination	е
8.2	Facilitate contamination remediation by Defence in Offset Area and adjoining areas	е
8.3	Ensure appropriate quality of revegetation in remediation areas	е
8.4	Remove non-hazardous waste and dumped materials	е
9	Soil and water management	
9.1	Develop soil and water quality management strategy	a, c, d, e
9.2	Fine scale erosion mapping	a, c, d, e
9.3	Implement soil and water quality management system	a, c, d, e
9.4	Mitigate and/or remediate erosion	е

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2.3.2.2 Engagement of specialists offset management contractor

Defence commenced a process during the reporting period to engage a specialist contractor to take over management of offset actions and implement the detailed requirements of the approved Offset Plan. The specialist contractor will be responsible for the planning, delivery and reporting against the majority of actions undertaken to achieve outcomes required under the Offset Plan. Infrastructure agreed to take part in the tender evaluation process run by Defence. At the close of this reporting period the tender process had not been completed and a specialist contractor was yet to be engaged. The next implementation report will provide further detail on this process.

2.3.2.3 Management Actions

While works were underway to engage a specialist contractor and finalise the Offset Plan, work commenced on weed and pest control at the Offset site in line with management actions 4 and 6 (**Table 4**). Further details of these activities during the reporting period are provided below.

2.3.2.3.1 Weed control

The draft Offset Plan sets outs that weed control should be undertaken across the Offset Area, with effort guided by the need to reduce High Threat Exotic plant species cover and exotic plant infestations. Exotic species represent inputs to site quality scores, and the removal of these plants therefore assists to meet the offset objectives. Weed control effort proceeded, as it was not considered to be a requirement that would be impacted by amendments being made to the draft Offset Plan.

As part of an early version of a weed control strategy (Management Action 4.1), a Defence Offset Area works program identified twenty-one weed species to target and remove according to a six-month maintenance schedule between January and June 2021 (Maintenance Actions 4.2 and 4.3). The Bush Regeneration Team was on site for the entire 6-month period.

The weed removal process was extensive and involved the following works:

- A mechanical excavator was used to remove Sharp Rush *Juncus acutus*. The weed was also sprayed with glyphosate.
- Callistemons growing in the area were cut and painted. The removed vegetation was chipped and dispersed on site.
- African Olive trees were cut then painted with neat Garlon on site. Seedlings were hand-pulled where possible.
- Blackberry specimens were sprayed and then removed with a reach arm mower and remotecontrolled mower. Existing blackberry infestations were slashed using flail mower.
- Caster oil and Saffron thistle plants were sprayed with herbicide, cut and painted.
- African Love Grass was slashed and sprayed in three treatments which had been timed to occur prior to flowering.
- African Olive monitoring plots and Biodiversity monitoring plots were used to monitor invasive flora behaviour.
- A rehabilitation process occurred. This involved the following actions:
 - Weed Callistemons removed from the DEOH northern buffer watercourse were replaced on a one-for-one basis, with the replacement trees being planted along the watercourse to assist water infiltration.
 - Replacement plants consisted of appropriate endemic Cumberland Plains Species. The seed from these plants was collected on site from existing native Cumberland Plain plant species, germinated and grown to tube stock, before being planted along the watercourse.

2.3.2.3.2 Pest fauna and overabundant native fauna control

The draft Offset Plan outlines that pest fauna exclusion and control should be undertaken to mitigate threats to biodiversity values. This includes control of predator pest species such as feral cats and foxes and exclusion of feral herbivores such as rabbits, hares and deer, coordinated with existing control programs in the locality. Pest control effort proceeded, as it was not considered to be a requirement that

would be impacted by amendments being made to the draft Offset Plan. During the reporting period, the following management actions were undertaken:

- Annual baseline monitoring for all invasive fauna included thermal transect counts for three nights and motion sensor camera monitoring for seven days.
- Following baseline monitoring, the following pest fauna controls were undertaken to make a start on achieving planned targets with the overarching aim to eradicate pest fauna within the Offset Area in the first 10 years of the Offset Improvement Period (Management Action 6.3):
 - A Spring Rabbit ground shooting program was employed for two nights as primary control for Rabbits and Hares.
 - A Spring 1080 Baiting Program was employed for twenty-eight days, utilising fresh meat/commercial prepared baits with five attractants.
 - A wild deer ground shooting program was employed for four nights as primary control for wild deer.
 - An Autumn 1080 Baiting Program was employed for twenty-eight days, utilising fresh meat/commercial prepared baits with five attractants.
 - A Rabbit Warren Fumigation and Collapsing Program was employed for five days for Warren destruction and area rehabilitation.

2.4 Other compensatory measures

Other compensatory measures are those actions which do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter, for example funding for research or educational programs.

In addition to direct biodiversity offsets, the BODP identified several other compensatory measures. These include research, capacity building and education programs. Ongoing activities associated with these programs which have been undertaken in the reporting period are described below"

- Australian Botanic Gardens Mount Annan (ABGMA) Threatened Flora Propagation Program (TFPP) (Section 2.4.1)
- Greening Australia seed collection and production program (Section 2.4.2).

In accordance with the EPBC Act Environmental Offsets Policy, up to 10% of the project's offset obligations can be delivered through 'other compensatory measures'. The quantum of offset associated with these two programs is likely to exceed 10% of the overall offset obligation, resulting in the delivery of total offsets in excess of the requirement. The quantum will be calculated as a percentage offset contribution to the total requirement for the relevant credits using the 'Other compensatory (\$)' section of the EPBC Act offsets assessment guide.

2.4.1 Threatened Flora Propagation Program

The Stage 1 TFPP was completed in 2019, as documented in the 2020 Implementation Report.

The funding of the TFPP by Infrastructure contributed to the findings published in the 2021 journal article *Conserving the genetic diversity of condemned populations: Optimizing collections and translocation* (Bragg et al, 2021). This article reported the results of a study to preserve the existing genetic diversity effectively and efficiently in an optimised ex situ collection of individuals. The research identified that it was possible to capture a large proportion of the genetic polymorphism in source population of *Pimelea spicata* with a reasonably modest number of plants, provided these plants were carefully chosen (e.g., 256 vegetative cuttings from such a collection could preserve a substantial proportion of genetic variation (>95% of polymorphism) over an appropriate time frame.

Infrastructure has arranged for ABGMA to expand the TFPP to help establish a longer term potted ex situ *Pimelea spicata* collection at the Mount Annan PlantBank (the Stage 2 TFPP), including 100 individuals from the WSI site for a genetic study. The collection of cuttings from the WSI site was a result of many visits to site over multiple years, based on rain and temperature. The potted collection would provide a source of cutting material to support any future translocation or amenity planting of the

Pimelea spicata population from the WSI site once the plants are removed. The PlantBank and part of the potted collection is shown in **Figure 3**. The Stage 2 TFPP will draw upon the results of the genetic study and experience in propagation techniques gained throughout the Stage 1 TFPP. Funding to maintain the collection has been committed for a period of five years, and has been ongoing during this reporting period.

In addition to the 100 *Pimelea spicata* individuals for the TFPP Stage 2 genetic study, ABGMA maintains a collection of *Pimelea spicata* (approximately 350 individuals) and *Marsedenia viridiflora* (approximately 200 individuals) from TFPP Stage 1 for future use. *Pultinaea parviflora* individuals from Stage 1 were collected from ABGMA in July 2020 for use by WSA Co.



Figure 3 ABGMA PlantBank, a purpose-built seed storage and research centre





2.4.2 Greening Australia Seed Collection and Production Program

The BODP outlined the provision of funding to Greening Australia to operate a seed collection and propagation program, which produces tube stock and subsequent seed for threatened species and native vegetation communities found on the Cumberland Plain. A primary focus of this program is developing seed of species found within the *Cumberland Plain Shale Woodlands* and *Shale-Gravel Transition Forest* Critically Endangered Ecological Community (CEEC). This program has been implemented through funding a five year contract from 2016 – 2021. Project outcomes to date have included:

- Increasing the Greening Australia seed propagation operations area 56% to 15.91 hectares
- Cultivating 410,000 plants consisting of over 80 Cumberland Plain species
- Increasing the Greening Australia seed inventory by 65% to 3,381 kilograms
- Employing eight full time personnel and engaging over 30 trades nationally.

2.4.2.1 Facility improvement

A key requirement of the program was the development of an expanded facility due to the existing Western Sydney University (WSU) Southee Road complex not meeting the required minimum 10-year land tenure. A new site, also within WSU, was identified and leased. The new production facility has been designed to meet future needs for the development and other major developments in Western Sydney, as well as provide a research platform and collaboration with other programs to further the conservation potential of the facility and program.

Construction of the new production facility, the Native Seed Centre for Restoration, was completed in June 2021 (Greening Australia, 2021). Two seed propagation areas of the Southee Road complex are continuing operation, with the remainder of the complex handed back to WSU. Outstanding project milestones were achieved by December 2020 and all key infrastructure assets were put into operation by January 2021.

Figure 4 Entrance to the seed collection and production facility, Richmond NSW (Source: Greening Australia)



Figure 5 Native Seed Centre operations: Improved seed storage capability; plant production; operational staff



2.4.2.2 Operational activities

Activities undertaken during the 2021 reporting period consisted of:

- the transplant and relocation of species between the Southee Road complex and new production facility to protected locations as required;
- the relocation of 100 *Pimelea spicata* from the Western Sydney Airport footprint to specialised planting beds at the new production facility;
- nursery operations such as propagation, maturing and planting;
- the continued harvesting of seed from wild populations of native vegetation with view to increasing the genetic diversity of the program's seed bank; and
- general inventory and facility maintenance activities.

2.4.2.3 Research, education and engagement

The new production facility has been positioned as a multi-purpose research hub servicing ecological practitioners and academic institutions. These include the Native Seed Centre for Restoration and the Hawkesbury Institute for the Environment. The new production facility provides access to the seed propagation areas, seed supply and technical expertise. Research activities include the supporting of:

- two post-doctorate WSU students;
- one WSU PhD project; and
- one WSU botany undergraduate class.

2.4.2.4 Next Steps

The Native Seed Production Area has been established with capacity to produce 150 species of seed, all of which are indigenous to the Cumberland Plain region. It has significant stock of over 80 species on hand awaiting use on major infrastructure projects across the Western Sydney region.

3.0 Conclusion

3.1 Outstanding offsets

No direct offsets were secured during the 2020-21 reporting period. Southern Myotis credits were identified in the reporting period, with 458 secured in September 2021. Being outside of the 2020-21 reporting period, they have not been included in the table below, and will be included in the 2022 BODP Implementation Report. Outstanding credits to be considered for the following reporting period are shown in **Table 5**.

Credit type	Credits required (BBAM)	Equivalent BAM credits	Credits secured in 2020-21	Outstanding credit (BBAM)	Outstanding credit (BAM)
Ecosystem credits					
River Flat Eucalypt Forest (HN526 / PCT 835)	2,661	n/a	0	428	n/a
Freshwater wetland (NH630 / PCT 1071)	926	545	0	881	519
Species Credits					
Spiked Rice- flower <i>Pimelea</i> spicata	107,068	53	0	107,068	53
Dillwynia tenuifolia	540	n/a	0	102	n/a
Southern Myotis <i>Myotis</i>	1,617	1,617	O ⁽¹⁾	858 ⁽¹⁾	858 ⁽¹⁾

Table 5 Outstanding biodiversity credit requirements following the 2020-21 reporting period								
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(2) 458 Southern Myotis credits secured in September 2021, outside of the 2020-21 reporting period, and not included in this amount. These credits would be reported in the 2021-22 reporting period.

3.2 Identification of additional offsets

Infrastructure identified 458 Southern Myotis BBAM credits which were subsequently secured in September 2021. The securing of these credits will be reported in the 2022 BODP Implementation Report.

3.3 Anticipated 2021-22 BODP reporting period activities

Actions in the 2022 reporting period are anticipated to include biodiversity credit availability investigation activities and determining options for securing remaining required biodiversity offset credits. Details on these investigations and the subsequent negotiations and purchases of offsets based on these options will be detailed in the 2022 Implementation Report.

Activities relevant to the Orchard Hills Offset Site are anticipated to include finalisation and approval of the Offset Plan, completion of the tender process for the appointment of a specialist contractor to implement the Offset Plan, and ongoing management activities.

An independent audit for the February 2021 to August 2022 period will be undertaken, to be submitted to the Commonwealth Environment department by February 2023 as per the requirement under Condition 30(11)(b) of the WSI Airport Plan.

4.0 References

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