



Oakdale South Estate

Biodiversity Offset Strategy - amended

prepared for

Goodman Property Services
(Aust.) Pty Ltd

écologique | environmental consulting

Oakdale South Estate – Biodiversity Offset Strategy - amended

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Goodman Property Services (Aust.) Pty Ltd

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Revision Schedule

Rev No	Date	Description	Issued to
1	24/01/2018	For MOD 6 Submission	Goodman

Executive Summary

Goodman Property Services (Aust) Pty Ltd (Goodman) are currently developing approximately 117 hectares (ha) under State significant development approval (SSD 6917).

The Oakdale South development (SSD 6917) comprises a Concept Proposal and Stage 1 Development Application. Consent for the Stage 1 DA approved: the removal of 3.55 ha of native vegetation; the filling of two tributaries of Ropes Creek; and the realignment of Drainage Line 1.

Development approval was granted subject to the implementation of the following plans and strategy (as relevant to Biodiversity):

- Biodiversity Assessment Report (Cumberland Ecology, 2015a)
- Biodiversity Offsetting Strategy (Cumberland Ecology, 2015b);
- Watercourse Realignment Works Plans (AECOM, 2016); and
- Vegetation Management Plan (Ecohort, 2015).

Since this time, the Biodiversity Assessment Report and Biodiversity Offsetting Strategy (Cumberland Ecology, 2015a and 2015b) have been the subject of an approved amendment (Cumberland Ecology, 2016a and 2016b) to accommodate future tenant's site layout requirements (SSD 6917 MOD 1).

Similarly the Vegetation Management Plan (Ecohort, 2015) has been the subject of approved amendments (Ecohort 2016 & 2017) in response to: submissions made by the NSW Office of Environment (OEH); and to accommodate future tenant's site layout requirements (SSD 6917 MOD 1).

Initially OEH raised concerns that the 2015 Vegetation Management Plan (VMP) could be perceived as an 'existing obligation' and potentially prejudice the creation of a biodiversity offset area at Oakdale South.

The subsequent 2016 and 2017 versions of the VMP removed the geographic overlap between the VMP management zones and biodiversity offset area, enabling construction certification and the development to proceed in December 2016.

During consultation with the Department of Planning (the Department) and OEH it was agreed that the geographic boundaries would eventually be removed via a S96 modification to ensure that the proposed offset area and riparian corridor lands are managed comprehensively.

This amended Biodiversity Offsetting Strategy (BOS) has been prepared to support the submission for S96 modification to SSD 6917 (MOD 6). Specifically the purpose of this amended Biodiversity Offset Strategy seeks to formalise the biodiversity offset areas, such that:

1. The main area of the Ropes Creek riparian zone is:
 - (a) incorporated into the biodiversity offset areas (BOS), and
 - (b) will be managed in perpetuity under the relevant Biodiversity Management Action Plan and biobanking agreement.
2. The smaller and disjunct riparian area adjacent to Precinct 6 (included in the BOS 2016b) is removed from the biodiversity offset area.

Note: the riparian zone at this location is only feasibly accessed from the northern side of Ropes Creek. Uncertainty in relation to the future management of the southern side of Ropes Creek is also a factor in its removal from the proposed biodiversity offset area;

3. The section of the watercourse realignment (included in the BOS 2016b) is removed from the biodiversity offset area, for similar reasons as the riparian area adjacent to Precinct 6; and
4. All areas are amended to reflect more accurate data collected during surveys of Oakdale South's relevant boundaries (LTS Lockley, 2017); and
5. Consent conditions are amended to reflect the reduced area of vegetation clearing and responding retirement of 160 to 158 ecosystem credits. This was amended within the BAR and BOS approved under SSD 6917 MOD 1, but was not reflected in the consent conditions.

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1. Introduction

1.1 Background

Goodman Property Services (Aust) Pty Ltd (Goodman) are currently developing the Oakdale South Industrial Estate (Oakdale South). Approval was granted on 26 October 2016 by the Department of Planning and Environment (the Department). The development is State significant development (SSD) pursuant to section 89C of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Oakdale South covers approximately 117 hectares (ha) of land located in the suburb of Kemps Creek in the Penrith local government area. The site is also located in Precinct 8 of the Western Sydney Employment Area (WSEA), which is strategically identified industrial land under State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP).

Oakdale South is predominantly zoned IN1 – General Industrial and land zoned E2 – Environmental Protection under the WSEA SEPP. Lands zoned as E2 are associated with remnant vegetation and riparian corridors of Ropes Creek and its tributaries.

1.2 Consent Conditions

The development (SSD 6917) comprised a Concept Proposal and Stage 1 Development Application. Consent for the Stage 1 DA approved: the removal of 3.58 ha of native vegetation; the filling of two tributaries of Ropes Creek; and the realignment of a further tributary (referred to in SSD 6917 documentation as Drainage Line 1).

Development approval was granted subject to the implementation of the following plans and strategy (as relevant to Biodiversity):

- Biodiversity Assessment Report (Cumberland Ecology 2015a);
- Biodiversity Offsetting Strategy (Cumberland Ecology 2015b);
- Watercourse Realignment Works Plans (AECOM 2016); and
- Vegetation Management Plan (Ecohort 2015).

1.2.1 Biodiversity Offset Strategy

The Secretary's Environmental Assessment Requirements (SEARs) issued on 22 April 2015 for SSD 6917 required that an assessment of impacts on the site's flora and fauna be undertaken in accordance with the Framework for Biodiversity Assessment (2014) and proposed measures to avoid, mitigate or offset any significant impacts be undertaken in accordance with the Biodiversity Offset Policy for Major Projects.

The Biodiversity Assessment Report (BAR) prepared for the proposal (Cumberland Ecology, 2015a) identified the vegetation cleared for the development, and calculated an offset requirement of 160 ecosystem credits.

No threatened species, or habitat for threatened species (other than those reliably predicted to occur within the vegetation found on the site), were determined to be present. Consequently no additional species credits were required to be offset other than those already catered for within ecosystem credits.

SSD 6917 consent condition E46 required that:

Within 12 months of the date of this consent, or as otherwise agreed by the Secretary, the Applicant shall retire 160 ecosystem credits to offset the removal of native vegetation on-site.

The Biodiversity Offsetting Strategy (Cumberland Ecology, 2015b) specifies how Goodman will retire the 160 ecosystem credits:

- Purchasing and retiring ecosystem credits for Cumberland Plain Woodland (which cannot be offset on site); and
- Establishing a biodiversity offset area adjacent to the development footprint of the Stage 1 DA, which will enable the retirement of ecosystem credits for Swamp Oak Floodplain Forest and River-flat Eucalypt Forest.

Goodman were granted an extension to the 12 month timeframe on 25 October 2017 by the Department, with the retirement of ecosystem credits due by the 26 January 2018.

1.2.2 Watercourse Realignment Works Plans

The Oakdale South Watercourse Realignment Works Plans (AECOM 2016) Drawing Set 60333552 have: informed the design of the master plan; the EIS prepared for SSD 6917; and formed the basis of later detailed construction drawings. The restoration of the watercourse riparian zone is addressed specifically within the VMPs prepared by Ecohort (2015, 2016, 2017) and later revision prepared for SSD 6917 MOD 5 (écologique, 2017).

1.2.3 Vegetation Management Plan

The original version of the Vegetation Management Plan (VMP) was submitted as part of the SSD 6917 documentation by Goodman to demonstrate how the construction impacts associated with the filling of two tributaries of Ropes Creek and the realignment of Drainage Line 1 would be managed.

The VMP was prepared commensurate with the NSW Department of Primary Industries -Water (DPIW) guidelines for controlled activities on waterfront land, specifically the “Guidelines for vegetation management plans on waterfront land” (July 2012).

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* (WM Act). However, it should be noted that:

1. Under Part 4 Division 4.1 Section 89J of the EP&A Act, controlled activity approval is not required for SSD proposals,
2. Preparation of the VMP was not a requirement identified in the SEARs or submissions made by DPIW during the preparation of the SEARs, and
3. In addition to the riparian restoration works associated with the watercourse realignment, the VMP addressed the main riparian zone of Ropes Creek whilst acknowledging that this zone was intended to be an integral component of the proposed biodiversity offset area.

During the assessment of SSD 6917, the NSW Office of Environment and Heritage (OEH) requested the five year vegetation management restoration / rehabilitation measures proposed under the VMP not be included in the proposed biodiversity offset area to avoid precluding the creation of the proposed biobank site under clause 11 of the *Threatened Species Conservation (Biodiversity Banking) Regulation 2008*.

In response the Department amended consent condition E47 to the following:

Prior to the issue of any Construction Certificate that includes the creek realignment works, the Applicant shall submit a revised Vegetation Management Plan (VMP). The revised VMP:

- (a) Be submitted to the satisfaction of the Secretary*
- (b) Be prepared in consultation with the OEH*
- (c) Remove any geographic overlap with Figure 4.3 in the Biodiversity Offset Strategy, prepared by Cumberland Ecology, dated 16 September 2015, and*

(d) Be consistent with the management measures and recommendations of the draft VMP prepared by EcoHort Pty Ltd dated 31 August 2015.

Note: the intention of Condition E47 was to ensure the 5yr vegetation management restoration / rehabilitation measures proposed under the VMP were not included in the proposed biobank area to avoid precluding the creation of the proposed biobank site under clause 11 of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008

Clause 11(e) of the Biodiversity Banking Regulation excludes land from being designated as a biobank site if there is an existing conservation obligation for the purpose of complying with requirements imposed by or under any Act (including the requirements of any authority granted by a public authority under any Act).

By separating the geographic overlap of the VMP and the biodiversity offset area, the Department was able to condition the implementation of the VMP without prejudicing the creation of the biodiversity offset area under the BioBanking Regulation. The works would therefore not constitute an 'existing obligation' other than the 5 year vegetation management measures in the riparian corridor to which the VMP applies, which would have otherwise been required by the consent in order to be consistent with the application of the guidelines as if they were to apply.

During consultation conducted to meet condition E47, OEHL advised it preferred an approach where the VMP encompassed both the proposed offset area and riparian corridor to ensure the lands are managed comprehensively. To clarify this arrangement, Goodman submitted amended VMPs (Ecohort 2016, 2017), which detailed the VMP and biodiversity offset areas with the geographic overlap removed.

Ultimately, it was intended that the geographic boundaries between the VMP and biodiversity offset areas would be later removed via a S96 modification in consultation with OEHL, and a separate BioBanking agreement entered into that includes the VMP management zones (as relevant to the main riparian zone of Ropes Creek).

1.2.4 SSD 6917 MOD 1 Consent Conditions

On 21 April 2017, the Department granted approval for amendments to the Concept Proposal and Stage 1 DA layouts to accommodate future tenant's site layout requirements for access, loading and unloading and building orientation (SSD 6917 MOD 1).

The approved amendments increased the area of site clearing by approximately 0.42 ha. The clearing did not impact on native vegetation but did impact on exotic grassland which is part of the biodiversity offset area. The result was a reduction in the total number of ecosystem credits generated in the proposed offset area. However sufficient ecosystem credits generated from the reduced biodiversity offset area remain to offset relevant ecosystem credits required.

Following a peer review of the draft BAR submitted for the SSD 6917 (including site inspection of vegetation to be cleared), mapping was amended to remove areas of shading to produce a more accurate representation of vegetation to be removed. Consequently the number of credits required to offset the development was reduced from 160 to 158 ecosystem credits.

The reduced areas and ecosystem credits were documented in the BAR and BOS (Cumberland Ecology 2016a and 2016b respectively) submitted with SSD 6917 MOD 1, but were not updated within the consent conditions.

1.3 Purpose of this BOS Amendment

The purpose of this BOS amendment is to formalise the biodiversity offset areas, such that:

6. The main area of the Ropes Creek riparian zone is:
 - (c) incorporated into the biodiversity offset areas (BOS), and
 - (d) will be managed in perpetuity under the relevant Biodiversity Management Action Plan and biobanking agreement.
7. The smaller and disjunct riparian area adjacent to Precinct 6 (included in the BOS 2016b) is removed from the biodiversity offset area.

Note: the riparian zone at this location is only feasibly accessed from the northern side of Ropes Creek. Uncertainty in relation to the future management of the southern side of Ropes Creek is also a factor in its removal from the proposed biodiversity offset area;
8. The section of the watercourse realignment (included in the BOS 2016b) is removed from the biodiversity offset area, for similar reasons as the riparian area adjacent to Precinct 6; and
9. All areas are amended to reflect more accurate data collected during surveys of Oakdale South’s relevant boundaries (LTS Lockley, 2017); and
10. Consent conditions are amended to reflect the reduced area of vegetation clearing and responding retirement of 160 to 158 ecosystem credits.

Figure 1-1 shows the areas removed and the areas to which this BOS amendment applies.

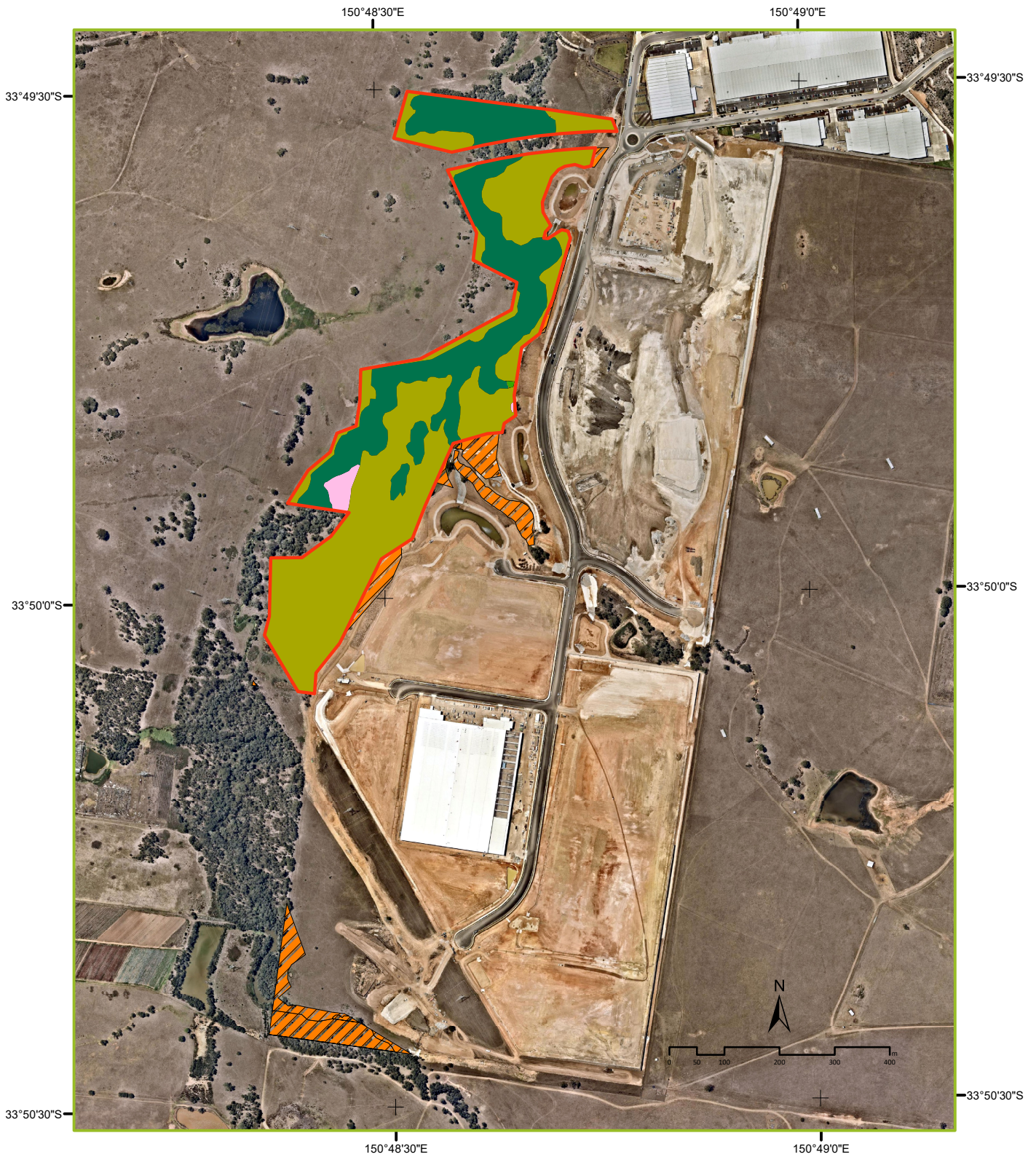
1.2.4 Additional relevant consent conditions

Oakdale South contains approximately 34.8 ha of non-developable land that is reserved for biodiversity conservation and various landscaping treatments. SSD 6917 consent condition F4 requires the preparation of an Operational Environmental Management Plan (OEMP) prior to the commencement of Oakdale South operations. The OEMP (SLR 2018) provides the strategic framework for environmental management at the Oakdale South and outlines all environmental management practices and procedures to be followed.

Relevantly, this BOS is one of several supporting management plans to the OEMP (SLR 2018). How each area will be managed are detailed in separate management plans which support an overarching OEMP. These areas are shown in Figure 1-2 and summarised in Table 1-1.

Table 1-1. OEMP management areas

Basin Management Plan	Area (ha)
Basin Management Plan	1.8
Landscape Management Plan	6.3
Landscape Boundary Screening Plan	2.8
Vegetation Management Plan	4.8
Biodiversity Management Plan –the subject of this plan	19.2
	34.8

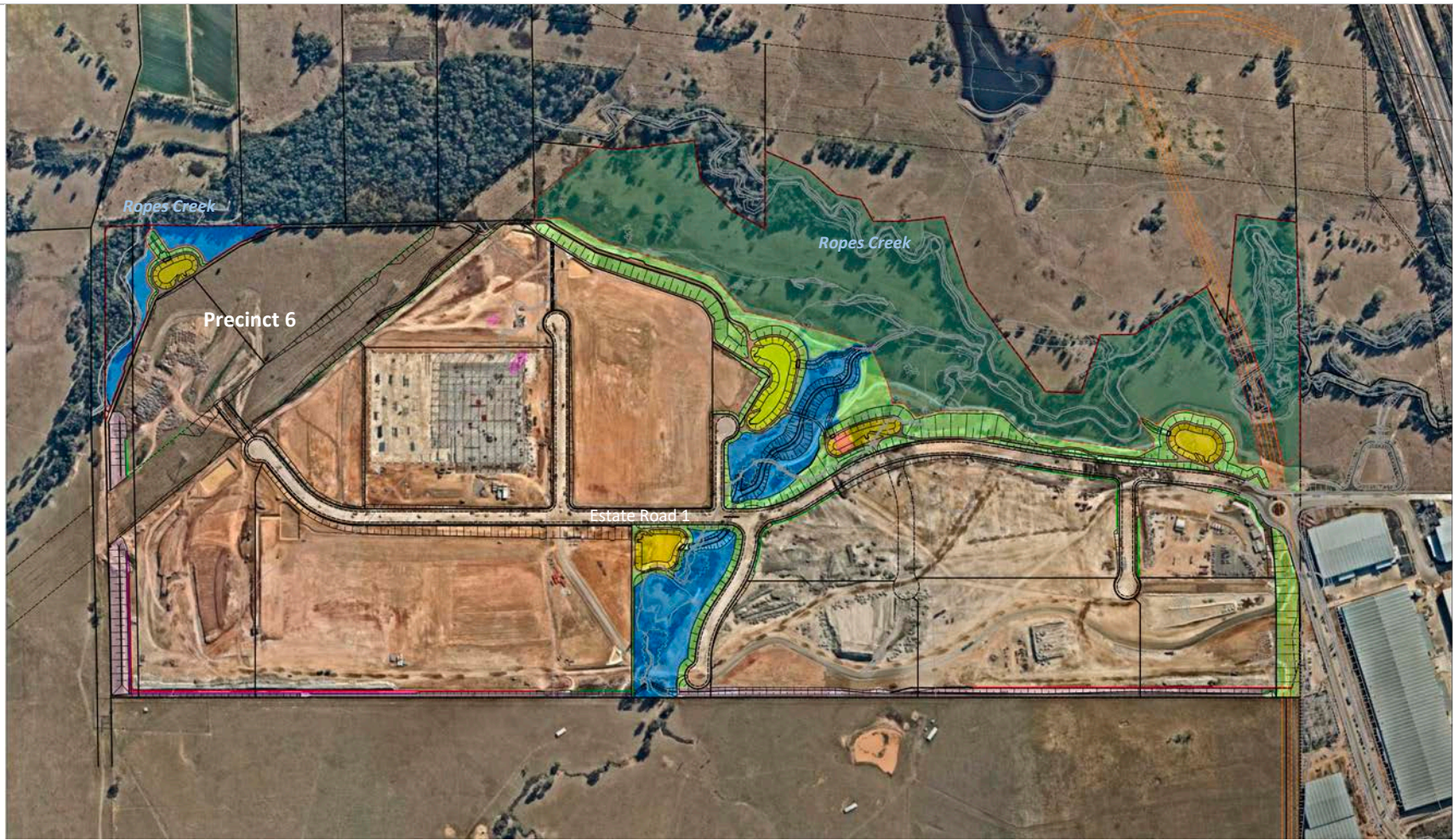


- Biodiversity offset areas
- HN526 Riverflat Eucalypt Forest (mod-good condition)
- HN526 Riverflat Eucalypt Forest (low condition)
- HN594 Swamp Oak Forest (mod-good condition)
- BOS areas (CE, 2016)

Oakdale South Estate Biodiversity Offset Strategy

Figure 1.1. Areas affected by this amended BOS

Coordinate System: MGA Zone 56 (GDA 94)
Image source: Nearmap 18 January 2018



- | | | | |
|---|---------------------------|---|----------------------------|
|  | VMP areas |  | Landscape management areas |
|  | Biodiversity offset areas |  | Landscape screening areas |
| | |  | Basins |

Oakdale South Estate

Figure 1-2. OEMP Management Zones

Imagery source: AT&L 11/12/2017

2. Impacts of the Development

2.1 Biodiversity Assessment

The current biodiversity assessment report (BAR) prepared for SSD 6917 MOD 1 (Cumberland Ecology, 2016a) remains unchanged.

In summary the BAR was prepared to assess the potential impacts of the Oakdale South development on the site's flora and fauna in accordance with the FBA and fulfilled the SEARs issued for SSDA 6917 as they relate to flora and fauna, specifically:

- Identification of the quantity and type of vegetation to be cleared;
- An assessment of direct and indirect impacts on threatened species, populations and ecological communities, and their habitats in accordance with the FBA; and
- Proposed measures to avoid, mitigate or offset any significant impacts in accordance with the NSW Biodiversity Offset Policy for Major Projects.

The Oakdale South development site is located on land historically used for cattle grazing and therefore has avoided and minimised impacts to native vegetation. Remnant native vegetation at the site is largely associated with the riparian corridors of Ropes Creek and its tributaries and comprises three plant community types (PCTs):

- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin (HN526);
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin (HN528); and
- Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion (HN598).

2.2 Impacts of the Development

The proposal will unavoidably remove 3.55 ha of native vegetation and 91.72 ha of low diversity/exotic grassland. Native vegetation to be removed includes three vegetation communities; listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as either Endangered Ecological Communities (EEC) or Critically Endangered Ecological Communities (CEEC).

In accordance with the FBA, impacts that require further consideration by OEH include any impact on a CEEC (unless specifically excluded in the SEARs) if it is likely to

- a) cause the extinction of the CEEC from the IBRA subregion, or
- b) significantly reduce the viability of the CEEC.

HN528 conforms to the TSC Act listed CEEC of Cumberland Plain Woodland in the Sydney Basin Bioregion and the EPBC Act listed CEEC of Cumberland Plain Shale Woodland. The impacts to HN528 were assessed through consideration of the information provided in *Section 7.2.2* of the Oakdale South BAR (Cumberland Ecology 2015) during the assessment of SSD 6917.

This PCT is being offset through the purchase and retirement of the required ecosystem credits (i.e. is not being offset onsite).

HN528 within the site did not meet the core threshold to be considered as a CEEC under the EPBC Act due to its size of only 0.29 ha which is lower than the threshold of 0.5 ha. As such referral under provisions of the EPBC Act was not required.

A summary of the areas directly impacted within the development site are shown in Table 2-1 along with the ecosystem credits required as determined by Cumberland Ecology (2016a).

Table 2-1. Summary of impacts to PCTs from the development of Oakdale South

Vegetation to be removed	Status		Area (ha)	Ecosystem credits required
	TSC Act	EPBC Act		
HN526: Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin	EEC		2.11	104
HN528: Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin	CEEC	CEEC	0.29	12
HN594: Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion	EEC		1.15	42
Total			3.55	158

3. Biodiversity Offsetting Strategy

3.1 Objectives

The specific objectives of the BOS are to provide guidance for the delivery of mitigation for the impacts from the development and to achieve a long-term conservation gain for threatened species, populations and communities impacted by the development.

The following were considered in establishing the biodiversity offsetting objectives:

- Securing the protection and management areas containing impacted threatened species and vegetation communities in perpetuity;
- Providing an area of offset that is greater than the impacts of the development; and
- Providing habitat and vegetation communities that is of equal to or better condition than that impacted by the development.

3.2 Amended Biodiversity Offset Areas

The biodiversity offset areas approved in the original SSD 6917 and SSD 6917 MOD1 require amendment due to differences found in more recent survey data (LTS Lockley, 2017) and rationalisation of the various management areas now formally identified within the Oakdale South OEMP (refer Section 1.2.4).

The amended BOS has considered adjoining land use interfaces and potential management conflicts, which are likely to impact on fulfilling the objectives and management requirements (in perpetuity) of the biodiversity offset areas. The rationalisation of management areas does not conflict with any of SSD 6917 or SSD 6917 MOD 1 consent conditions.

Table 3-1 provides a summary of amendments made to the biodiversity offset areas over time.

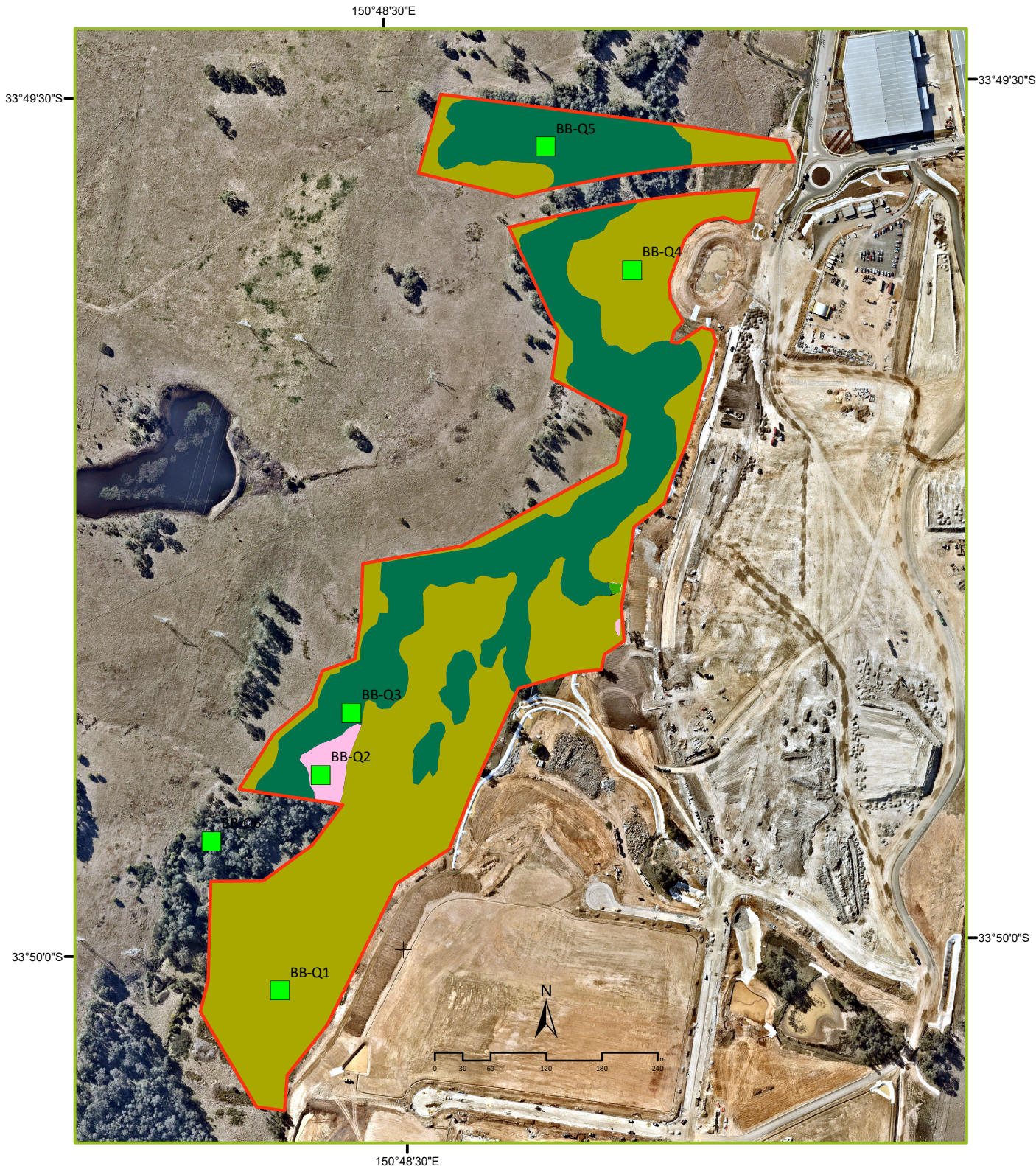
Table 3-1. Amendments made to biodiversity offset areas

Relevant BOS documentation	Status description	Area (ha)
SSD 6917 BOS (Cumberland Ecology 16 September 2015)	Original biodiversity offset area approved (26 October 2016)	21.43
SSD 6917 MOD 1 BOS (Cumberland Ecology 18 August 2016)	Amended biodiversity offset area approved (21 April 2017)	21.12
SSD 6917 MOD 6 (the subject of this BOS amendment)	Amended biodiversity offset area (January 2018)	19.20

As identified in Table 3-1 the BOS applies to an area of 19.2 ha, which is separated into two areas by land reserved for the the future Southern Link Road (see Figure 1-2).

The biodiversity offset area was further divided by Cumberland Ecology (2016b) into management zones based on the existing remnant plant community type or that which is intended to be restored.

Figure 3-1 shows the management zones applicable to this BOS and Table 3-2 identifies the management zones delineated by Cumberland Ecology (2016b) and those applicable to this amended BOS.



- 1. HN526 Riverflat Eucalypt Forest (mod-good condition)
- 2. HN526 Riverflat Eucalypt Forest (low condition)
- 3. HN594 Swamp Oak Forest Forest (mod-good condition)
- Biodiversity offset areas
- Plot locations

Oakdale South Estate Biodiversity Offset Strategy

Figure 3.1. Management Zones

*Coordinate System: MGA Zone 56 (GDA 94)
Image source: Nearmap 18 January 2018*

Table 3-2. Biodiversity offset management zones

Zone		Description	Area (ha)	
			2016	2018
1	HN526 Mod-Good	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin	1.19	0.30
2	HN526 Low	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin	12.65	11.70
3	HN594 Mod-Good	Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion	7.28	7.20
Total offset area			21.12	19.20

3.3 Approach to amending the BOS

For the most part, the data collected and assessment conducted by Cumberland Ecology (2016b) remains largely unchanged.

3.3.1 Assessment circles

No change has been made.

A 1,000 ha outer assessment circle and 100 ha inner assessment circle was established to identify landscape features associated with the biodiversity offset areas, with the inner assessment circle centred on the portion of the biodiversity offset area that contained the highest improvement of percent native vegetation cover.

3.3.2 Landscape features

No change has been made. Table 3-3 summarises the landscape features used in the assessment.

Table 3-3. Landscape features used in this assessment

Landscape feature	Outer assessment circle	Biodiversity offset area
IBRA bioregion	Sydney Basin (100%)	Sydney Basin (100%)
IBRA subregion	Cumberland Plain (100%)	Cumberland Plain (100%)
NSW Mitchell landscape	Cumberland Plain (98%) Sydney Basin Diatremes (2%)	Cumberland Plain (100%)
Rivers and streams	Hawkesbury Nepean catchment: Ropes Creek 3 rd order stream Ropes Creek tributary 1 st order stream	Hawkesbury Nepean catchment: Ropes Creek 3 rd order stream Ropes Creek tributary 1 st order stream
Wetlands	Nil	Nil

Landscape feature	Outer assessment circle	Biodiversity offset area
Native vegetation extent	117 ha (12%)	14.44 ha (14%) - inner assessment circle
State or regionally significant biodiversity links	Nil	Nil

3.3.3 Landscape value score

No change has been made. Table 3-4 summarises the landscape value attributes used in the assessment.

Table 3-4. Landscape value attributes used in this assessment

Landscape feature	Outer assessment circle	Biodiversity offset area
Strategic location	-	Both sides of Ropes Creek , 3 rd order stream
Percent native vegetation existing	117 ha (12%)	14.44 ha (14%) - inner assessment circle
Percent native vegetation future	129.55 ha (13%)	26.31 ha (26%) - inner assessment circle
Connectivity value		One connecting link – assessment required due to location of site within a strategic location
Patch size	91 % cleared 228.6 ha	91 % cleared 228.6 ha Score = 12 (extra large)
Landscape value		23.30

3.3.4 Ecosystem credit species

No change

Predicted ecosystem credit species are based on:

- Cumberland IBRA subregion
- PCTs HN526 and HN594
- 12% native vegetation in outer assessment circle
- Moderate to good condition in zones 1 and 3, and low condition in zone 2
- Patch size of 222.86 ha for zones 1 and 3, and 0 ha for zone 2

The highest Tg value used for all zones = 3 for the Masked Owl (*Tyto novaehollandiae*) and Powerful Owl (*Ninox connivens*). No additional assessment for habitat components was undertaken. No species credits are being sought.

3.4 Gain in Biodiversity Values

The biodiversity values of the site have been assessed based on the following:

- Landscape value
- Biodiversity values of native vegetation
- Biodiversity values of threatened species

The gain in site value scores as a result of management actions is provided in Table 3-5.

Table 3-5. Gain in site values

Zone / Condition	Change from 2016 to 2018	Current site value	Future site value	Gain in site value
1. HN526 – moderate to good	none	46.88	62.85	15.97
2. HN526 – low	yes	From 12.5 to 9.9	From 29.25 to 24.93	From 16.75 to 14.93
3. HN594 – moderate to good	none	76.09	89.37	13.28

The gain in the landscape score changed from 23.20 to 23.30.

3.5 Amended Credit Balance

Due to the removal of the areas of the watercourse realignment and south west corner adjacent to Precinct 6, and refinement of surveyed boundaries, an amended credit balance has been determined using the biobanking calculator (see Table 3-3 and Appendix A).

In summary the biodiversity offset area will still generate a surplus of credits above that required to offset the impacts to both HN526 and HN594 from the Oakdale South development.

Table 3-6. Amended credit balance

Zone	BAR 2016	BOS 2016				Amended BOS (2018)			
	Credits required	Offset area (ha)	Credits generated		Credit balance	Offset area (ha)	Credits generated		Credit balance
0. HN528#	12	0	0	0	-12	0	0	0	-12
1. HN526	104	1.19	13	143	39	0.30	3	116	12
2. HN526		12.65	130			11.70	113		
3. HN594	42	7.28	80	80	38	7.20	78	78	36
	158	21.12	223	223	65	19.20	194	194	36

Offsets for HN528 are being secured through purchase and retirement of ecosystem credits

4. References

AECOM (2016) Oakdale South Industrial Development Watercourse Design. Report prepared for Goodman.

Cumberland Ecology (2015a) Oakdale South State Significant Development Application Biodiversity Assessment Report (BAR), prepared for Goodman Property Services (Aust.) Pty Ltd, September 2016.

Cumberland Ecology (2015b) Oakdale South State Significant Development Application Biodiversity Offsetting Strategy (BOS), prepared for Goodman Property Services (Aust.) Pty Ltd, August 2016.

Cumberland Ecology (2016a) Oakdale South State Significant Development Application Biodiversity Assessment Report (BAR), prepared for Goodman Property Services (Aust.) Pty Ltd, November 2016.

Cumberland Ecology (2016b) Oakdale South State Significant Development Application Biodiversity Offsetting Strategy (BOS), prepared for Goodman Property Services (Aust.) Pty Ltd, August 2016.

Ecohort (2015) Vegetation Management Plan for the Oakdale South Development at Horsley Park. Prepared by Ecohort Pty Ltd for Goodman, 31 August 2015.

Ecohort (2016) Vegetation Management Plan for the Oakdale South Development at Horsley Park. Prepared for Goodman, 11 December 2016.

Ecohort (2017) Vegetation Management Plan for the Oakdale South Development at Horsley Park. Prepared for Goodman, 13 January 2017.

écologique (2017) Draft Oakdale South Estate Vegetation Management Plan. Prepared for Goodman Australia Pty Ltd. 18/12/2017.

Hawkesbury River County Council (2017) Biosecurity Priority Weeds Local Plan October 2017.

LTS Lockley (2017) Plan of Subdivision of Lot 12 in DP 1178389 and LOT 87 in DP 752041. Draft prepared in December 2017.

SLR (2018) Draft Oakdale South Industrial Estate Master Plan: Operational Environmental Management Plan. Report Number 610.17706 prepared for Goodman 15 January 2018.

Appendix A. Biobanking Credit Report



This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 23/01/2018

Time: 6:30:41PM

Calculator version: v4.0

Biobank details

Proposal ID: 195/2017/4227B

Proposal name: SSD 6917 Oakdale South Estate Offset Site

Proposal address: Millner Street Erskine Park NSW

Proponent name: Goodman Property Services (Aust) Pty Ltd

Proponent address: Level 17 60 Castlereagh Street Sydney NSW 2000

Proponent phone: +61 2 9230 7225

Assessor name: Kat Duchatel

Assessor address: 12 WANGANELLA ST Bowgowlah NSW 2093

Assessor phone: 0437 821 110

Assessor accreditation: 195

Additional information required for approval:

- Use of local benchmark
- Expert report...
- Request for additional gain in site value

Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	12.00	116.00
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	7.20	78.00
Total	19.20	194

Credit profiles

1. Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion, (HN526)

Number of ecosystem credits created	3
IBRA sub-region	Cumberland - Hawkesbury/Nepean

2. Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion, (HN526)

Number of ecosystem credits created	113
IBRA sub-region	Cumberland - Hawkesbury/Nepean

3. Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion, (HN594)

Number of ecosystem credits created	78
IBRA sub-region	Cumberland - Hawkesbury/Nepean

Species credits summary

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Exclude commercial apiaries
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Exclude miscellaneous feral species
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Feral and/or over-abundant native herbivore control
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Fox control
Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Slashing
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Control of feral pigs
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Exclude commercial apiaries
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Exclude miscellaneous feral species
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Feral and/or over-abundant native herbivore control
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Fox control
Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Maintain or re-introduce natural flow regimes

Appendix B. Plot data



Flora survey transect used in this assessment

Plot Name	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL	Easting	Northing	Zone
BB-Q1	8	0	0	24	0	0	33.33	0	1	1	297066	6254119	56
BB-Q2	35	40	0	88	4	24	6	0	1	12	297110	6254351	56
BB-Q3	31	44	8	80	2	46	12	0	1	20	297143	6254418	56
BB-Q4	3	0	0	6	0	0	33.33	0	0	0	297445	6254895	56
BB-Q5	24	61.5	0	90	2	36	12	1	1	17	297352	6255028	56
BB-Q6	23	20	8	54	18	0	32.6	1	1	20	296992	6254280	56

NPS	Native plant species richness 1
NOS	Native over-storey cover (%)
NMS	Native mid-storey cover (%)
NGCG	Native ground cover (grasses) (%)
NGCS	Native ground cover (shrubs) (%)
NGCO	Native ground cover (other) (%)
EPC	Exotic plant cover
NTH	Number of trees with hollows
OR	Over-storey regeneration
FL	Total length of fallen logs (m)



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