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STATE WATER CORPORATION

Chaffey Dam Augmentation and Safety Upgrade

Vegetation Offset Plan

301015-02980 – 301015-02980-REP-0015

1 November 2013

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SYNOPSIS

This Vegetation Offset Plan has been prepared by WorleyParsons Services Pty Ltd to document the proposed vegetation site to offset impacts to biodiversity arising from the Chaffey Dam Augmentation and Safety Upgrade Project.

PROJECT 301015-02980 - CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE							
REV	DESCRIPTION	ORIG	REVIEW	QUALITY MANAGEMENT REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL
A	Issued for internal review	N Cowlishaw	S Mason-Jones		N/A	22-Oct-13	
B	Issued for client review	N Cowlishaw	S Mason-Jones	R Power	N/A	24-Oct-13	
0	Issued for use	N Cowlishaw	R Power	R Power	C Thomas	01-Nov-13	

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TERMS AND ACRONYMS

Acronym / Term	Definition
AHD	Australian height datum
BBAM	BioBanking assessment methodology
BCC	BioBanking credit calculator
CEEC	Critically endangered ecological community
DoE	Commonwealth Department of the Environment (formerly Department of Sustainability, Environment, Water, Population and Communities, SEWPaC)
DP&I	NSW Department of Planning and Infrastructure
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FFA	Terrestrial and Aquatic Flora and Fauna Impact Assessment (nghenvironmental 2012)
FSL	Full supply level
GL	Gigalitres
ha	Hectares
Impact Site	The area to be impacted by the Project through inundation and clearing
km	Kilometres
NES	Matters of National Environmental Significance under the EPBC Act
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
Offset Site	The North-Western Offset Site
PFC	Projected foliage cover
PIR	Preferred Infrastructure Report
SSD	State significant development
SSI	State significant infrastructure
State Water	State Water Corporation
TEC	Threatened ecological community
The Project	Chaffey Dam Augmentation and Safety Upgrade Project
TSC Act	NSW *Threatened Species Conservation Act 1995*
WorleyParsons	WorleyParsons Services Pty Ltd

EXECUTIVE SUMMARY

State Water Corporation (State Water) is planning to carry out the Chaffey Dam Augmentation and Safety Upgrade Project (the Project). Chaffey Dam is located on the Peel River approximately 30 kilometres (km) south east of Tamworth, in northern New South Wales (NSW).

The Project is required for the dam to comply with current Australian National Committee on Large Dams (ANCOLD) and Dams Safety Committee safety standards for high hazard dams as well as to meet the future town water supply, irrigation and agricultural needs of the Tamworth region.

The Project will result in a 6.5m increase to the full supply level (FSL) of the reservoir, from 518.6 m Australian Height Datum (AHD) to 525.1 m AHD; an increase in the permanent storage capacity from 62 gigalitres (GL) to 100 GL and inundation of an additional 185ha of land that occurs immediately adjacent to the existing reservoir.

Flora and Fauna Impact Assessment and Addendum Reports were prepared for the Project by nghenvironmental in 2012 and 2013, respectively. The Assessment and Report concluded that the Project will impact on approximately 160 ha of native vegetation, of which about 150 ha contains the White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (EEC), which is listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Further, the Report concluded that within the area of EEC vegetation, approximately 7.5 ha is considered to comprise the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (CEEC) which is listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

nghenvironmental concluded that the Project will not have a significant impact on either the TSC Act listed EEC or on the EPBC Act listed CEEC.

While not having any significant impacts, the impacts of the Project on the TSC Act listed EEC are required to be offset in accordance with the:

- NSW Office of Environment and Heritage (OEH) *Interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* (*OEH SSI Interim Offsets Policy*);
- *Principles for the use of biodiversity offsets in NSW*; and
- *NSW offset principles for major projects (state significant development and infrastructure)*.

The *EPBC Act Environmental Offsets Policy* requires offsets to be implemented where a significant impact remains after implementation of avoidance and mitigation measures. Accordingly, the provisions of the *EPBC Act Environmental Offsets Policy* do not trigger the need for an offset for the Project.

However, consideration of the offset proposed for the TSC Act listed EEC against the *EPBC Act Environmental Offsets Policy* is provided to demonstrate the conservation outcomes for the CEEC expected to be achieved through implementation and management of the North-Western Offset Site.

This Vegetation Offset Plan has been prepared to detail the proposed vegetation offset site for the Project. Offsets for the Booroolong Frog are the subject of a separate plan.

The proposed vegetation offset site, described as the North-Western Offset Site, is located on the northern and western foreshore of Chaffey Dam. The North-Western Offset Site is approximately 1,000 ha in size and comprises the allotments shown in the table below, which are contiguous with each other and with the impact site (i.e. the areas to be inundated or cleared by the Project).

Land comprising the North-Western Offset Site

Lot	Whole or Part Lot	Deposited Plan (DP)	Registered Landowner[1]	State Water Acquired Land[2]
1	Whole	589245	Water Administration and Ministerial Corporation*	Yes
1	Whole	589247	Land and Property Management Authority	Yes
2	Whole	589247	Land and Property Management Authority	Yes
2	Whole	615111	Land and Property Management Authority	Yes
3	Part	615111	Land and Property Management Authority	Yes
2	Part	631895	Department of Sport Recreation and Racing	Yes
7012	Whole	1026362	The State of New South Wales*	No
5	Part	1139917	Water Administration and Ministerial Corporation*	Yes
6	Part	1139917	Land and Property Management Authority	Yes
7	Part	1139917	Water Administration and Ministerial Corporation*	Yes
1	Part	1174369	Water Administration and Ministerial Corporation	Yes

[1] Based on cadastral data supplied by Tamworth Regional Council to WorleyParsons, except those marked with an asterisk (*) for which Land Titles were obtained to establish the registered landowner.

[2] Land listed as "ACQUIRED LANDS D.W.R., W.R.C., W.A.M.C., W.C.&I.C. AND S.W.C." on the State Water plan labelled "Chaffey Dam. Map showing acquired lands and lands affected by proposed new FSL 1:100 year flood and possible maximum flood". Date of Map: August 2012. Plan No. D11/0049.

State Water has confirmed that a Vesting Order was issued for all of the land within the North-Western Offset Site, excluding Lot 7012 DP 1026362, and that the land is currently vested in State Water. State Water is seeking delegation from the Minister for Trade and Investment to enable it to enter into Conservation Agreements over the land or to transfer the land into State Water's ownership. Either the delegation or the transfer of ownership will be in place prior to Project impacts occurring.

Lot 7012 DP 1026362 is owned by the State of New South Wales. On the certificate of title for this lot, it is described as being a reserve within the meaning of Part 5 of the *Crown Lands Act 1989*. However it does not appear that this reserve is being managed for the purposes of conservation. State Water proposes to liaise with NSW Trade & Investment Crown Lands with the aim of acquiring this land for incorporation into the North-Western Offset Site.

An assessment of potential additional offset areas surrounding the reservoir found no sites were considered to be suitable for use as an additional offset site for the Project. A search of the BioBanking Public Register on 26 February 2013 by nghenvironmental (2013d) found no credits for the EEC to be available on the market.

In order to secure the North-Western Offset Site for the purposes of a biodiversity offset, it is proposed that a Conservation Agreement under the *National Parks and Wildlife Act 1974* be established over the land. The Conservation Agreement will comprise a joint agreement between State Water and the NSW Minister for the Environment and will remain in place for the life of the proposed augmentation

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site. To achieve this objective, the management actions have been designed to reduce the level of threats currently occurring at the site.

The following management actions will be implemented:

- Strategic stock exclusion;
- Weed control;
- Feral animal control;
- Restriction of public access;
- Assisted regeneration; and
- Controlled burns.

A North-Western Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions.

The North-Western Offset Site was selected and management actions developed having regard to the following key policies:

- *OEH SSI Interim Offsets Policy*;
- *Principles for the use of biodiversity offsets in NSW*; and
- *NSW offset principles for major projects (state significant development and infrastructure)*.

Further, consideration was given to the *Namoi Catchment Management Authority Biodiversity Offsets Policy 2011*.

Although an offset is not required under the *EPBC Act Environmental Offsets Policy*, the North-Western Offset Site complies with the principles of that policy and provides an appropriate offset in accordance with the EPBC Act Offsets Assessment Guide.

The BioBanking Assessment Methodology (BBAM) was used to assess the suitability of the North-Western Offset Site to adequately offset the impacts of the Project. In accordance with the *OEH SSI Interim Offsets Policy*, the BBAM was used to:

- Quantify and categorise the biodiversity values and impacts of the Project; and
- Establish, for benchmarking purposes, the offsets that would be required if the Project were expected to meet the "*improve or maintain*" standard required under the BioBanking Scheme.

The North-Western Offset Site, with an area of approximately 1,000 ha, provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC.

An assessment carried out in accordance with the BBAM showed an overall ecosystem credit surplus of 2,355 credits. Although the site has a 4,609 credit deficiency to satisfy the BBAM for the White Box Yellow Box Blakely's Red Gum Woodland EEC, implementation of the *NSW offset principles for major projects (state significant development and infrastructure)* and *OEH SSI Interim Offsets Policy* Tier 3 standard variation criteria (a), enables this deficiency to be compensated by the surplus of credits for the Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest. This provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

Therefore, the selection of the North-Western Offset Site and the proposed management actions will provide an appropriate offset for the Project in accordance with the relevant NSW offset policy requirements and positive long-term conservation outcomes in accordance with the *EPBC Act Environmental Offsets Policy*.

1 INTRODUCTION

1.1 Project Background

State Water Corporation (State Water) is planning to carry out the Chaffey Dam Augmentation and Safety Upgrade Project (the Project). Chaffey Dam is located on the Peel River approximately 30 kilometres (km) south east of Tamworth, in northern New South Wales (NSW).

The Project will result in a 6.5m increase to the full supply level (FSL) of the reservoir, from 518.6 m Australian Height Datum (AHD) to 525.1 m AHD and an increase in the permanent storage capacity from 62 gigalitres (GL) to 100 GL. It will also result in inundation of an additional 185 ha of land immediately adjacent to the existing reservoir.

In April 2012, WorleyParsons Services Pty Ltd (WorleyParsons) was engaged to prepare an Environmental Impact Statement (EIS) for the Project on behalf of State Water. The EIS was prepared to accompany a State Significant Infrastructure (SSI) application, submitted to the Minister for Planning and Infrastructure pursuant to Part 5.1, Division 2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

On 29 August 2012, State Water referred the Project to the then Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (now the Department of the Environment, DoE) under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 28 September 2012 the then Minister for SEWPaC declared the project a controlled action, requiring assessment and approval under the EPBC Act. SEWPaC advised that the Project would be assessed through an accredited assessment process under Part 5.1 of the EP&A Act.

The EIS that was prepared for the Project (WorleyParsons 2012) addressed the Director-General's Requirements (DGRs) received on 23 January 2012 and supplementary DGRs received on 19 October 2012.

A Preferred Infrastructure Report (PIR) (WorleyParsons 2013a) was prepared in accordance with the requirements of Part 5.1 of the EP&A Act and the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) to respond to submissions received during and following public exhibition of the EIS. The PIR incorporated a combined Offset Plan (incorporating offsets for both vegetation and the Booroolong Frog), that was prepared by nghenvironmental Pty Ltd (nghenvironmental 2013b).

On 31 May 2013, additional Project information, including a revised Offset Plan (nghenvironmental 2013d), was submitted to the Department of Planning and Infrastructure (DP&I) in response to comments on the PIR by Commonwealth and NSW Government Agencies.

Further comments in regard to the revised Offset Plan (nghenvironmental 2013d) were provided by Commonwealth and NSW Government Agencies. On 20 August 2013, WorleyParsons submitted further additional information to DP&I in response to these comments, including additional information regarding vegetation offsets.

This Vegetation Offset Plan has been prepared to finalise the proposed vegetation offset site for the Project. Previous comments from State and Commonwealth Agencies in regard to offsets for the Project have been taken into consideration in preparing the Vegetation Offset Plan. The Vegetation Offset Plan incorporates all relevant information previously submitted to DP&I in regard to the proposed vegetation offset site for the Project.

Offsets for the Booroolong Frog are the subject of a separate plan.

1.2 Overview of Project Impacts

Terrestrial and aquatic flora and fauna impact assessments carried out for the EIS and PIR (nghenvironmental 2013a, 2013c), including desk top investigations and field surveys, determined that the Project will impact on approximately 160 ha of native vegetation (Table 1-1). Impacts to vegetation communities will result primarily from inundation to the new FSL (approximately 126 ha) and by direct clearing for construction (approximately 34 ha).

Of the native vegetation to be impacted by the Project, approximately 150 ha was considered to comprise the White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (EEC) listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Within the area of EEC vegetation, approximately 7.5 ha was considered to also comprise the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (CEEC) listed under the Commonwealth EPBC Act (nghenvironmental 2013c) (Table 1-2).

nghenvironmental (2013a, 2013c) found that the Project will not result in a significant impact to the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC or the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.

Impacts to the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC will be offset in accordance with the NSW Office of Environment and Heritage (OEH) *Interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* (OEH 2011) (*OEH SSI Interim Offsets Policy*), the *Principles for the use of biodiversity offsets in NSW* and the *NSW offset principles for major projects (state significant development and infrastructure)* (refer Section 3).

The *EPBC Act Environmental Offsets Policy* requires that offsets be implemented where a significant impact remains after implementation of avoidance and mitigation measures. Accordingly, no offset is required for the Project under the provisions of the *EPBC Act Environmental Offsets Policy*.

However, consideration of the offset proposed for the TSC Act listed EEC against the *EPBC Act Environmental Offsets Policy* is provided to demonstrate the conservation outcomes for the CEEC that are expected to be achieved through implementation and management of the North-Western Offset Site (refer Section 4).

Table 1-1 Impact of the Project on vegetation communities

Regional Vegetation Community (RVC)	Inundation Impact Area (ha)	Construction Impact Area (ha)	Total Impact Area (ha) [3]
Box–gum grassy woodlands, Brigalow Belt South and Nandewar (RVC 17)	30	6	36
Derived grasslands, Brigalow Belt South and Nandewar (RVC 28)	87	27	114
Silvertop Stringybark grassy open forests, eastern Nandewar and New England Tablelands (RVC 39)	3	1	4
River Oak Riparian Woodland, eastern NSW (RVC 71)	6	0	6
Wetlands and marshes, inland NSW (RVC 70)	0.25	0	0.25
Sub-total (native indigenous vegetation)	**126.25**	**34**	**160.25**
Planted non-indigenous native vegetation (no RVC)	9	2	11
Exotic non-native vegetation	45	2	47
Sub-total (non-native and non-indigenous vegetation)	**54**	**4**	**58**
TOTAL	**180.25**	**38**	**218.25**

[3] Areas do not include existing cleared areas, such as roads.

Table 1-2 Impact of the Project on Threatened Ecological Communities (TECs)

Threatened Ecological Community	Inundation Impact Area (ha)	Construction Impact Area (ha)	Total Impact Area (ha)
White Box Yellow Box Blakely's Red Gum Woodland (TSC Act listed EEC)	117	33	150
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act listed CEEC)	6	1.5	7.5

1.3 Scope

The Vegetation Offset Plan has been prepared to detail the proposed vegetation offset site for the Project. As discussed in Section 1.2, the provision of a suitable site is required in order for State Water to offset the assessed biodiversity impacts of the Project.

Although an offset is not required in accordance with the *EPBC Act Environmental Offset Policy*, a discussion is incorporated in Section 4 to show the conservation outcomes that the proposed vegetation offset site provides for the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.

As identified in Section 3.1.3, the impact of the Project on the threatened Booroolong Frog (*Litoria booroolongensis*) generates species credits that require offsetting. Offsets relevant to the Booroolong Frog are the subject of a separate Offset Plan and are not incorporated into this Vegetation Offset Plan.

Vegetation type nomenclature referred to in this plan is as defined within the Biometric Vegetation Types Database and utilised within the Biobanking Assessment Methodology (BBAM).

1.4 Aim and Objectives

The Vegetation Offset Plan aims to address the relevant requirements of State and principles of Commonwealth biodiversity offset policies, including:

- Project DGRs and supplementary DGRs;
- *OEH SSI Interim Offsets Policy*;
- *OEH Principles for the use of biodiversity offsets in NSW*;
- *NSW offset principles for major projects (state significant development and infrastructure)*;
- *EPBC Act Environmental Offsets Policy*; and
- *Namoi Catchment Management Authority Biodiversity Offsets Policy 2011.*

The objectives of the Vegetation Offset Plan are to:

- Document the area to be impacted by the Project, including the size and type of vegetation;
- Determine the offset requirements in regard to the relevant biodiversity offset policies;
- Document the proposed vegetation offset site, including Lot and DP, size and type of existing vegetation; and
- Define the proposed protection mechanism and management actions to be implemented at the proposed vegetation offset site.

2 THE NORTH-WESTERN OFFSET SITE

The proposed vegetation offset site, described as the North-Western Offset Site, is located on the northern and western foreshore of Chaffey Dam. The North-Western Offset Site covers an area of approximately 1,000 ha and comprises the allotments shown in Table 2-1, which are contiguous (excluding the Western Foreshore Road) with each other and with the impact site (Figure 2-1).

Table 2-1 Land comprising the North-Western Offset Site

Lot	Whole or Part Lot	Deposited Plan (DP)	Registered Landowner[4]	State Water Acquired Land[5]
1	Whole	589245	Water Administration and Ministerial Corporation*	Yes
1	Whole	589247	Land and Property Management Authority	Yes
2	Whole	589247	Land and Property Management Authority	Yes
2	Whole	615111	Land and Property Management Authority	Yes
3	Part	615111	Land and Property Management Authority	Yes
2	Part	631895	Department of Sport Recreation and Racing	Yes
7012	Whole	1026362	The State of New South Wales*	No
5	Part	1139917	Water Administration and Ministerial Corporation*	Yes
6	Part	1139917	Land and Property Management Authority	Yes
7	Part	1139917	Water Administration and Ministerial Corporation*	Yes
1	Part	1174369	Water Administration and Ministerial Corporation	Yes

[4] Based on cadastral data supplied by Tamworth Regional Council to WorleyParsons, except those marked with an asterisk (*) for which Land Titles were obtained to establish the registered landowner.

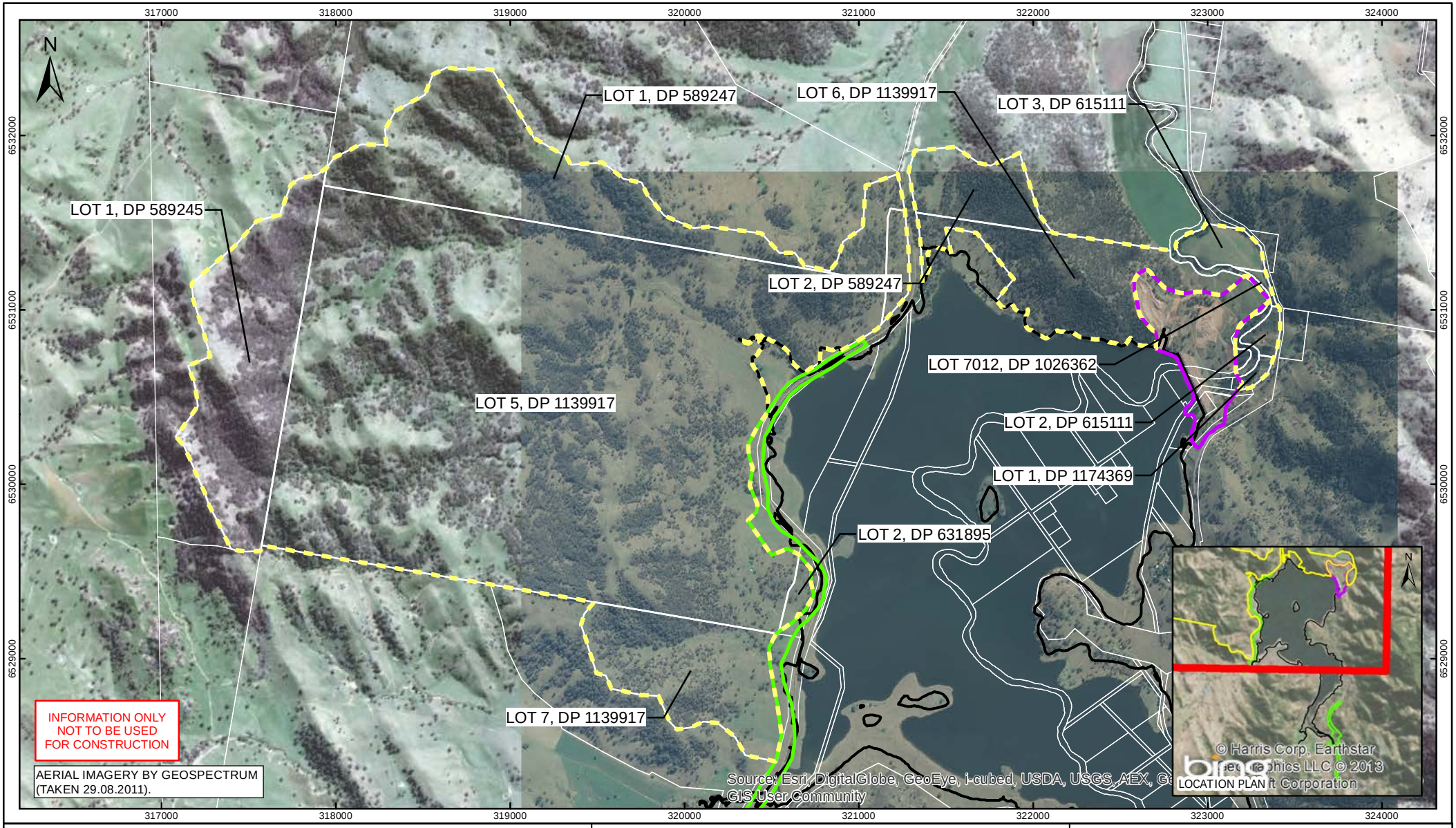
[5] Land listed as "ACQUIRED LANDS D.W.R., W.R.C., W.A.M.C., W.C.&I.C. AND S.W.C." on the State Water plan labelled "Chaffey Dam. Map showing acquired lands and lands affected by proposed new FSL 1:100 year flood and possible maximum flood". Date of Map: August 2012. Plan No. D11/0049.

State Water has confirmed that a Vesting Order was issued for all of the land within the North-Western Offset Site, excluding Lot 7012 DP 1026362, and that the land is currently vested in State Water. State Water is seeking delegation from the Minister for Trade and Investment to enable it to enter into Conservation Agreements over the land or to transfer the land into State Water's ownership. Either the delegation or the transfer of ownership will be in place prior to Project impacts occurring.

Lot 7012 DP 1026362 is owned by the State of New South Wales. On the certificate of title for this lot, it is described as being a reserve within the meaning of Part 5 of the *Crown Lands Act 1989*. However it does not appear that this reserve is being managed for the purposes of conservation. State Water will liaise with NSW Trade & Investment Crown Lands with the aim of acquiring this land for incorporation into the North-Western Offset Site. Given that Lot 7012 is a small lot, approximately 1.5 ha in size, failure of this liaison to secure this land as part of the offset site is considered very unlikely to impact on the conservation success of the North-Western Offset Site.

An assessment of potential additional offset areas was carried out for the areas surrounding the reservoir (Appendix 1). This assessment found no sites considered suitable for use as an additional offset site for the Project.

Further, the BioBanking Public Register was searched on 26 February 2013 by nghenvironmental (2013d) and no credits for the EEC community were found to be available on the market.



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0 0.25 0.5 1 1.5
Kilometres @ A4

Datum : GDA94
Map Grid of Australia
Zone 56

LEGEND

- NORTH-WESTERN OFFSET SITE
- DAM WALL WORKS AREA
- ROAD WORKS AREAS
- NEW FULL SUPPLY LEVEL
- CADASTRE

CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE

NORTH-WESTERN OFFSET SITE

DATE : 24 Oct 2013
SCALE : 1:30,000
CUSTOMER : STATE WATER
AUTHOR : RW
REF : 301015-02980-GIS-SKT-015.mxd
REV : A

Produced By: ryan.wright@worleyparsons.com - Geomatics

Location: ..\301015-02980 CHAFFEY DAM\03Project\Workspace_SKT\301015-02980-GIS-SKT-015

2.1 Existing and Surrounding Land Uses

All of the parcels of land within the North-Western Offset Site, except Lot 7012 DP 1026362, are currently leased on a permissive occupancy basis to local farmers for grazing purposes. State Water has advised that the existing leases will be terminated on 31 December 2013 and that lease holders have been notified of this. Consequently, this land will be available for dedication as an offset site from 1 January 2014.

Cattle grazing is also carried out on the Peel River floodplain, in the far eastern section of the site. This area is also accessed by the general public for recreational purposes.

The offset site is zoned "*RU1 Primary Production*" under the Tamworth Regional Local Environmental Plan 2010 (Tamworth LEP).

The eastern section of the offset site is subject to two current Exploration Licences (EL8067 and EL8012) issued under the NSW *Mining Act 1992*, as shown in Table 2-2**Error! Reference source not found.**. The presence of these Exploration Licences poses a potential future risk to the integrity of the site.

The Exploration Licences are not registered on the title of the land. Following implementation of Conservation Agreements over the land, State Water will write to the Minister for Resources and Energy to seek information on these titles and inform their holders of the restrictions on the land.

Table 2-2 Current mineral titles over the North-Western Offset Site

Title Name	Company	Grant Date	Expiry Date	Renewal Date	Minerals[6]
EL8067	IRGS Northern Gold Pty Ltd	22 Mar 2013	22 Mar 2016	22 Mar 2013	Group 1 (Metallic minerals)
EL8012	SOC1 Pty Ltd	21 Nov 2012	21 Nov 2014	21 Nov 2012	Group 1 (Metallic minerals)

Source: Department of Trade and Investment (2013)

The South Bowlo Fishing Club (located on the northern foreshore of the reservoir) and the Western Foreshore Road (which runs north-south, adjacent to the reservoir) are located immediately adjacent to the North-Western Offset Site. Both the South Bowlo Fishing Club land and the Western Foreshore Road are excluded from the North-Western Offset Site. The Tamworth-Nundle Road forms the far eastern boundary of the site.

[6] Pursuant to Schedule 1 of the Mining Regulation 2010.

Land to the immediate north, west and south is zoned "*RU1 Primary Production*" under the Tamworth LEP. Cattle grazing is carried out on the land surrounding the offset site. Much of this land comprises rugged terrain, with less sloped areas having been largely cleared of overstorey vegetation.

2.2 Existing Vegetation and Habitat

The North-Western Offset Site contains vegetation similar to that within the impact site. Yellow Box - Blakely's Red Gum grassy woodland occupies the lower slopes, while Rough-barked Apple - Silvertop Stringybark forest occurs on the steeper upper slopes. White Box grassy woodland also occurs within the site as an intermediate between the Yellow Box and Silvertop Stringybark communities, while River Oak riparian woodland is present along the Peel River (Figure 3-4). Several species of noxious weeds are widespread across the offset site (nghenvironmental, 2013d).

The Yellow Box - Blakely's Red Gum grassy woodland and White Box grassy woodland (collectively "Box-gum woodland") within the North-Western Offset Site are considered to comprise the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC. Components of these communities are considered to also comprise the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (nghenvironmental, 2013d).

The North-Western Offset Site comprises areas of derived grassland that have been degraded by grazing and recreational pressures, similar to those evident across the impact site. However, the offset site also contains extensive areas with regenerating overstorey, which with proper management, are expected to increase in quality within a relatively short time frame, resulting in a net improvement to the biodiversity values at the site.

The Rough-barked Apple – Silvertop Stringybark forest community, which comprises the majority of the vegetation within the offset site (approximately 650 ha), provides high quality habitat for a range of threatened species such as the Border Thick-tailed Gecko, Masked Owl and other species with large home ranges. This area also provides a buffer for the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC and the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (nghenvironmental, 2013d).

The North-Western Offset Site supports known habitat for threatened fauna species including the Regent Honeyeater (*Xanthomyza Phrygia*), Border Thick-tailed Gecko (*Uvidicolus (Underwoodisaurus) sphyrurus*) and Speckled Warbler (*Pyrrholaemus saggitatus*). The site provides suitable habitat for a range of other threatened fauna species including the Spotted-tailed Quoll (*Dasyurus maculatus*), Little Lorikeet (*Glossopsitta pusilla*), and woodland birds including the Brown Treecreeper (*Climacteris picumnus victoriae*) (nghenvironmental, 2013d). Evidence of the Red Fox (*Vulpes vulpes*) and of European Rabbits (*Oryctolagus cuniculus*) was found across the adjacent impact site suggesting that these species are abundant in the area (nghenvironmental 2012).

The North-Western Offset Site provides an important corridor for connectivity between areas of native vegetation east and west of the reservoir. Implementation of management actions (refer Section 2.4) are expected to improve the function of this corridor (nghenvironmental, 2013d).

2.3 Proposed Security

In order to secure the North-Western Offset Site for the purposes of a biodiversity offset, it is proposed that a Conservation Agreement under the *National Parks and Wildlife Act 1974* be established over the land. The Conservation Agreement will comprise a joint agreement between State Water and the Minister for the Environment and will remain in place for the life of the proposed augmentation. .

The Conservation Agreement will incorporate the key management actions to be implemented at the North-Western Offset Site, as detailed in Section 2.4.

As part of the Conservation Agreement, the areas incorporated into the North-Western Offset Site will be registered on the title of the land under the *Real Property Act 1900*. This will ensure that, if the land is sold, the agreement and management requirements remain in place.

Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

2.4 Proposed Management

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site. To achieve this objective, the management actions have been designed to reduce the level of threats currently occurring at the site.

The following management actions will be implemented at the North-Western Offset Site:

- Strategic stock exclusion;
- Weed control;
- Feral animal control;
- Restriction of public access;
- Assisted regeneration; and
- Controlled burns.

The proposed management actions are described further in Table 2-3, including the objective, justification, timing and monitoring requirements for each action.

All management actions will be reviewed annually within the first three years following establishment of the North-Western Offset Site, then every three years thereafter. Implementation of management actions should be carried out with a holistic focus, so that each management action does not adversely impact on any other management action.

Prior to impacts occurring, a North-Western Offset Site Management Plan will be developed that will incorporate all requirements of this Vegetation Offset Plan. It will detail the following:

- Aims and objectives of the offset site;
- Figure/s defining the various threats operating within the offset site and the associated management actions to be implemented in those areas;
- Roles and responsibilities;
- Thresholds for implementation of adaptive action;
- Corrective actions for non-compliance with management actions;
- Review and auditing requirements; and
- Timeframes and reporting requirements.

For each management action, the North-Western Offset Site Management Plan will detail the:

- Existing situation at the offset site;
- Objectives of the action;
- Specific details of the action;
- Locations at which the action is to be implemented;
- Responsibility for implementation of the action;
- Monitoring regime;
- Reporting requirements;
- Required timeframes for implementation, monitoring and reporting; and
- Estimated costs for implementation of the action.

Table 2-3 Overview of management actions to be implemented at the North-Western Offset Site

Management Action	Objective	Justification	Timing	Monitoring
Strategic Stock Exclusion Exclusion of stock access to and grazing within the offset site through installation of fencing. Strategic, intermittent access and grazing to control biomass, open up inter-tussock spaces to allow for the colonisation of native forbs, assist in weed control and promote successful overstorey regeneration. Location, timing and duration of strategic grazing to be determined in consultation with a suitably qualified person experienced in grazing for conservation purposes.	To prevent overgrazing and encourage the regeneration of native vegetation within the offset site.	Extensive stock access and grazing within the offset site, particularly on the lower slopes, has resulted in low diversity within the understorey of vegetation communities and a decrease in the quality of these communities (nghenvironmental 2012). The sudden cessation of grazing may result in detrimental effects in these areas including the vigorous growth of weeds or tall tussock grasses that may smother the growth or prevent the colonisation of other native species. Strategic stock access and grazing management can control weeds and assist in the recovery of previously heavily grazed areas.	Exclusion of stock access to and grazing within the offset site to commence at establishment of the offset site. Timing for implementation of strategic, intermittent stock access and grazing to be determined in consultation with a suitably qualified person experienced in grazing for conservation purposes.	Annual inspections of fencing and for evidence of unauthorised stock access to and grazing within the offset site. Monthly informal “drive-by” inspections to monitor for damage to fencing and evidence of unauthorised stock access to and grazing within the offset site. Annually for the first five years, then every three years thereafter, vegetation survey to identify and map the extent and condition of vegetation communities within the offset site. This survey must enable quantification of changes to the extent and condition of vegetation communities within the offset site from the preceding year.
Weed Control Weed identification through mapping of weeds within the offset site and identification of target areas and species. Implementation of active weed control using methodologies appropriate to the target species and landscape context.	To minimise the occurrence of weeds within the offset site, particularly Weeds of National Significance and listed noxious weeds.	Weeds compete with native species and degrade habitats. The offset site has extensive infestations of noxious weeds including Blackberry, Sweet Briar, Hawthorn and Bathurst Burr. Coolatai grass also occurs extensively throughout the adjacent impact area (nghenvironmental 2012). Control and monitoring of Coolatai grass is listed by OEH as a current priority action for White Box Yellow Box Blakely’s Red Gum Woodland EEC in the upper Namoi Catchment.	Commence weed mapping and identification of target species at establishment of the offset site. Ongoing implementation of active weed control, as required for each target species. Timing of weed control will depend on the target species to be controlled and the methods to be employed, including the requirement for follow up treatment. After the first year, the frequency of weed control activities will be informed by results of monitoring.	Annually for the first five years, then every three years thereafter, weed survey and mapping of offset site to quantify type and extent of weeds within the offset site. This survey must enable quantification of changes to the type and extent of weeds within the offset site from the preceding year. Reassessment of target areas and species following weed survey and mapping.

Management Action	Objective	Justification	Timing	Monitoring
Feral Animal Control Feral animal control (cats, foxes and rabbits) through implementation of baiting programs within the offset site.	To minimise the presence of feral animals, specifically cats, foxes and rabbits, within the offset site.	Evidence of the Red Fox of European Rabbits was found to be abundant across the adjacent impact site (nghenvironmental 2012). Control of cats is considered important to ensure an increase in feral cat populations does not result as a consequence of decreasing fox populations. Feral species can compete for resources with native fauna. Predation by cats and foxes can have serious impacts on the populations of native fauna, particularly threatened species. Grazing by rabbits can have marked effects on the structure and composition of vegetation communities. Control of feral cat and fox populations is listed by OEH as a current priority action for the Border Thick-tailed Gecko.	Implement baiting program twice each year for the first five years, then ongoing maintenance of populations as required, commencing at (or close to) establishment of the offset site. Align baiting programs with existing pest management strategies in the locality, implemented by Namoi Catchment Management Authority and the Central North Livestock Health and Pest Authority.	Survey following each baiting program to quantify, collect and dispose of animals impacted by the baiting program. Annually for the first five years, then every three years thereafter, fauna survey to identify and map the occurrence of feral and threatened species (and their habitat) within the offset site. This survey must enable quantification of changes to the occurrence of feral and threatened species (and their habitat) within the offset site from the preceding year.
Restriction of Public Access Restriction of public access through installation of fencing and signage around the offset site. Implementation of enforcement action where required.	To minimise adverse impacts at the offset site resulting from human activity.	Degradation of habitats through various human activities is evident within and near the offset site. Such activities include rubbish dumping, recreational vehicle use (motorcycles and 4WDs) and camping (including collection of firewood). Humans and vehicles can also serve as vectors for weed ingress and spread.	Implement fencing and signage at establishment of the offset site. Ongoing maintenance as required.	Annual inspections of fencing, signage and for evidence of human activity within the offset site. Monthly informal “drive-by” inspections to monitor for damage to fencing and signage and evidence of human activity within the offset site.
Assisted Regeneration Assisted regeneration of cleared and heavily grazed areas derived from Threatened Ecological Communities (TECs), including the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC and the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC, through strategic rehabilitation, including plantings.	To assist in the regeneration of cleared and heavily grazed areas derived from TECs within the offset site.	Much of the cleared and heavily grazed area within the offset site formerly comprised TECs. Assisted regeneration in these areas will contribute to the reestablishment and conservation of this community. This will also provide connectivity and habitats for threatened flora and fauna.	Assisted regeneration activities to commence within two years of establishment of the offset site.	Fortnightly monitoring and maintenance of seedlings (including watering and replacement of protective shrouds as required) for the first six months after planting. Annually for the first five years, then every three years thereafter, vegetation survey to identify and map the extent and condition of plantings within the offset site. This survey must enable quantification of the survival rate of plantings within the offset site.

Management Action	Objective	Justification	Timing	Monitoring
Controlled Burns Implementation of a controlled burn program within the offset site, developed in conjunction with an ecologist and the Rural Fire Service.	To re-introduce a more natural fire regime and assist in the recovery of degraded areas.	Fire is an integral part of the Australian landscape. Many plant species depend on it for successful germination. Fire can also assist in maintaining the balance of species within an ecosystem.	Timing for implementation of controlled burn program to be determined in consultation with an ecologist and the Rural Fire Service.	Annually for the first five years, then every three years thereafter, fauna survey to identify and map the occurrence of feral and threatened species (and their habitat) within the offset site. This survey must enable quantification of changes to the occurrence of feral and threatened species (and their habitat) within the offset site from the preceding year. Annually for the first five years, then every three years thereafter, vegetation survey to identify and map the extent and condition of vegetation communities within the offset site. This survey must enable quantification of changes to the extent and condition of vegetation communities within the offset site from the preceding year.

Source: modified from nghenvironmental (2013d)

3 NSW OFFSET REQUIREMENTS

A number of NSW biodiversity and offset policies and principles are relevant to offsets for the Project.

On 20 December 2011, the EPA provide comment on the Draft DGRs, including advice that "*the DECC 2008 BioBanking Assessment Methodology can be used to assess biodiversity losses at development sites and calculate offset requirements*".

The Project DGRs, issued on 23 January 2012, include the requirement that "*the details of available offset measures to compensate the biodiversity impacts of the proposal where offset measures are proposed, consistent with the Principles for the use of biodiversity offsets in NSW*".

On 30 January 2013, the Namoi Catchment Management Authority (CMA) provided a submission on the Project EIS, which requested consideration of the *Namoi Catchment Management Authority Biodiversity Offsets Policy 2011* (*Namoi CMA Biodiversity Offsets Policy*).

In its submission on the EIS dated 1 February 2013, OEH recommended that State Water consider *OEH SSI Interim Offsets Policy*. OEH stated that "*this policy includes reference to both the Biobanking Assessment Methodology (BBAM) and the Principles for the use of Biodiversity Offsets in NSW*".

In August 2013, OEH released the *NSW offset principles for major projects (state significant development and infrastructure)*.

The *OEH SSI Interim Offsets Policy, the Principles for the use of biodiversity offsets in NSW* and the *NSW offset principles for major projects (state significant development and infrastructure)* are the key NSW policy documents that have been applied in the preparation of the Vegetation Offset Plan.

Consideration has been given to the *Namoi CMA Biodiversity Offsets Policy*. However, where inconsistencies occur between that document and the aforementioned key NSW policy documents, the provisions of the key NSW policy documents prevail.

The BBAM has been utilised to assess the suitability of the proposed offset site to adequately offset the impacts associated with the Project. In accordance with the *OEH SSI Interim Offsets Policy*, the BBAM has been used to:

- Quantify and categorise the biodiversity values and impacts of the Project; and
- Establish, for benchmarking purposes, the offsets that would be required if the Project were expected to meet the "improve or maintain" standard required under the BioBanking Scheme.

The BBAM provides a structured approach to determining how proposals may meet one of two alternative standards established under the *OEH SSI Interim Offsets Policy* (refer Section 3.2).

3.1 BioBanking Assessment

An assessment of the impact site (i.e. the area that will be directly impacted by the Project through inundation or clearing, refer Section1.2) and the proposed North-Western Offset Site (refer Section 2) was carried out by nghenvironmental (2013d) in accordance with the BBAM.

3.1.1 Impact Site Landscape Assessment

The impact site occurs within the Peel subregion of the Namoi Catchment Management Area The majority of the impact site along the northern, western and southern foreshores of the reservoir falls within the Tamworth - Keepit Slopes and Plains Mitchell Landscape. Some areas in close proximity to the reservoir occur within the Peel Channels and Floodplain Mitchell Landscape. Some areas on the eastern side of the reservoir and upstream areas of the impact site extend into the Nundle Hills Mitchell Landscape (nghenvironmental 2013d). The Tamworth - Keepit Slopes and Plains Mitchell Landscape was adopted by nghenvironmental (2013d) for the purposes of the BBAM, as it is the dominant landscape across the impact site.

Two “1,000 ha assessment circles” were used to cover the impact site (outer yellow lines) (Figure 3-1)[7]. One “100 ha assessment circle” was placed inside each of the larger assessment circles to capture the greatest impact from the Project, as required by the BBAM. The vegetation communities within the assessment circles are comprised of forest, woodland and derived grasslands with a predominantly native species composition although some areas that have been subject to pasture improvement now contain predominately exotic vegetation. Adjacent remnant vegetation has been disturbed by clearing and agricultural practices in the past and continues to be grazed by cattle (nghenvironmental 2013d).

Within the northern 1,000 ha assessment circle, nghenvironmental (2013d) determined the percentage overstorey cover to be 21-30% before and after implementation of the Project. Within the northern 100 ha assessment circle, nghenvironmental (2013d) determined the percentage overstorey cover before implementation of the Project to be 31-40% and 21-30% after implementation of the Project. Within the southern 1,000 ha assessment circle, the percentage overstorey cover was determined as 51-60% before and after implementation of the Project and 41-50% within the southern 100 ha assessment circle before and after implementation of the Project (nghenvironmental 2013d).

[7] A small proportion of the impact site occurs outside of the 1,000 ha assessment circles. nghenvironmental (2013d) concluded that this area is predominantly cleared of overstorey and therefore would not influence the landscape assessment. This approach was discussed with the OEH BioBanking team (Andrew Remnant pers. comm. with nghenvironmental, 4 February 2013) and considered appropriate.

The “most limiting link” was identified by nghenvironmental (2013d) as occurring in the south-west of the impact site, with a width of approximately 160 m. The average condition of the link was found to be moderate to good, determined on the basis of overstorey cover and projected foliage cover (PFC) having a rating of >25% of the lower benchmark. The groundcover in this area was found to be predominately exotic (nghenvironmental 2013d).

It was concluded by nghenvironmental (2013d) that the Project will have a major impact on this link as it will be inundated as a result of implementation of the Project.

No native or midstorey or ground cover was recorded within the “after development” fields.

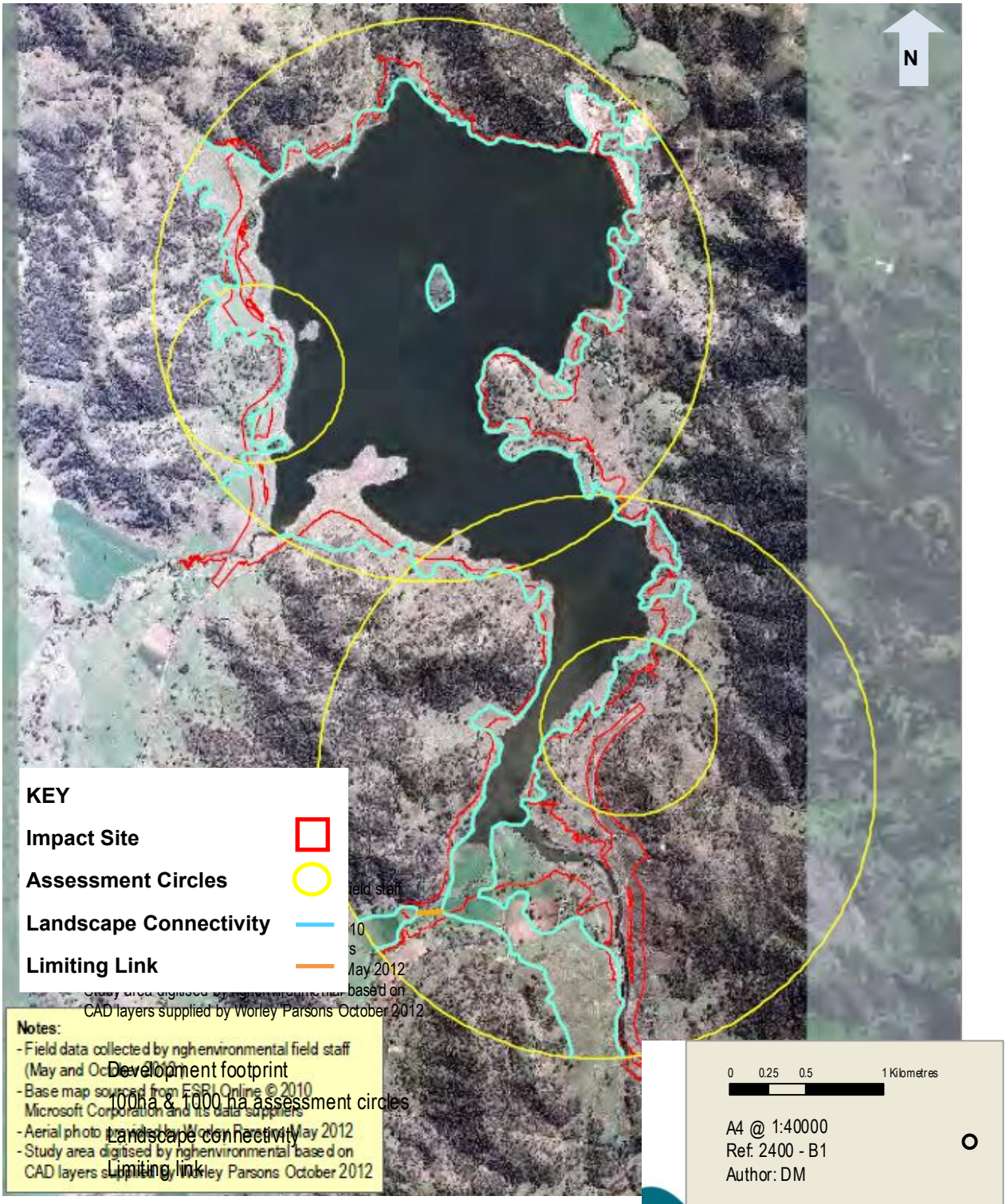


Figure 3-1 Landscape assessment for the impact site

Source: modified from nghenvironmental (2013d)

3.1.2 Impact Site Mapping Zones

"*Homogenous vegetation zones*" were mapped during the Terrestrial and Aquatic Flora and Fauna Impact Assessment (FFA) for the Project (nghenvironmental 2012) and refined during subsequent surveys (nghenvironmental 2013d). Although separate vegetation types were defined in the FFA for Box-Gum grassy woodland and derived grassland, within the BBAM, derived grasslands are included within the vegetation types they are derived from. Hence, the Box-Gum grassy woodland and derived grasslands were mapped as a single zone.

Three homogenous zones were mapped on the basis of vegetation type and condition corresponding to the permanent Project footprint. Dominant vegetation types were determined with reference to previous detailed assessments at the site by nghenvironmental (2012) and the OEH Biometric Vegetation Types Database. The vegetation zones identified within the Project impact site are defined in Table 3-1 and mapped on Figure 3-2.

Two Biometric condition categories are available for native vegetation, namely, "low" and "moderate to good". The moderate to good category includes relatively degraded pasture derived from woodland communities as it is still predominately native, albeit of low diversity. All three homogenous zones mapped for the Project impact site were considered to be moderate to good. However, plot data collected at the impact site provide a more precise measurement of vegetation quality in the biometric assessment (nghenvironmental 2013d).

Remnant areas were assessed by nghenvironmental (2013d) to be over 500 ha for all zones, as all surrounding vegetation was considered to be native vegetation. The collection of plot data was based on the entire area of each homogenous zone and the number of plots conducted was sufficient to meet the minimum requirements for these areas (nghenvironmental 2013d).

However, given that the number of plots required is specific to each homogenous zone within each circle and that the impact site was divided into two 1,000 ha assessment circles, the number of plots required increased. As the condition of the vegetation at the site is relatively consistent, the BBAM is being used only to indicate the suitability of the proposed offset site and the number of plots undertaken was sufficient to satisfy the requirements of the BBAM. Furthermore, consultation with OEH (David Coote *pers. comm.* with nghenvironmental 6 February 2013) confirmed that it was acceptable to duplicate some of the plot data within each assessment circle to meet the required number of plots. Plots that have been duplicated are denoted in Table 3-1 by an asterisk (*). Plots duplicated are those that were located closest to the relevant assessment circle.

Geographic and habitat features at the impact site were selected with respect to threatened species, with suitable habitat identified for eight species, as described in Table 3-2.

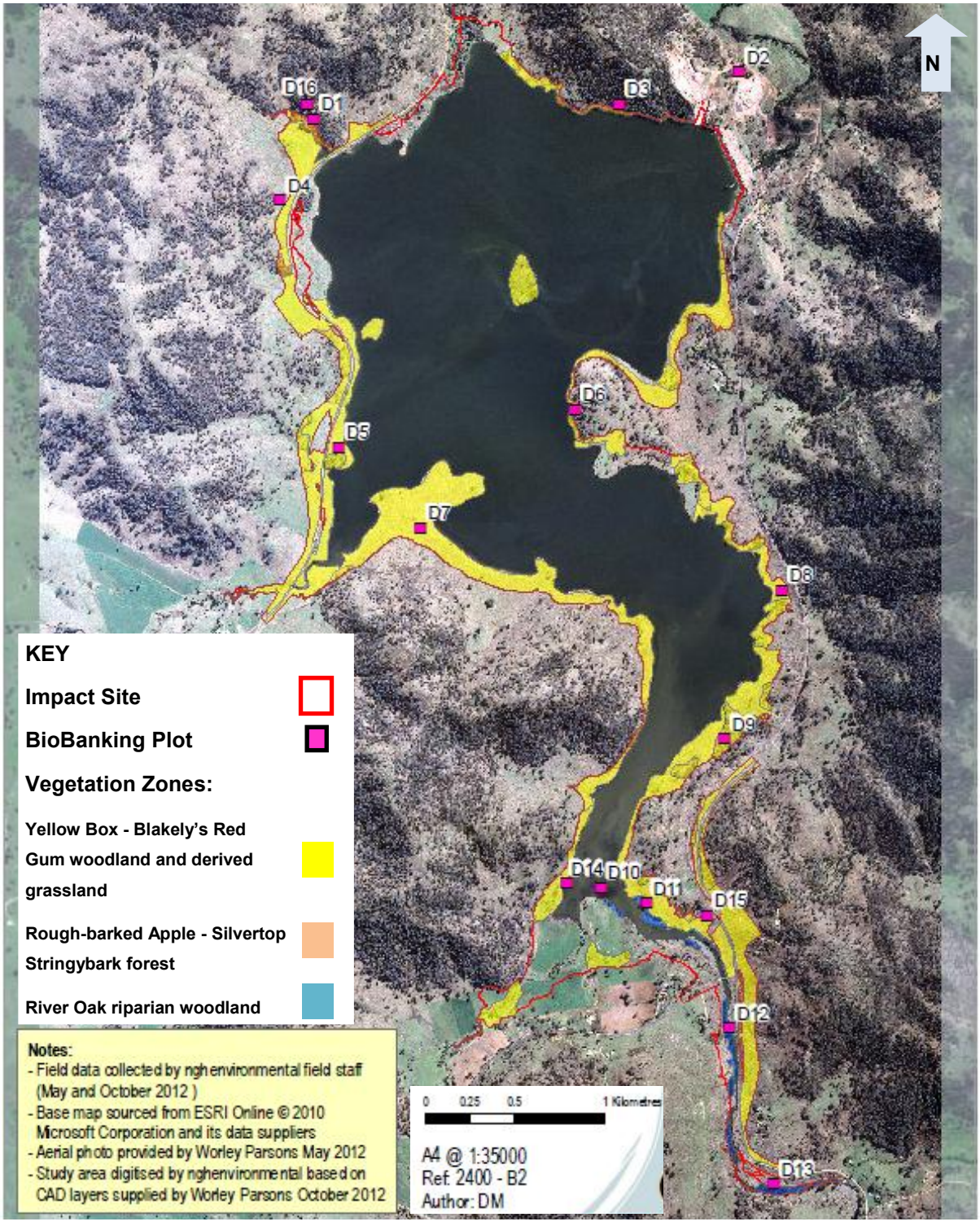


Figure 3-2 Impact site homogenous zones and plot locations

Source: modified from nghenvironmental (2013d)

Table 3-1 Impact site: homogenous zones

Assessment Circle	Zone ID	Vegetation Type Code	Vegetation Name	Condition	Area Effectively Removed (ha)	Plot IDs
North	1	NA237	Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Moderate/Good	89.58	D4, D5, D6, D7*, D8*, D9*
North	2	NA196	Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Moderate/Good	3.11	D1, D2, D3*, D16
South	4	NA237	Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Moderate/Good	62.77	D7*, D8*, D9*, D14, D15
South	5	NA196	Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Moderate/Good	0.54	D3*
South	6	NA191	River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	Moderate/Good	5.71	D11, D12, D13

Source: nghenvironmental (2013d)

Table 3-2 Threatened species considered to occur at the impact site according to relevant geographical and habitat features

Common Name	Scientific Name	Feature
Austral Toadflax	*Thesium australe*	Coastal headlands, grassland, grassy open forest or woodland on fertile or moderately fertile soils
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	Land within 40 m of rainforest, coastal scrub, riparian or estuarine communities
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	Land within 100 m of rocky areas
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	Shallow or infertile soils
Black-breasted Buzzard	*Hamirostra melanosternon*	Land within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts
Dungowan Starbush	*Asterolasia* sp. 'Dungowan Creek'	Land within Dungowan Dam area near Tamworth in Peel CMA subregion
Pale-headed Snake	*Hoplocephalus bitorquatus*	Land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber
Booroolong Frog	*Litoria booroolongensis*	Land within 100 m of stream or creek banks

Source: nghenvironmental (2013d)

3.1.3 Impact Site Credits

SPECIES PREDICTED TO OCCUR

The species predicted by the BioBanking Credit Calculator (BCC) to occur at the impact site and contribute to the ecosystem credits that are required to be offset are listed in Table 3-3. The Tg values included in Table 3-3 are accessed by the BBAM from the Threatened Species Profile Database (TSPD) and provide a measure of the species' ability to respond to improvement in site value or habitat value at an offset site. Tg values are also used in the calculations performed for the impact site to determine the required number of ecosystem credits.

Table 3-3 Species predicted to occur at the impact site

Common Name	Scientific Name	Tg Value
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	0.5
Spotted-tailed Quoll	*Dasyurus maculatus*	0.35
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	0.45
Little Lorikeet	*Glossopsitta pusilla*	0.58
Painted Honeyeater	*Grantiella picta*	0.75
Swift Parrot	*Lathamus discolour*	0.75
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	0.75
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	0.75
Turquoise Parrot	*Neophema pulchella*	0.55
Barking Owl	*Ninox connivens*	0.33
Powerful Owl	*Ninox strenua*	0.33
Greater Long-eared Bat (south eastern form)	*Nyctophilus timoriensis*	0.48
Yellow-bellied Glider	*Petaurus australis*	0.43
Squirrel Glider	*Petaurus norfolcensis*	0.45
Scarlet Robin	*Petroica boodang*	0.6
Flame Robin	*Petroica phoenicea*	0.6
Koala	*Phascolarctos cinereus*	0.83
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	0.75
Grey-headed Flying-fox	*Pteropus poliocephalus*	0.93
Speckled Warbler	*Pyrrholaemus saggitatus*	0.4
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	0.45
Diamond Firetail	*Stagonopleura guttata*	0.75
Masked Owl	*Tyto novaehollandiae*	0.33
Regent Honeyeater	*Xanthomyza Phrygia*	0.75

Source: nghenvironmental (2013d)

SPECIES REQUIRING SURVEY

A total of 15 species were determined by the BCC as requiring survey, as shown in Table 3-4.

A series of field surveys were undertaken as part of the FFA (nghenvironmental 2012), which enabled nghenvironmental (2013d) to conclude that 10 of these species are unlikely to occur at the impact site and as such will not be impacted by the Project. No impact was assumed for an additional three species based on the lack of habitat availability within the impact site and the proximity of the nearest records of the species. One species, the Border Thick-tailed Gecko, is known to occur at the site but will not be impacted by the Project.

Table 3-4 Species requiring survey at the impact site and having the potential to be impacted

Common Name	Scientific Name	Impacted?	ID Method	Loss	Units of Loss	Tg Value
Austral Toadflax	*Thesium australe*	No	Survey	0.00	indiv	0.58
Little Eagle	*Hieraaetus morphnoides*	No	Survey	0.00	ha	0.74
Spotted Harrier	*Circus assimilis*	No	Survey	0.00	ha	0.74
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	No	Survey	0.00	ha	0.93
Bluegrass	*Dichanthium setosum*	No	Survey	0.00	indiv	0.13
Finger Panic Grass	*Digitaria porrecta*	No	Assumed	0.00	indiv	0.75
Brush-tailed Phascogale	*Phascogale tapoatafa*	No	Assumed	0.00	ha	0.5
Square-tailed Kite	*Lophoictinia isura*	No	Survey	0.00	ha	0.74
Gang-gang Cockatoo	*Callocephalon fimbriatum*	No	Assumed	0.00	ha	0.5
Border Thick-tailed Gecko	*Uvidicolus (Underwoodisaurus) sphyrurus*	No	Survey	0.00	ha	0.75
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	No	Survey	0.00	indiv	0.7
Black-breasted Buzzard	*Hamirostra melanosternon*	No	Survey	0.00	ha	0.74
Dungowan Starbush	*Asterolasia sp. 'Dungowan Creek'*	No	Survey	0.00	indiv	0.13
Pale-headed Snake	*Hoplocephalus bitorquatus*	No	Assumed	0.00	ha	0.3
Booroolong Frog	*Litoria booroolongensis*	Yes	Survey	4.77	ha	0.4

Source: nghenvironmental (2013d)

One species listed as requiring survey, the Booroolong Frog, has been recorded during surveys at the site and has the potential to be impacted by the Project. The impact to this species generates species credits that require offsetting. Offsets relevant to the Booroolong Frog are the subject of a separate Offset Plan.

RED FLAGS

Under the BioBanking Scheme, red flags identified by the BCC indicate an area of land that has high biodiversity conservation values. One red flag area was identified within the impact site, comprising *Yellow Box – Blakely's Red Gum grassy woodland (vegetation type being >70% cleared or it contains an EEC)*.

Under the BioBanking assessment pathway, clearing of red flag areas requires the approval of the Director General of OEH. Given that the Project is classified as SSI, the *OEH SSI Interim Offsets Policy* applies and clearing of red flags areas is allowed through the Tier 2 and Tier 3 standards (refer Section 3.2).

CREDIT SUMMARY

A BioBanking Credit Statement was produced for the Project impact site by nghenvironmental (2013d) (Appendix 2). The ecosystem and species credits required to offset the loss of habitats as a result of the Project is summarised in Table 3-5.

Table 3-5 Impact site BioBanking Credit Calculator credit summary

Biometric Vegetation Type	Area Impacted (ha)	Credits Required
Ecosystem credits		
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	152.35	8128
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	3.65	254
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	5.71	323
Species credits		
Booroolong Frog	4.77	119

Source: nghenvironmental (2013d)

3.1.4 Offset Site Landscape Assessment

The proposed North-Western Offset Site is located within the Peel subregion of the Namoi Catchment Management Area. The majority of the offset site falls within the Tamworth - Keepit Slopes and Plains Mitchell Landscape. Some areas of the offset site that occur in close proximity to the reservoir are located within the Peel Channels and Floodplain Mitchell Landscape. On the eastern side of the reservoir, a small portion of the offset area extends into the Nundle Hills Mitchell Landscape. The Tamworth - Keepit Slopes and Plains Mitchell Landscape was used by nghenvironmental (2013d) for the purposes of the BBAM, as it is the dominant landscape across the offset site.

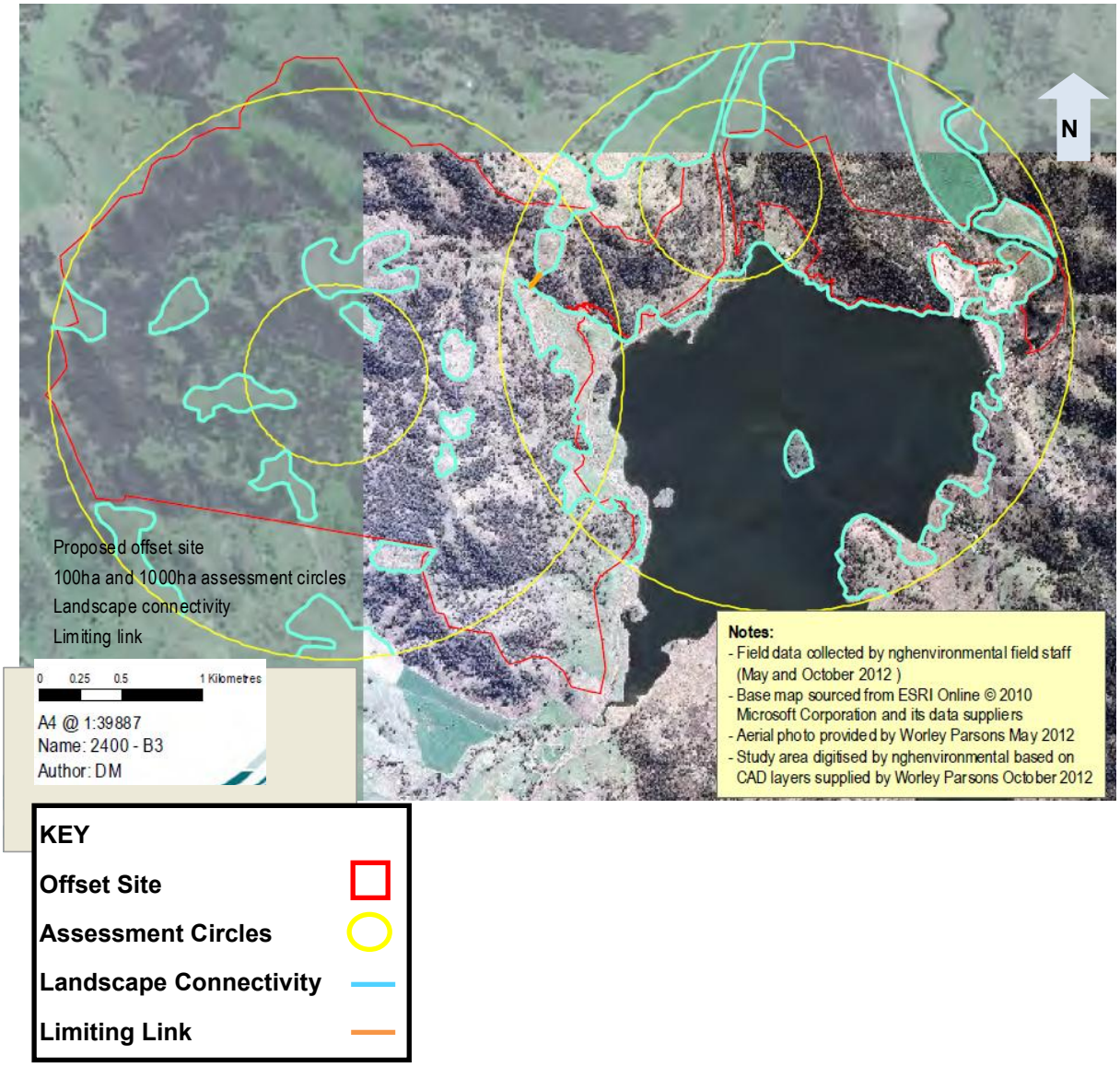
Two 1,000 ha assessment circles were used by nghenvironmental (2013d) to cover the offset site (outer yellow lines) (Figure 3-3). The 100 ha circles have been positioned to capture a representative sample within each 1,000 ha assessment circle. The vegetation communities within the1,000 ha assessment circles comprise forest, woodland and derived grasslands with a predominantly native species composition although some areas that have been subject to pasture improvement now contain predominately exotic vegetation. Adjacent remnant vegetation has been disturbed by clearing and agricultural practices in the past and the properties continue to be grazed by cattle (nghenvironmental 2013d).

Within the eastern 1,000 ha assessment circle, nghenvironmental (2013d) determined the percentage overstorey cover to be 21-30% before implementation of the offset. The percentage overstorey cover was estimated to increase to 31-40% after implementation of the offset. Native vegetation cover within the eastern 100 ha assessment circle was determined to be 41-50% before implementation of the offset, increasing to 51-60% after implementation of the offset. Within the western 1,000 ha assessment circle, the percentage overstorey cover was determined by nghenvironmental (2013d) to be 51-60% before implementation of the offset and 61-70% after implementation of the offset. The percentage overstorey cover within the 100 ha circle. Within the western 100 ha assessment circle, the percentage overstorey cover was determined to be 71-80% before and 81-90% after implementation of the offset site.

The "*most limiting link*" was identified by nghenvironmental (2013d) as occurring in the central area of the offset site, providing connectivity from east to west with a width of approximately 100 m. The average condition of the link was determined to be moderate to good, on the basis of overstorey cover and PFC being rated as >25% of the lower benchmark. The groundcover in this area is predominately native and was also rated at >25% of the lower benchmark.

Evidence of good regrowth potential was noted onsite by nghenvironmental (2013d), connecting this link with adjacent vegetation to the south. Consequently, an increase in the width of this link to over 500 m was recorded in the "after BioBank" field.

It was concluded by nghenvironmental (2013d) that the offset would be likely to have a positive impact on this link.



by nghenvironmental field staff
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by Worley Parsons October 2012

Figure 3-3 Landscape assessment for the North-Western Offset Site

Source: modified from nghenvironmental (2013d)

3.1.5 Offset Site Mapping Zones

Homogenous vegetation zones were broadly mapped for the majority of the North-Western Offset Site during the FFA (nghenvironmental 2012). The homogenous zones were more accurately refined during surveys in February 2013 to collect plot data at the offset site (nghenvironmental 2013d). As discussed for the impact site, derived grasslands are included within the vegetation types they are derived from.

Four homogenous zones were mapped on the basis of vegetation type and condition corresponding to the offset site. Dominant vegetation types were determined with reference to the previous detailed assessments at the site (nghenvironmental 2012) and the OEH Biometric Vegetation Types Database. All vegetation within the offset site was considered by nghenvironmental (2013d) to be in moderate to good condition. Remnant areas were assessed to be over 500 ha for all zones, as all surrounding vegetation is considered to be native vegetation. The vegetation zones are defined in Table 3-6 and mapped on Figure 3-4.

Plot data was collected based on the entire area of each homogenous zone and the number of plots conducted was sufficient to meet the minimum requirements for these areas. An exception was the number of plots required for the Rough-barked Apple – Silvertop Stringybark forest. During the refinement of the area of impact for the Project, following the impact site surveys, two plots (D1 and D16) were located within the proposed offset. In addition Plot D3 was located slightly upslope of the impact site (but still representative of the vegetation within the impact site) and also located within the proposed offset. The data from these plots was used within the offset site calculations (nghenvironmental 2013d).

Given the consistency of the vegetation within this homogenous zone and the close proximity of the offset site to the impact site, Plot D2 was also included as it was also considered by nghenvironmental (2013d) to be highly representative of vegetation and habitat features within the offset site. The use of this plot data was considered to be acceptable by nghenvironmental (2013d) and OEH (David Coote *pers. comm.* with nghenvironmental 6 February 2013), given the objectives of the assessment, its representativeness and that Rough-barked Apple – Silvertop Stringybark forest is common and not of conservation significance.

Two plots were conducted within the River Oak riparian woodland vegetation community at the offset site and two were conducted within this community upstream of the new FSL on the Peel River (plots O17 and O18, Figure 3-5). These plots were included within the assessment to make up the minimum plot requirement and also because they were considered to be representative of the vegetation within the offset site. Plot O19 was not included within the assessment as it was within an area not being considered for use as an offset site and was not representative (nghenvironmental 2013d).

Offset site plot data was duplicated only when required to satisfy the minimum plot requirements for each assessment circle. Plots that were duplicated are denoted in Table 3-6 by an asterisk (*). Plots duplicated are those that were located closest to the relevant assessment circle (nghenvironmental 2013d). Geographic and habitat features were selected with respect to threatened species as outlined in Table 3-7.

"After BioBank" management scores were as determined by the BCC and not modified (nghenvironmental 2013d).

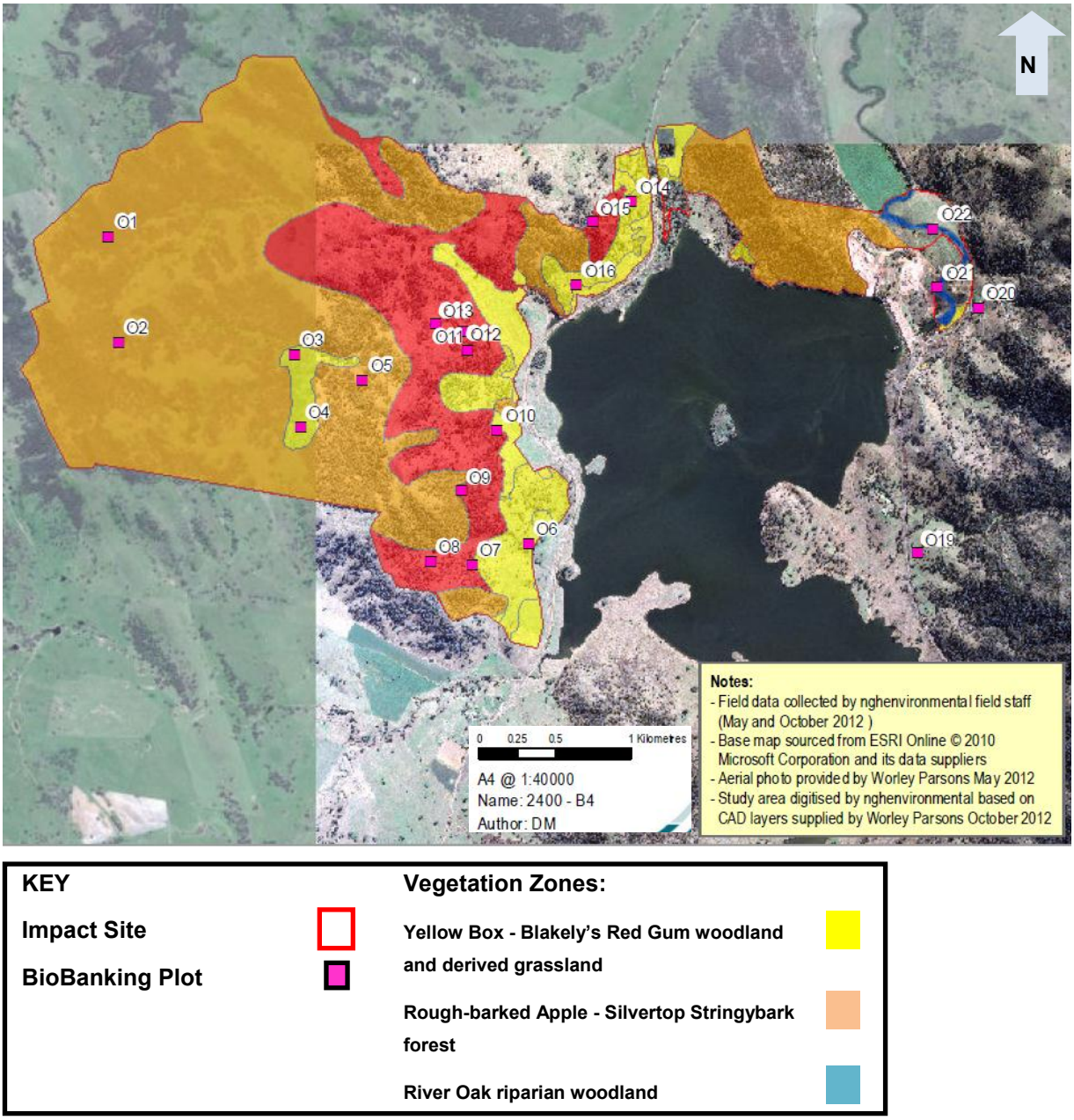

Figure 3-4 North-Western Offset Site homogenous zones and plot locations

Source: modified from nghenvironmental (2013d)

Table 3-6 North-Western Offset Site: homogenous zones

Assessment Circle	Zone ID	Vegetation Type Code	Vegetation Name	Condition	Area within Offset Site (ha)	Plot IDs
East	1	NA237	Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Moderate/Good	76.6	O6*, O7*, O14, O16, O20
West	5	NA237	Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Moderate/Good	48.98	O3, O4, O6*, O7*
East	2	NA196	Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Moderate/Good	91.29	D1*, D2, D3*, D16*, O9*
East	3	NA191	River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	Moderate/Good	6.98	O17, O18, O21, O22
East	4	NA226	White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Moderate/Good	53.3	O10*, O11*, O12*, O13*, O15*
West	6	NA196	Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Moderate/Good	557.31	O1, O2, O5, O9*, D1*, D3*, D16*
West	7	NA226	White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Moderate/Good	142.75	O8, O10*, O11*, O12*, O13*, O15*

* Duplicated plot data *Source: nghenvironmental (2013d)*

Table 3-7 Threatened species and relevant geographic and habitat features considered to potentially occur at the North-Western Offset Site

Common Name	Scientific Name	Feature
Austral Toadflax	*Thesium australe*	Coastal headlands, grassland, grassy open forest or woodland on fertile or moderately fertile soils
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	Land within 40 m of rainforest, coastal scrub, riparian or estuarine communities
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	Land within 100 m of rocky areas
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	Shallow or infertile soils
Dungowan Starbush	*Asterolasia sp. 'Dungowan Creek'*	Land within Dungowan Dam area near Tamworth in Peel CMA subregion
Pale-headed Snake	*Hoplocephalus bitorquatus*	Land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber
Booroolong Frog	*Litoria booroolongensis*	Land within 100 m of stream or creek banks

Source: nghenvironmental (2013d)

3.1.6 Offset Site Credits

SPECIES PREDICTED TO OCCUR

The species predicted by the BCC to occur at the offset site and contribute to the ecosystem credits generated are listed in Table 3-8.

Table 3-8 Species predicted to occur at the offset site

Common Name	Scientific Name	Tg Value
Bush Stone-curlew	*Burhinus grallarius*	0.4
Eastern Pygmy-possum	*Cercartetus nanus*	0.5
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	0.5
Spotted-tailed Quoll	*Dasyurus maculatus*	0.35
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	0.45

Common Name	Scientific Name	Tg Value
Little Lorikeet	*Glossopsitta pusilla*	0.58
Painted Honeyeater	*Grantiella picta*	0.75
Swift Parrot	*Lathamus discolor*	0.75
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	0.75
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	0.75
Turquoise Parrot	*Neophema pulchella*	0.55
Barking Owl	*Ninox connivens*	0.33
Powerful Owl	*Ninox strenua*	0.33
Greater Long-eared Bat (south eastern form)	*Nyctophilus timoriensis*	0.48
Yellow-bellied Glider	*Petaurus australis*	0.43
Squirrel Glider	*Petaurus norfolcensis*	0.45
Scarlet Robin	*Petroica boodang*	0.6
Flame Robin	*Petroica phoenicea*	0.6
Koala	*Phascolarctos cinereus*	0.83
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	0.75
Grey-headed Flying-fox	*Pteropus poliocephalus*	0.93
Speckled Warbler	*Pyrrholaemus saggitatus*	0.4
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	0.45
Diamond Firetail	*Stagonopleura guttata*	0.75
Masked Owl	*Tyto novaehollandiae*	0.33
Regent Honeyeater	*Xanthomyza phrygia*	0.75

Source: nghenvironmental (2013d)

SPECIES REQUIRING SURVEY

A total of 14 species were identified by the BCC to as requiring survey (Table 3-9), noting that survey is not essential for an offset site under the BBAM (nghenvironmental 2013d). A series of field surveys were undertaken as part of the FFA (nghenvironmental 2012), however the majority of these surveys did not focus on the offset site. As such, the species identified by the BCC were assumed by nghenvironmental (2013d) not to occur at the offset site unless demonstrated otherwise through survey.

The Border Thick-tailed Gecko was detected during surveys on the northern foreshore of the reservoir, west of the auxiliary spillway on Goat Mountain. It was conservatively estimated by nghenvironmental (2013d) that at least 2 ha of habitat for this species would be managed at the offset site. Species credits are generated for this species.

Table 3-9 Species requiring survey at the offset site and those that would be managed

Common Name	Scientific Name	Managed at Offset Site?	ID Method	Gain	Units of Gain	Survey Date
Austral Toadflax	*Thesium australe*	No	N/A	0.00	Indiv	N/A
Little Eagle	*Hieraaetus morphnoides*	No	N/A	0.00	Ha	N/A
Spotted Harrier	*Circus assimilis*	No	N/A	0.00	Ha	N/A
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	No	N/A	0.00	Ha	N/A
Bluegrass	*Dichanthium setosum*	No	N/A	0.00	Indiv	N/A
Finger Panic Grass	*Digitaria porrecta*	No	N/A	0.00	Indiv	N/A
Brush-tailed Phascogale	*Phascogale tapoatafa*	No	N/A	0.00	Ha	N/A
Square-tailed Kite	*Lophoictinia isura*	No	N/A	0.00	Ha	N/A
Gang-gang Cockatoo	*Callocephalon fimbriatum*	No	N/A	0.00	Ha	N/A
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	Yes	Survey	2.00	Ha	17/10/12
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	No	N/A	0.00	Indiv	N/A
Pale-headed Snake	*Hoplocephalus bitorquatus*	No	N/A	0.00	Ha	N/A
Dungowan Starbush	*Asterolasia sp. 'Dungowan Creek'*	No	N/A	0.00	Indiv	N/A

Source: nghenvironmental (2013d)

CREDIT SUMMARY

A BioBanking credit statement was produced for the offset site by nghenvironmental (2013d) (Appendix 2). The ecosystem and species credits generated at the offset site is summarised in Table 3-10.

Table 3-10 Offset site credit summary

Biometric Vegetation Type	Area Offset (ha)	Credits Generated
Ecosystem credits		
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	125.76	1500
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	196.05	2019
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	649.88	7310
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	12.08	231
Species credits		
Border Thick-tailed Gecko	2.00	12

Source: nghenvironmental (2013d)

3.1.7 Credit Comparison

A comparison of the ecosystem credits generated at the North-Western Offset Site with those required for the impact site is provided in Table 3-11.

Table 3-11 Credit comparison summary

Biometric vegetation type	Permanent Habitat Loss (ha)	Area within Offset (ha)	Impact Credits Required	Offset Credits Generated	Credit Difference
Ecosystem credits					
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	152.35	125.76	8128	1500	-6628
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	0	196.05	0	2019	+2019
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	3.65	649.88	254	7310	+7056
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	5.71	12.08	323	231	-92
Total ecosystem credits	**161.71**	**983.77**	**8705**	**11060**	**+2355**
Species credits					
Border Thick-tailed Gecko	0	2.00	0	12	+12
Booroolong Frog	4.77	0	119	0	-119
Total species credits	**4.77**	**2.00**	**119**	**12**	**-107**

Source: nghenvironmental (2013d)

Overall, the North-Western Offset Site provides a 6:1 offset to impact area ratio, with an ecosystem credit surplus of 2,355 credits (Table 3-11).

The offset site has a credit shortfall of 6,628 credits for the Yellow Box - Blakely's Red Gum grassy woodland, comprising the Box-Gum grassy woodland EEC. However, White Box grassy woodland occurs within the offset site, which also comprises the White Box Yellow Box Blakely's Red Gum Woodland EEC. The BCC credit statement (Appendix 2) identifies White Box grassy woodland as a suitable offset option for Yellow Box - Blakely's Red Gum grassy woodland.

Further, the inclusion of White Box grassy woodland at the offset site in place of Yellow Box - Blakely's Red Gum grassy woodland was supported in principle by OEH (David Coote *pers. comm.* with nghenvironmental 22 February 2013), given that both communities are afforded the same level of statutory protection and provide similar habitats for threatened species.

In combining these two vegetation types, a credit deficit of 4,609 credits remains under the BBAM. However a 2.1:1 offset to impact area ratio is achieved for the White Box Yellow Box Blakely's Red Gum Woodland EEC.

The results of the BBAM also show a shortfall in the amount of River Oak riparian woodland contained within the offset site. The current proposed offset offers a 2.1:1 offset to development area ratio with a 92 credit deficit. It is anticipated that additional offsets for River Oak riparian woodland will be provided in conjunction with the offset provided for Booroolong Frog, which is the subject of a separate offset plan.

Although no impact credits are required for the threatened Border Thick-tailed Gecko, the offset site provides approximately 2 ha of habitat for this species, generating 12 species credits. The impact of the Project on the Booroolong Frog generates species credits that require offsetting (Table 3-11). Offsets relevant to the Booroolong Frog are the subject of a separate offset plan.

The BCC credit statement (Appendix 2) identifies additional management actions required for each vegetation type or threatened species. The additional management actions identified for the North-Western Offset Site have been considered in developing the management actions set out in Section 2.4 and comprise the following:

- Cat and/or fox control;
- Exclusion of miscellaneous feral species; and
- Feral and /or native herbivore control/exclusion (e.g. rabbits, goats, deer etc).

3.2 Assessment against the OEH SSI Interim Offsets Policy

The *OEH SSI Interim Offsets Policy*[8] is relevant to State Significant Infrastructure (SSI), State Significant Development (SSD) and proposals assessed under former Part 3A of the EP&A Act that are not being considered as part of the BioBanking Scheme.

The interim policy acknowledges that SSI, SSD and former Part 3A projects do not have to meet the "improve or maintain" (Tier 1) standard required under the BioBanking Scheme. Nevertheless, the interim policy adopts the use of the BBAM for the purpose of:

- Quantifying and categorising the biodiversity values and impacts of SSI, SSD and former Part 3A proposals;
- Establishing, for benchmarking purposes, the offsets that would be required if the SSI, SSD or former Part 3A proposal had been expected to meet the improve or maintain standard; and
- Providing a structured approach to determine how proposals may, in lieu of meeting the improve or maintain standard, meet one of two alternate standards established under the interim policy referred to as Tier 2 "no net loss" and Tier 3 "mitigated net loss".

In accordance with the *OEH SSI Interim Offsets Policy*, the BBAM has been used to determine the suitability of the North-Western Offset Site for the Project. The credit comparison provided in Section 3.1.7 demonstrates that the offset site falls within the Tier 3 mitigated net loss standard.

In considering whether a mitigated net loss standard is appropriate, the *OEH SSI Interim Offsets Policy* requires that consideration be given to:

- Whether the credits required by the BCC are available on the market;
- Whether alternative offset sites (other than credits) are available on the market; and
- The overall cost of the offsets and whether these costs are reasonable given the circumstances.

As described in Section 2, the BioBanking Public Register was searched by nghenvironmental (2013d) on 26 February 2013 and no credits for the Yellow Box – Blakely's Red Gum community were found to be available on the market.

[8] It is noted that the OEH SSI Interim Offsets Policy includes a statement that it will "*operate on a trial basis in partnership with DSEWPC and DP&I until 30 June 2012, and will be reviewed at the end of this period*". On 25 February 2013, it was agreed at a meeting with DP&I, OEH, State Water and WorleyParsons that the OEH SSI Interim Offsets Policy was relevant to the Project, despite this statement.

Further, as described in Section 2, an assessment of potential additional offset areas found no sites surrounding the reservoir considered suitable for use as an additional offset site for the Project (Appendix 1). This assessment considered the existing designation and use of some land (including existing business operations and reserve status that would preclude the use of such land as an offset site), as well as likely cost for acquisition of land. The acquisition cost of land was considered to be prohibitive for all but one (which was held in reserve and contained only a small extent of EEC) of the potential additional offset sites.

Given the outcomes of the assessment, it is considered that all of the above listed circumstances apply. The *OEH SSI Interim Offsets Policy* sets out that where any of these circumstances apply, then it is reasonable to apply the "variation criteria" so that:

- *"a) suitable offset sites can be found within a reasonable[9] timeframe;*
- *b) the costs of offsetting is brought within a reasonable range; and*
- *c) an offset to clearing ratio of at least 2:1 vegetated to cleared hectares is achieved."*

Attachment B of the *OEH SSI Interim Offsets Policy* sets out the variation criteria that may be applied to the offsetting requirements of the BBAM to achieve a Tier 3 standard. As documented by nghenvironmental (2013d), variation criteria (a) is relevant to the Project, as shown in Table 3-12.

Table 3-12 Variation Criteria for the Tier 3 standard

Variation Criteria	When is this Option Appropriate?	How this Applies to the Project
a) Convert ecosystem credits for one vegetation type to any vegetation type within the same vegetation formation in the same IBRA bioregion	When no matching ecosystem credits are available	Insufficient credits (4,609 credit deficiency) are available at the offset site for the White Box Yellow Box Blakely's Red Gum Woodland EEC to satisfy the BBAM. However the North-Western Offset Site provides a 2.1:1 offset to impact ratio for this community. Both the White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest are of the "grassy woodland" formation. A surplus of 7,056 credits is available for this latter community. Implementation of variation criteria (a) enables the transfer of credits between these two communities, which would then satisfy the credit requirements of the BBAM, whilst maintaining a credit surplus of 2,447 credits for these grassy woodland formations.

Source: modified from nghenvironmental (2013d)

[9] What is "reasonable" is contingent upon a range of factors and needs to be considered on a case by case basis (OEH, 2011).

Given that the land that forms the North-Western Offset Site is vested in State Water (excluding one small lot, which will be the subject of negotiation), it is available immediately for establishment of an offset site. The time required to investigate additional lands and negotiate acquisition of land under multiple ownerships could be lengthy and has the potential to delay implementation of offsets and potentially, the Project.

As described above, the acquisition cost of additional land around the reservoir was considered to be prohibitive. Implementation of the North-Western Offset Site will enable direction of increased funding to establish management actions, rather than land acquisition.

The North-Western Offset Site provides an overall ecosystem credit surplus of 2,355 credits, calculated in accordance with the BBAM. Although the site contains a 4,609 credit deficiency to satisfy the BBAM for the White Box Yellow Box Blakely's Red Gum Woodland EEC, implementation of variation criteria (a) enables this deficiency to be compensated by the surplus of credits for the Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest.

The North-Western Offset Site provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

As described in Section 2.3, a Conservation Agreement under the *National Parks and Wildlife Act 1974* will be utilised to secure the North-Western Offset Site for the life of the proposed augmentation. It is considered that this mechanism ought to secure the management of the land in accordance with the criteria set out in the *OEH SSI Interim Offsets Policy* (Table 3-13).

Table 3-13 Assessment against criteria for determining suitability of conservation mechanisms for an offset site

Criteria	Assessment
The unambiguous principal objective of ongoing site management is biodiversity conservation.	Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site. To achieve this objective, the management actions have been designed to reduce the level of threats currently occurring at the site. Refer Section 2.4.
Management is undertaken in accordance with a Plan of Management.	An Offset Site Management Plan will be developed and implemented for the North-Western Offset Site. The Offset Site Management Plan will incorporate all requirements of this Vegetation Offset Plan. Refer Section 2.4.
There is reasonable likelihood that sufficient resourcing will be available to implement the Plan of Management over-time.	Upon execution of the Conservation Agreement, State Water, a NSW State Owned Corporation, will have a legal obligation to implement the required management actions. Refer Section 2.3. Accordingly, it is considered highly likely that sufficient resourcing will be available to implement the Plan of Management over-time.
The arrangements are in-perpetuity, and conservation obligations are transparently transferred and disclosed to any new owners of the land through appropriate administrative procedures.	The Conservation Agreement will be implemented for the life of the proposed augmentation. It will be executed in accordance with the *National Parks and Wildlife Act 1974*. As part of the Conservation Agreement, the area incorporated into the North-Western Offset Site will be registered on the title of the land under the *Real Property Act 1900*. This will ensure that, if the land is sold, the agreement and management requirements remain in place. Refer Section 2.3.
There are appropriate accountability mechanisms to secure the outcomes and these mechanisms cannot be altered without alternative and comparable offsetting arrangements being put in place.	The Conservation Agreement will incorporate the key management actions to be implemented at the North-Western Offset Site. This will ensure that State Water is accountable for implementation of management actions and associated outcomes. Further, if the land is sold, the agreement and management requirements remain in place. Refer Section 2.3 and 2.4.

The North-Western Offset Site has been assessed according to the BBAM and meets the requirements for a Tier 3 mitigated net loss outcome according to the *OEH SSI Interim Offsets Policy*. The implementation of a Conservation Agreement over the site is considered to be an appropriate mechanism to ensure management of the land is in accordance with the criteria set out in the *OEH SSI Interim Offsets Policy*.

It is considered that the North-Western Offset Site satisfies the requirements of the *OEH SSI Interim Offsets Policy*.

3.3 Assessment against the Principles for the use of Biodiversity Offsets in NSW

The Project DGRs, issued on 23 January 2012, include the requirement that "*the details of available offset measures to compensate the biodiversity impacts of the proposal where offset measures are proposed, consistent with the Principles for the use of biodiversity offsets in NSW*".

An assessment of the North-Western Offset Site against the 13 principles for the use of biodiversity offsets in NSW is provided below.

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

Impacts have been avoided or mitigated as far as practical, given the nature of the Project, as documented in the EIS and PIR. This includes reducing the road works footprints and modifying the design of works to the dam wall.

The North-Western Offset Site will be established in order to offset the residual impacts that cannot be avoided or mitigated.

"All regulatory requirements must be met"

The Project has been assessed in accordance with NSW and Commonwealth legislation, including the proposal to offset residual impacts, as documented in the Project EIS and PIR.

The proposed security and management of the North-Western Offset Site is considered to be in accordance with the relevant State Government policy requirements, as discussed in Sections 3 and 4.

The North-Western Offset Site is not covered by any existing conservation covenants or agreements. Although the land is vested in State Water, it is currently the subject of grazing leases and is not being managed for conservation purposes.

The offset site is zoned "*RU1 Primary Production*" under the Tamworth LEP, which does not afford the site any environmental protection beyond that required under NSW and Commonwealth planning and environmental legislation.

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site.

"Offsets must never reward ongoing poor performance"

A Conservation Agreement will be implemented to secure the offset site for the life of the proposed augmentation. Management actions to be implemented at the site will be incorporated into the Conservation Agreement. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

A North-Western Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions.

"Offsets will complement other government programs"

Implementation of management actions at the offset site will consider other Government programs that are being carried out in the area. Specifically, baiting programs for feral animals will be aligned with existing pest management strategies in the locality, implemented by Namoi CMA and the Central North Livestock Health and Pest Authority.

State Water has an excellent working relationship with Namoi CMA, which will assist in ensuring that management of the offset site complements other government programs being carried out within the catchment.

"Offsets must be underpinned by sound ecological principles"

The BBAM has been utilised to quantify the biodiversity losses at the impact site and to calculate the biodiversity gains required at the offset site. Inputs to the BBAM are based on scientific investigations carried out by nghenvironmental, State Water and WorleyParsons. Records of these investigations are publically available in the EIS and PIR prepared for the Project. Consultation has been carried out with the then SEWPaC, DP&I, OEH and Namoi CMA in the preparation of these scientific investigations.

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

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site.

The North-Western Offset Site comprises areas of derived grassland that have been degraded by grazing and recreational pressures, similar to those in the impact site. However, the offset site also contains extensive areas with regenerating overstorey, which with proper management, are expected to increase in quality within a relatively short time frame, resulting in a net improvement to the biodiversity values at the site.

Management actions to be implemented at the North-Western Offset Site are predicted to result in the regeneration of grassy woodland communities within areas that have been previously cleared or heavily grazed. The majority of these areas are expected to regenerate to form the TSC Act listed EEC and EPBC Act listed CEEC known from the impact site.

"Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs"

A Conservation Agreement under the *National Parks and Wildlife Act 1974* will be implemented to secure the offset site for the life of the proposed augmentation. Management actions to be implemented at the site will be incorporated into the Conservation Agreement. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

As part of the Conservation Agreement, the area incorporated into the North-Western Offset Site will be registered on the title of the land under the *Real Property Act 1900*. This will ensure that, if the land is sold, the agreement and management requirements remain in place.

"Offsets should be agreed prior to the impact occurring"

This Vegetation Offset Plan is intended to enable vegetation offsets for the Project to be agreed prior to commencement of the Project. The land within the North-Western Offset Site is vested in State Water (excluding Lot 7012) and available for dedication as offset site from 1 January 2014, following termination of existing grazing leases on 31 December 2013. Construction of the Project is scheduled to commence in March 2014, pending determination of relevant approvals.

"Offsets must be quantifiable - the impacts and benefits must be reliably estimated"

The BBAM has been utilised to quantify the conservation losses at the impact site and the conservation gains at the offset site. This assessment shows an overall ecosystem credit surplus of 2,355 credits. Implementation of the *OEH SSI Interim Offsets Policy* variation criteria (a) provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

Inputs to the BBAM are based on scientific investigations carried out by nghenvironmental, State Water and WorleyParsons. Records of these investigations are publically available in the EIS and PIR prepared for the Project. Consultation has been carried out with the then SEWPaC, DP&I, OEH and Namoi CMA in the preparation of these scientific investigations.

A North-Western Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions.

Management actions to be implemented at the site will be incorporated into the Conservation Agreement. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

"Offsets must be targeted"

The North-Western Offset Site covers an area of approximately 1,000 ha. In comparison to the 160 ha of vegetation to be inundated or cleared at the impact site, this provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

Under the BBAM, the offset site appropriately compensates for the loss of vegetation types and quantities in the impact site except River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

The deficiency in River Oak riparian woodland is anticipated to be addressed in the separate offset plan to be prepared for the Booroolong Frog.

Implementation the *OEH SSI Interim Offsets Policy* variation criteria (a) enables the deficiency in the White Box Yellow Box Blakely's Red Gum Woodland EEC to be compensated by the surplus of credits for the Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest. This provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

> *"Offsets must be located appropriately"*

The North-Western Offset Site is located immediately adjacent to and contiguous with the impact site. Both the impact site and the offset site occur wholly within the Namoi Catchment Management Area.

The North-Western Offset Site comprises areas of derived grassland that have been degraded by grazing and recreational pressures, similar to those in the impact site. However, the offset site also contains extensive areas with regenerating overstorey, which with proper management, are expected to increase in quality within a relatively short time frame, resulting in a net improvement to the biodiversity values at the site.

> *"Offsets must be supplementary"*

The land within the North-Western Offset Site is not currently protected by any Conservation Agreements or reservation schemes (nghenvironmental 2013d). As noted above, the offset site is zoned "RU1 Primary Production" under the Tamworth LEP, which does not afford environmental protection beyond that required under NSW and Commonwealth planning and environmental legislation.

The proposed security and management of the site is supplementary to existing requirements and not already funded under another scheme.

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

A Conservation Agreement will be implemented to secure the offset site for the life of the proposed augmentation. Management actions to be implemented at the site will be incorporated into the Conservation Agreement. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

An Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions.

3.4 Assessment against the NSW Offset Principles for Major Projects

In August 2013, the OEH released the NSW offset principles for major projects (state significant development and infrastructure). An assessment of the North-Western Offset Site against these seven principles is provided below.

> *"Before offsets are considered, impacts must first be avoided and unavoidable impacts minimised through mitigation measures. Only then should offsets be considered for the remaining impacts"*

Impacts have been avoided or mitigated as far as practical, given the nature of the Project, as documented in the EIS and PIR. This includes reducing the road works footprints and modifying the design of works to the dam wall.

The North-Western Offset Site will be established in order to offset the residual impacts that cannot be avoided or mitigated.

> *"Offset requirements should be based on a reliable and transparent assessment of losses and gains"*

The BBAM has been utilised to quantify the biodiversity losses at the impact site and to calculate the biodiversity gains required at the offset site. Inputs to the BBAM are based on scientific investigations carried out by nghenvironmental, State Water and WorleyParsons. Records of these investigations are publically available in the EIS and PIR prepared for the Project. Consultation has been carried out with the then SEWPaC, DP&I, OEH and Namoi CMA in the preparation of these scientific investigations.

> *"Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities"*

The North-Western Offset Site is immediately adjacent to and contiguous with the impact site. The offset site provides a 2.1:1 offset to impact ratio for the White Box Yellow Box Blakely's Red Gum Woodland EEC.

In accordance with the *OEH SSI Interim Offsets Policy* variation criteria (a), the North-Western Offset Site provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

> *"Offsets must be additional to other legal requirements"*

The North-Western Offset Site is not covered by any existing conservation covenants or agreements. Although the land is vested in State Water, it is currently the subject of grazing leases and is not being managed for conservation purposes.

The offset site is zoned "*RU1 Primary Production*" under the Tamworth LEP, which does not afford the site any environmental protection beyond that required under NSW and Commonwealth planning and environmental legislation.

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site.

> *"Offsets must be enduring, enforceable and auditable"*

A Conservation Agreement will be implemented to secure the offset site for the life of the proposed augmentation. Management actions to be implemented at the site will be incorporated into the Conservation Agreement. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

An Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions.

> *"Supplementary measures can be used in lieu of offsets"*

The North-Western Offset Site provides a direct offset within an overall 6:1 offset to impact area ratio and an ecosystem credit surplus of 2,355 credits. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

Accordingly, no supplementary measures are proposed to be used in lieu of offsets.

> *"Offsets can be discounted where significant social and economic benefits accrue to NSW as a consequence of the proposal"*

The North-Western Offset Site provides an overall ecosystem credit surplus of 2,355 credits, calculated in accordance with the BBAM. Although the site contains a 4,609 credit deficiency to satisfy the BBAM for the White Box Yellow Box Blakely's Red Gum Woodland EEC, implementation of this principle and *OEH SSI Interim Offsets Policy* variation criteria (a) enables this deficiency to be compensated by the surplus of credits for the Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest. This provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

The North-Western Offset Site provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

3.5 Assessment against the Namoi CMA Biodiversity Offsets Policy

The Namoi CMA has developed the *Namoi CMA Biodiversity Offsets Policy* to ensure that biodiversity values within the Namoi catchment are protected. The principle objective of the policy is to avoid further loss of biodiversity that will result in critical thresholds identified in the *Namoi Catchment Action Plan 2010-2020* (Namoi CMA 2011a) being crossed.

As described in Section 3, consideration has been given to the *Namoi CMA Biodiversity Offsets Policy*, however where inconsistencies occur between this document and the key NSW policy documents (*OEH SSI Interim Offsets Policy*, *Principles for the use of biodiversity offsets in NSW* and *NSW offset principles for major projects (state significant development and infrastructure)*, precedence has been given to the key NSW policy documents.

The *Namoi CMA Biodiversity Offsets Policy* states that any offsets proposed for the Namoi catchment will need to:

> *"Compensate for predicted impacts of a development proposal on biodiversity values"*

The North-Western Offset Site provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

The BBAM has been utilised to assess the conservation losses at the impact site and the conservation gains at the offset site. This assessment shows an overall ecosystem credit surplus of 2,355 credits. Implementation of the *OEH SSI Interim Offsets Policy* variation criteria (a) provides a credit surplus of 2,447 credits under the BBAM for grassy woodland formations (White Box Yellow Box Blakely's Red Gum Woodland and Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest).

It is considered that the management of the North-Western Offset Site will compensate for the predicted impacts of the Project on biodiversity values.

> *"Ensure that the development results in no net loss of native vegetation in the catchment"*

The Project will result in the loss of native vegetation through inundation and construction activities. However, management actions to be implemented at the North-Western Offset Site are predicted to result in the regeneration of grassy woodland communities within areas that have been previously cleared or heavily grazed. The majority of these areas are expected to regenerate to form the TSC Act listed EEC and EPBC Act listed CEEC known from the impact site.

Given that much of the impact site has been cleared of overstorey vegetation, the potential gains at the North-Western Offset Site are considered likely to result in a net gain in terms of the native vegetation that would have originally occupied the impact site.

> *"Ensure that development avoids the Namoi catchment or sub-catchments crossing critical thresholds identified in the Namoi CAP*
>
> - *30% (in cleared sub-catchments) woody native vegetation extent threshold*
> - *70% (in intact sub-catchments) woody native vegetation extent threshold*
> - *30% of Regional vegetation Communities threshold within the Catchment"*

Management of the North-Western Offset Site is considered likely to result in a net gain for the TSC Act listed EEC and EPBC Act listed CEEC. Gains are also likely for the more common vegetation types, such as the Rough-barked Apple – Silvertop Stringybark forest community, which provide important habitat features.

With the implementation of management actions at the North-Western Offset Site, it is considered unlikely that the development will result in vegetation within the Namoi catchment or sub-catchments crossing critical thresholds.

> *"Be consistent with the existing NSW Government and Commonwealth legislative requirements as a minimum standard"*

The Project has been assessed in accordance with the relevant NSW and Commonwealth legislation, including the proposal to offset impacts, as documented in the Project EIS and PIR.

The proposed security and management of the North-Western Offset Site is considered to be in accordance with relevant State Government policy requirements and provide long-term conservation outcomes consistent with the *EPBC Act Environmental Offsets Policy*, as discussed in Sections 3 and 4.

In addition to the above, the *Namoi CMA Biodiversity Offsets Policy* requires that the following principles be applied when considering using biodiversity offsets in the Namoi catchment for any development:

> *"Offsets will be used as a last resort, after consideration of alternatives to avoid and/or mitigate impacts"*

Impacts have been avoided or mitigated as far as practical, given the nature of the Project, as documented in the EIS and PIR. This includes reducing the road works footprints and modifying the design of works to the dam wall.

The North-Western Offset Site will be established in order to offset the residual impacts that cannot be avoided or mitigated.

> *"Offsets must be kept within the Namoi Catchment boundaries (either wholly or in part – as a contiguous area of native vegetation)"*

The North-Western Offset Site is immediately adjacent to the impact site and occurs wholly within the Namoi Catchment Management Area. The offset site comprises 11 lots that are contiguous with each

other, noting that the Western Foreshore Road (a single lane, unsealed road) has been excluded from the offset site.

> *"Offsets must be of the same vegetation type and be at least the size, equivalent biodiversity value and configuration of the vegetation lost through development and additional to existing native vegetation areas"*

The North-Western Offset Site covers an area of approximately 1,000 ha. In comparison to the 160 ha of vegetation to be inundated or cleared at the impact site, this provides an overall offset to impact area ratio of 6:1. The site provides an offset to impact area ratio of 2.1:1 for the River Oak riparian woodland and the White Box Yellow Box Blakely's Red Gum Woodland EEC.

Although the offset site is not additional to existing native vegetation areas, it has been developed in accordance with relevant NSW legislation and policies and is expected to result in a net conservation gain in the long term.

> *"Offsetting must achieve biodiversity benefits in perpetuity and be registered on title"*

The North-Western Offset Site will be secured for the life of the proposed augmentation through execution of a Conservation Agreement under the *National Parks and Wildlife Act 1974*.

As part of the Conservation Agreement, the area incorporated into the North-Western Offset Site will be registered on the title of the land under the *Real Property Act 1900*. This will ensure that, if the land is sold, the agreement and management requirements remain in place.

> *"Offset conditions must be monitored, enforceable, clearly mapped, recorded and publicly available"*

Management actions to be implemented at the North-Western Offset Site will be incorporated into the Conservation Agreement for the site. Upon execution of the Conservation Agreement, State Water will have a legal obligation to implement the required management actions.

A North-Western Offset Site Management Plan will be developed and implemented at the site. This plan will include monitoring, reporting and auditing requirements for each of the management actions. The North-Western Offset Site Management Plan will be made available to relevant NSW and Commonwealth Government Agencies, however a strategic decision will made as to whether public display of this information will create a risk to management of the offset site.

This Vegetation Offset Plan will be made publically available.

> *"An offset area, once designated, cannot be used for further offsetting of subsequent developments in the future"*

The North-Western Offset Site will be secured through a Conservation Agreement and will not be available for further offsetting of any future development.

4 COMMONWEALTH OFFSET REQUIREMENTS

The Supplementary DGRs issued for the Project on 19 October 2012 included the requirement for offsets to be implemented in accordance with the *EPBC Act Environmental Offsets Policy* (SEWPaC 2012) in the event that impacts cannot be avoided or mitigated.

4.1 EPBC Act Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* outlines the Commonwealth Government's approach to the use of environmental offsets under the EPBC Act. The policy requires that offsets be implemented where a significant residual impact remains after implementation of avoidance and mitigation measures.

As documented in Section 1.2 and the FFA (nghenvironmental 2012), approximately 7.5 ha of the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC will be impacted by the Project. It was concluded by nghenvironmental (2012) that no significant impact to this community, or to any other threatened species, community or population listed under the EPBC Act, will result from the Project. Accordingly, no offset is required for the Project under the provisions of the *EPBC Act Environmental Offsets Policy*.

However, the offset proposed in accordance with the NSW *OEH SSI Interim Offsets Policy* for the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC incorporates approximately 207 ha of the EPBC Act listed CEEC that variably meets the EPBC criteria based on understorey diversity, the density of mature trees and the presence of overstorey regeneration (nghenvironmental 2012). As such, consideration against the *EPBC Act Environmental Offsets Policy* is provided to demonstrate the conservation outcomes for the CEEC expected to be achieved through implementation and management of the North-Western Offset Site.

4.1.1 EPBC Act Offsets Assessment Guide

An assessment of the North-Western Offset Site was carried out by nghenvironmental (2013d) utilising the EPBC Act Offsets Assessment Guide, supported by information in the document "*How to use the Offsets Assessment Guide*".

Utilising the values described below, the EPBC Act Offsets Assessment Guide returned a 304% direct offset for the Project (Appendix 3).

An explanation of the inputs used for each component is provided below.

> *"Quality of habitat to be impacted and the start quality of habitat at the offset site"*

An overall habitat quality score was determined by nghenvironmental (2013d) for the impact site and the offset site, on a scale of zero (being the lowest habitat quality) to 10 (being the highest habitat quality).

Consideration was given to the following factors:

- Site condition, including vegetation condition (weediness), structure and species diversity;
- Site context, comprising the biodiversity importance of the site in terms of its landscape position; and
- Species stocking rate, comprising the number of individual populations at the site.

The contribution of these factors was then weighted according to their level of importance to achieve an overall habitat quality score. The results of this analysis are provided in Table 4-1 and Table 4-2.

Table 4-1 Habitat quality of Box-Gum grassy woodland CEEC to be impacted by the Project

Factor	Score	Importance	Reasoning
Site condition	8	1	The northern extent of the area to be impacted exhibits a high diversity of native forbs. Weeds are common but not prolific. The southern area has a moderate diversity and similar weediness. Overstorey regeneration was evident in all areas. Areas of the community with a moderate to high diversity within the impact site are rare.
Site context	6	2	The Chaffey Dam reservoir acts as a barrier to the impact site. The impact site is subject to high grazing pressures and is also used for recreational purposes. Areas of more high quality vegetation occur where such pressures are less intense.
Species stocking rate	7	3	The role of the impact site in sustaining the community is considered to be relatively important, however not essential to the survival of the community. The community is not widespread within the area to be impacted.
Overall habitat quality score	8		

Source: nghenvironmental (2013d)

Table 4-2 Starting habitat quality of Box-Gum grassy woodland CEEC within the North-Western Offset site

Factor	Score	Importance	Reasoning
Site condition	7	2	Generally, a moderate diversity of native forbs is present with small patches of high diversity. Lower diversity areas are widespread as are common pasture weeds. Regeneration of the overstorey is evident throughout.
Site context	7	1	The offset site occurs within a landscape that has been largely cleared for agriculture and is subject to grazing pressures. It provides an important link in habitat between the north and south of the reservoir, however similar examples of the community are common throughout the broader area.
Species stocking rate	6	3	The occurrence of the community within the offset area is not considered to be essential to the survival of the community within the broader area, however some higher quality areas would provide an important source for dispersal. It is anticipated that this value would increase substantially through implementation of the offset.
Overall habitat quality score	7		

Source: nghenvironmental (2013d)

"Time over which loss is averted for the offset"

As the North-Western Offset Site will be legally secured for the life of the proposed augmentation (refer Section 2.3), the maximum forecast term of 20 years was selected as the time over which loss will be averted for the offset site.

"Future quality with or without offset and time until ecological benefit"

The habitat quality of the offset site with or without implementation of the offset is largely based on the management actions proposed (refer Section 2.4). Key management actions of relevance to the EPBC Act listed CEEC include:

- Weed control;
- Feral and native herbivore control;
- Stock grazing management; and
- Assisted regeneration.

It was considered by nghenvironmental (2013d) that the overall quality of the habitat for the Box-Gum grassy woodland CEEC within the North-Western Offset Site could be increased from a value of 7 to a value of 8 over a period of 10 years by implementing these key management actions.

Conversely, if current land management practices continue, nghenvironmental (2013d) considered that degradation of habitat quality would be likely to continue, predominately due to a continued loss of groundcover diversity. Over a 10 year period it was considered likely that the overall habitat quality would degrade to a value of 6.

As the degradation at the North-Western Offset Site has been largely caused by weed invasion and grazing and that the management actions described above are ensured to be carried out as part of a management plan for the forecast period, a confidence level of 85% was applied by nghenvironmental (2013d).

"Risk of loss of the offset site with or without the offset"

The North-Western Offset Site is currently utilised for grazing and is situated within a locality where this is the dominant land use. The land is vested in State Water and leased to private landowners. The land is not subject to conservation agreements or reservation schemes (nghenvironmental 2013d).

The offset site is zoned "*RU1 Primary Production*" under the Tamworth LEP. Within this zone, development including extractive industries, intensive livestock and plant agriculture, landscaping material supplies and open cut mining is permitted with consent. As such, the current zoning of the land does not afford environmental protection beyond that required under NSW and Commonwealth planning and environmental legislation.

The offset site is located within a fossicking district (District Number 3; File Number L98/0394), which poses a potential future risk to the integrity of the site (Department of Trade and Investment 2013).

The eastern section of the offset site is subject to two current Exploration Licences (EL8067 and EL8012) issued under the NSW *Mining Act 1992*, as shown in Table 2-2**Error! Reference source not found.**. The presence of these Exploration Licences also poses a potential future risk to the integrity of the site.

There are no known development applications that apply to the offset site.

Given the land is vested in State Water, it is unlikely that future land uses would lead to the loss of the offset site unless the site was sold. An estimate of 10% risk of loss without offset was applied in the analysis undertaken by nghenvironmental (2013d).

With the offset in place, the risk of loss was considered by nghenvironmental (2013d) to be very low, given the offset will be legally secured for the life of the proposed augmentation. There is a small chance that the offset may be lost due to unforeseen circumstances. A 5% risk of loss was applied to account for this.

Considering the amount of field survey undertaken, nghenvironmental (2013d) considered that a good understanding of the site and associated land use pressures has been obtained. Accordingly, the estimated value for risk of loss was considered to be reasonably informed and a 70% confidence in these results was applied.

4.1.2 Offset Principles

The *EPBC Act Environmental Offsets Policy* identified eight overarching principles that must be applied in determining the suitability of offsets. Consideration of these principles in regard to protection of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC afforded by the North-Western Offset Site is provided below.

> *"Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action"*

The Project will directly impact upon approximately 7.4 ha of vegetation considered to comprise the EPBC Act listed CEEC. The proposed North-Western Offset Site contains approximately 207 ha of vegetation considered to comprise this community, although of slightly lower quality than that to be impacted.

An assessment of the impact and offset sites utilising the EPBC Act Offsets Assessment Guide showed that the North-Western Offset Site provides a 304% direct offset for the EPBC Act listed CEEC (nghenvironmental 2013d).

Implementation of the proposed management measures at the offset site, including securing the site for the life of the proposed augmentation, will ensure that the long-term viability of the CEEC at the site is maintained or improved.

"Be built around direct offsets but may include other compensatory measures"

An assessment of the impact and offset sites utilising the EPBC Act Offsets Assessment Guide showed that the North-Western Offset Site provides a 304% direct offset for the EPBC Act listed CEEC (nghenvironmental 2013d). No other compensatory measures are proposed.

"Be in proportion to the level of statutory protection that applies to the protected matter"

The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community is listed as critically endangered. The assessment carried out using the EPBC Act Offsets Assessment Guide incorporated the annual probability of extinction relative to this conservation status (6.8%).

Implementation of the North-Western Offset Site will provide protection and management of approximately 207 ha of this community, which comprises a direct offset of more than three times that required by the EPBC Act Offsets Assessment Guide.

"Be of a size and scale proportionate to the residual impacts on the protected matter"

As previously noted, nghenvironmental (2013d) concluded that no significant residual impacts to the CEEC will occur as a result of the Project. However, the North-Western Offset Site proposed in accordance with the NSW *OEH SSI Interim Offsets Policy* for the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC will provide protection and management over an area of approximately 1,000 ha, 20% of which constitutes the CEEC.

The proposed offset site offers a 304% direct offset (as calculated by the EPBC Act Offsets Assessment Guide), which confirms that the size and scale of the offset is suitable.

"Effectively account for and manage the risks of the offset not succeeding"

It is recognised in the *EPBC Act Environmental Offsets Policy* that direct offsets present a lower risk than other compensatory measures as they are more likely to result in a conservation gain for a protected matter. The North-Western Offset Site comprises a direct offset that will be protected and managed for the life of the proposed augmentation. A legally binding agreement will be implemented for the offset site, which provides surety of the offset succeeding for the long-term. Further certainty is given to the likelihood of the offset succeeding by the fact that State Water, a State Owned Corporation, will be responsible for the ongoing management of the offset site.

"Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs"

The land within the North-Western Offset Site is not currently subject to any conservation agreements or reservation schemes (nghenvironmental 2013d). As noted above, the offset site is zoned "*RU1 Primary Production*" under the Tamworth LEP, which does not afford environmental protection beyond that required under NSW and Commonwealth planning and environmental legislation.

The security and management of the site proposed is additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.

"Be efficient, effective, timely, transparent, scientifically robust and reasonable"

The North-Western Offset Site will be secured and implementation of management actions commenced prior to the stated Project impacts occurring. The offset site will be secured and managed for the life of the proposed augmentation.

The North-Western Offset Site has been selected and management actions developed on the basis of scientific investigations carried out by nghenvironmental, State Water and WorleyParsons. Records of these investigations are publically available in the EIS and PIR prepared for the Project. Consultation has been carried out with the then SEWPaC, DP&I, OEH and Namoi CMA, in the preparation of these scientific investigations.

Identification of the offset site has taken into consideration the availability and acquisition costs of other land outside of the North-Western Offset Site.

The North-Western Offset Site and proposed management actions are considered to be efficient, effective, timely, transparent, scientifically robust and reasonable.

"Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced"

The North-Western Offset Site will be secured and managed for the life of the proposed augmentation through implementation of a Conservation Agreement. A management plan will be developed for the North-Western Offset Site, which will detail the required management objectives, targets and actions, as well as monitoring, reporting and auditing requirements.

5 CONCLUSION

The Project will impact on approximately 160 ha of native vegetation, including approximately 150 ha of vegetation considered to comprise the White Box Yellow Box Blakely's Red Gum Woodland EEC listed under the TSC Act. Within the area of the EEC vegetation, approximately 7.5 ha is considered to also comprise the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC listed under the Commonwealth EPBC Act (nghenvironmental 2013c).

nghenvironmental (2013a, 2013c) concluded that the Project will not result in a significant impact to the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC or the EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.

Impacts to the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC will be offset through the protection and management of 1,000 ha of land, described as the North-Western Offset Site, in accordance with the:

- *OEH SSI Interim Offsets Policy*;
- *Principles for the use of biodiversity offsets in NSW*; and
- *NSW offset principles for major projects (state significant development and infrastructure)*.

Consideration was also given to the *Namoi CMA Biodiversity Offsets Policy 2011*.

The *EPBC Act Environmental Offsets Policy* requires that offsets be implemented where a significant impact remains after implementation of avoidance and mitigation measures. Accordingly, no offset is required for the Project under the provisions of the *EPBC Act Environmental Offsets Policy*. Nonetheless, the protection and management of the North-Western Offset Site is considered to provide positive conservation outcomes for the CEEC.

In order to secure the North-Western Offset Site for the purposes of a biodiversity offset, it is proposed that a Conservation Agreement under the *National Parks and Wildlife Act 1974* be established over the land. The Conservation Agreement will comprise a joint agreement between State Water and the Minister for the Environment and will remain in place for the life of the proposed augmentation.

Management actions will be implemented by State Water at the North-Western Offset Site with the key objective of improving the biodiversity values of the site. To achieve this objective, the management actions have been designed to reduce the level of threats currently occurring at the site.

The following management actions will be implemented at the North-Western Offset Site:

- Strategic stock exclusion;
- Weed control;
- Feral animal control;
- Restriction of public access;
- Assisted regeneration; and
- Controlled burns.

It is considered that the protection and management of the North-Western Offset Site provides an appropriate offset for the Project in accordance with the *OEH SSI Interim Offsets Policy*, the Principles for the use of biodiversity offsets in NSW and the NSW offset principles for major projects (state significant development and infrastructure).

Further, it is considered that the protection and management of the North-Western Offset Site complies with the principles of the *EPBC Act Environmental Offsets Policy* and will provide positive long-term conservation outcomes for the CEEC.

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Appendices

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Appendix 1: Assessment of Potential Additional Offset Sites

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ASSESSMENT OF POTENTIAL ADDITIONAL OFFSET SITES

Following identification of the North-Western Offset Site, an assessment of potential additional offset sites was carried out for the land immediately surrounding the reservoir. Areas of land around the reservoir containing the TSC Act listed White Box Yellow Box Blakely's Red Gum Woodland EEC were investigated for their potential use as additional offset sites.

Field surveys have been carried out (at least in part) over each of the sites considered for use as an offset site (**Figure**). The vegetation communities surrounding the reservoir were then mapped by nghenvironmental (2012, 2013c) on the basis of these surveys and GIS analysis (**Figure**).

For each of the identified potential additional offset sites, the following was established:

- Landowner/s;
- Current conservation (reserve) status;
- Estimated market value (acquisition cost);
- Potential market availability; and
- Potential to establish a management agreement over the land.

Market value was estimated for each of the potential offset sites, utilising Valuer General's land valuations where available (Attachment A). For those properties where no Valuer General's land valuation was available, the market value was estimated based on an average land value per hectare, calculated from those properties with available Valuer General's land valuations.

Real estate websites were also examined to assist in estimating the market value for each site. Using the information for past property sales near Chaffey Dam on the website “Onthehouse” (Attachment B), an average market value per hectare was estimated for comparison with the average land value per hectare calculated using the Valuer General's land valuations.

Based on an assessment of the information above and in particular, the existing designation and use of some land (including reserve status that would preclude the use of such land as an offset site and existing business operations), as well as likely cost for acquisition of land, the potential availability to use the sites assessed as an additional EEC offset site was considered unsuitable to the Project. A summary of the assessment is provided in Table A.

Figure A: Survey effort within and surrounding the Project Site (nghenvironmental 2013c)

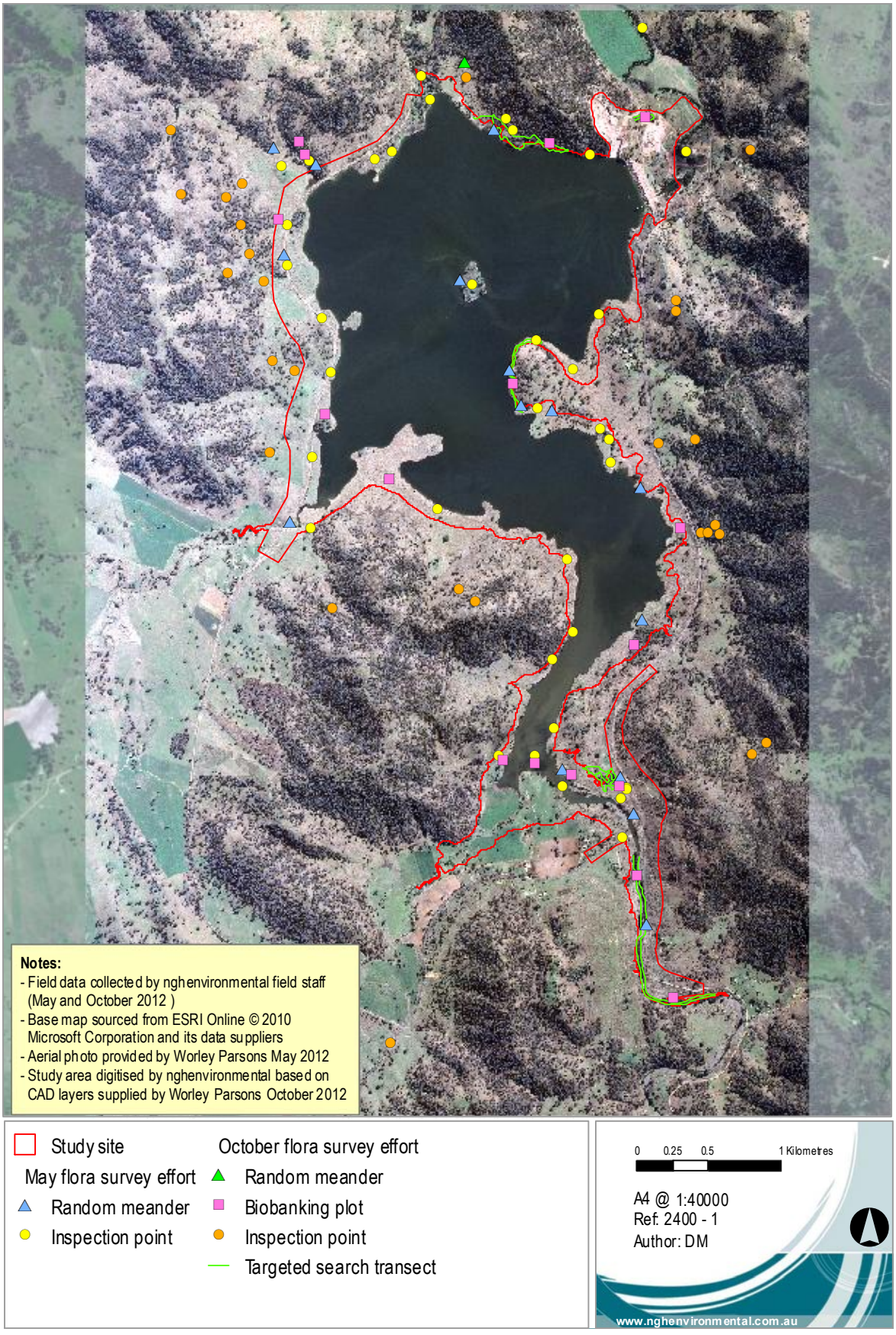


Figure 3-1 Flora survey effort Survey 1 and Survey 2 (May and October 2012)

Figure B: Vegetation communities within and surrounding the Project Site (nghenvironmental 2013c)

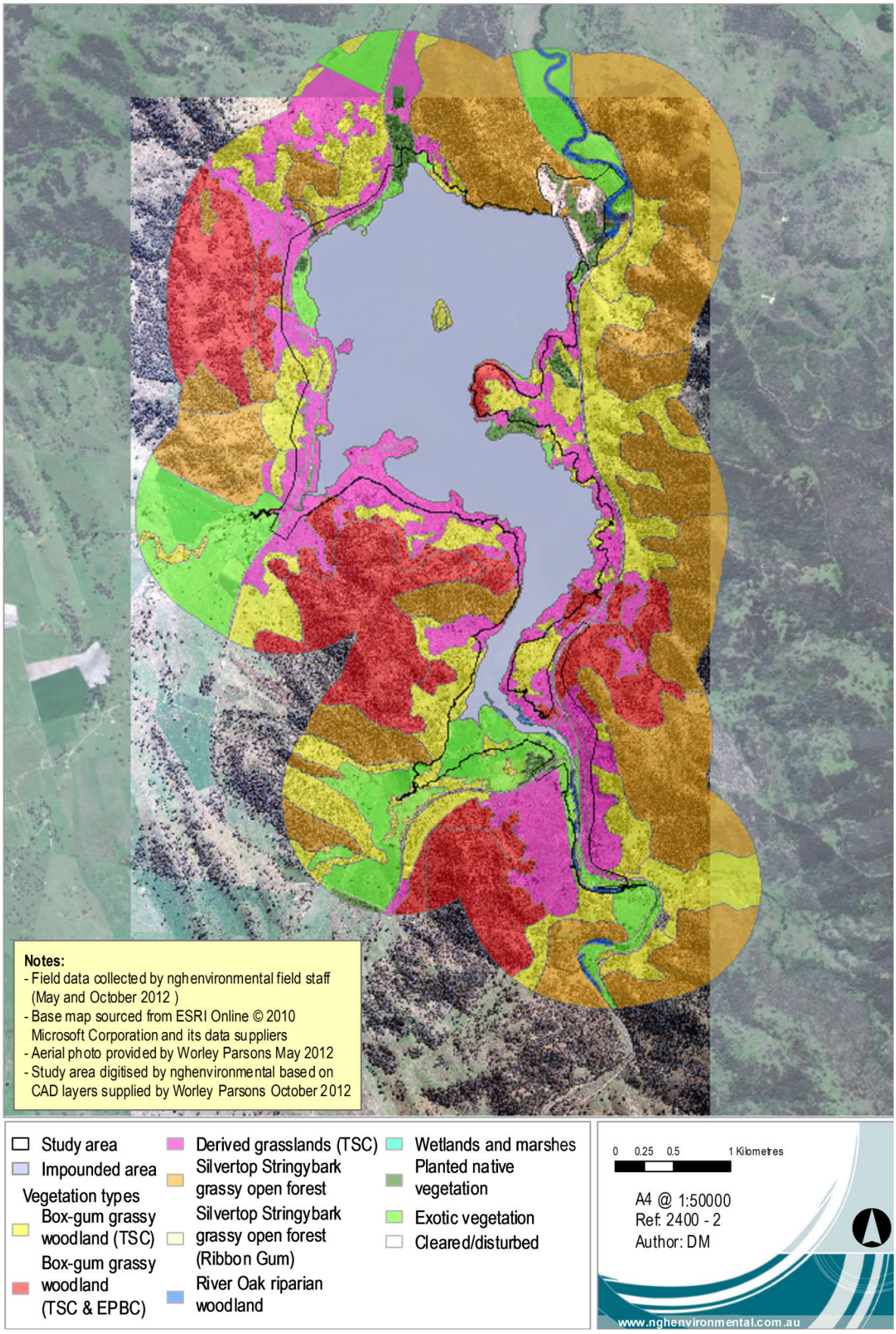


Figure 2-11 Vegetation Communities within the study area

Table A: Assessment of potential additional offset sites

Primary Properties	Property Size (Ha)	Landowner	Land Type	Reserve Status	Survey (Refer Figures A and B)	Approx. EEC Extent over Property (%)	Approx. EEC Extent over Property (ha)	Ratio to Clearing (117Ha)	Market Value (nearby sales)** (Total)	Market Land Value (VGV)* (Total)	Market Land Value (VGV)* ($/ha)	Market Availability	Availability for Management Agreement	Outcome
Eastern Foreshore Potential Additional Offset Site														
Lot 1 DP261290	458	Land and Property Management Authority	Crown	Reserve # R200015 Purpose: Soil Conservation Management: Crown Lands Tamworth ALC: Yes	Part Complete	25%	114.5	0.979	$5,592,180.00	$1,198,521.63	$2,616.86	Low - currently held in reserve	Low - subject of an Aboriginal Land Claim (ALC) and not available unless the claim is settled.	Acquisition costs prohibitive. Large land size relative to extent of EEC. Majority of land currently held in reserve.
Lot 1 DP719760	19	Land and Property Management Authority	Crown	Reserve # R96568 Bowling Alley Point Recreation Reserve Management: Trust Purpose: Public Recreation ALC: Yes Other: Trust issued tenure Grazing Licence 504177	Complete	90%	17.1	0.146	$231,990.00	$49,720.33	$2,616.86	Low - currently held in reserve	Low - recreational land uses associated with current reserve status are not conducive to management as an offset site, ALC.	
Lot 241 DP755324	70	Land and Property Management Authority	Crown	None known	Complete	80%	56	0.479	$854,700.00	$183,180.16	$2,616.86	Mod - potentially available	Low - subject of an Aboriginal Land Claim (ALC) and not available unless the claim is settled.	
Total	**477**						**131.6**	1.125	**$5,824,170.00**	**$1,248,241.96**				
Southern Foreshore Potential Additional Offset Site														
Lot 1 DP631895	194	Land and Property Management Authority	Crown	Reserve # R97619 Purpose: National Fitness and Physical Education Management: Chaffey Dam Reserve Trust	Complete	80%	155.2	1.326	$2,368,740.00	$507,670.73	$2,616.86	Low - currently held in reserve	Low - land uses associated with current reserve status are not conducive to management as an offset site, ALC.	Acquisition costs prohibitive. Potential for socioeconomic impacts due to current land uses. Part of land currently held in reserve.
Lot 1 DP598184	98	Water Resources Commission [State Water]	Leasehold	None known	Complete	100%	98	0.838	$1,196,580.00	$256,452.23	$2,616.86	Low - leaseholder operates business on land	Low - business carried out on land (Dairy Farm) is not conducive to management as an offset site	
Lot 10 DP1125418	538	Bukit Padang and Co Pty Limited	Private	None known	Part Complete	60%	322.8	2.759	$6,568,980.00	*$999,000.00*	*$1,856.88*	Low - landowner lives on and operates business on land	Low - business carried out on land (Dairy Farm) is not conducive to management as an offset site	
Total	**830**						**576**	4.923	**$10,134,300.00**	**$1,763,122.96**				

Primary Properties	Property Size (Ha)	Landowner	Land Type	Reserve Status	Survey (Refer Figures A and B)	Approx. EEC Extent over Property (%)	Approx. EEC Extent over Property (ha)	Ratio to Clearing (117Ha)	Market Value (nearby sales)** (Total)	Market Land Value (VGV)* (Total)	Market Land Value (VGV)* ($/ha)	Market Availability	Availability for Management Agreement	Outcome
Peel River Potential Additional Offset Site														
Lot 7023 DP1066124	19	Land and Property Management Authority	Crown	Reserve # R96568 Bowling Alley Point Recreation Reserve Management: Trust ALC: Yes	Complete	90%	17.1	0.146	$231,990.00	$49,720.33	$2,616.86	Low - currently held in reserve	Low - recreational land uses associated with current reserve status are not conducive to management as an offset site, ALC.	Small extent of EEC. Land currently held in reserve.
Lot 7024 DP1066124	15	Land and Property Management Authority	Crown		Complete	0%	0	0.000	$183,150.00	$39,252.89	$2,616.86			
Lot 7002 DP96452	15	Land and Property Management Authority	Crown		Complete	50%	7.5	0.064	$183,150.00	$39,252.89	$2,616.86			
Lot 7022 DP96455	36	Land and Property Management Authority	Crown		Complete	30%	10.8	0.092	$439,560.00	$94,206.94	$2,616.86			
Total	**85**						**35.4**	0.303	**$1,037,850.00**	**$222,433.05**				
South Western Foreshore Potential Additional Offset Site														
Lot 3 DP611964	70	Mrs PJ Murphy and Mr MR Murphy	Private	None known	Part Complete	75%	52.5	0.449	$854,700.00	*$208,852.00*	*$2,983.60*	Low - will only consider sale of whole (not part) of land.	Low - land is largely cleared and has been used for intensive cattle grazing.	Acquisition costs prohibitive. Potential for socioeconomic impacts due to current land uses.
Lot 4 DP611964	495	Mr RS Hobden and Mrs DM Hobden	Private	None known	Part Complete	5%	24.75	0.212	$6,043,950.00	*$1,490,000.00*	*$3,010.10*	Low - will only consider sale of whole (not part) of land.	Low - site contains insufficient area of EEC to warrant use of an offset site	
Total	**565**						**77.25**	0.660	**$6,898,650.00**	**$1,698,852.00**				

*Market land values in italics are based on the Valuer General's land valuations. All other values are based on an average land value per hectare, calculated from those properties with available Valuer General's land valuations.
**Market values (nearby sales) are based on an average cost per hectare, calculated from five past property sales in the vicinity of Chaffey Dam.

ATTACHMENT A – VALUER GENERAL'S LAND CERTIFCATES

Land and Property Information Division
ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT Land & Property Information
A division of the Department of Finance & Services

LAND VALUE FOR NON OWNERS

Property ID: 3404955

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - LAND VALUE SEARCH

PROPERTY NO:	3404955 LGA: TAMWORTH REGIONAL
ADDRESS OF PROPERTY:	BIRRALEE, 738 MONERAY RD, LOOMBERAH NSW 2340
DESCRIPTION OF LAND:	3/611964 3/716702
PROPERTY AREA:	171.94 HECTARES (FROM PLAN)
PROPERTY DIMENSIONS:	NOT AVAILABLE
VALUING YEAR:	01/07/2012 DATE VALUATION WAS MADE: 05/09/2012
ZONING USED FOR VALUATION:	PRIMARY PRODUCTION
LAND VALUE AUTHORITY:	14A(1) - ANNUAL REVALUATION
GROSS LAND VALUE:	$513,000
DIVISION 3 AND 4 ALLOWANCES:	NOT APPLICABLE
NET LAND VALUE:	$513,000
LAND VALUE BASIS:	6A(1) - THE LAND VALUE IS THE FREEHOLD VALUE OF THE LAND EXCLUDING ANY STRUCTURAL IMPROVEMENTS
OTHER ALLOWANCES/CONCESSIONS:	NOT APPLICABLE

THE CURRENT VALUING YEAR FOR RATING PURPOSES IN THE LOCAL GOVERNMENT AREA OF TAMWORTH REGIONAL IS 1 JULY 2010.

PRODUCED: 3 JULY 2013 16:02:37 PROPERTY STATUS AT THIS DATE: CURRENT

THIS LAND VALUE SEARCH DOES NOT CONVEY A RIGHT OF OBJECTION TO THE LAND VALUE.

THE VALUES SHOWN ARE CURRENT AT TODAY'S DATE. THE VALUER GENERAL CONDUCTS ONGOING REVIEWS OF LAND VALUES AND THEREFORE THE VALUES SHOWN MAY CHANGE.

THE LAND VALUE RECORDED ON THIS LAND VALUE SEARCH HAS BEEN DETERMINED UNDER THE VALUATION OF LAND ACT 1916 (AND THE HERITAGE ACT 1977, WHERE APPLICABLE) FOR RATING AND TAXING PURPOSES. LAND VALUES HAVE REGARD TO THE REQUIREMENTS OF RATING AND TAXING LEGISLATION AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE WITHOUT THE SPECIFIC AGREEMENT OF THE VALUER GENERAL.

*** END OF SEARCH ***

CLIENT REFERENCE: 17596873

Land and Property Information Division
ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT Land & Property Information
A division of the Department of Finance & Services

LAND VALUE FOR NON OWNERS

Property ID: 3380324

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - LAND VALUE SEARCH

PROPERTY NO:	3380324 LGA: TAMWORTH REGIONAL
ADDRESS OF PROPERTY:	MONREID, WEST BANK RD, NUNDLE NSW 2340
DESCRIPTION OF LAND:	4/611964
PROPERTY AREA:	493.97 HECTARES (FROM PLAN)
PROPERTY DIMENSIONS:	NOT AVAILABLE
VALUING YEAR:	01/07/2012 DATE VALUATION WAS MADE: 05/09/2012
ZONING USED FOR VALUATION:	PRIMARY PRODUCTION
LAND VALUE AUTHORITY:	14A(1) - ANNUAL REVALUATION
GROSS LAND VALUE:	$1,490,000
DIVISION 3 AND 4 ALLOWANCES:	NOT APPLICABLE
NET LAND VALUE:	$1,490,000
LAND VALUE BASIS:	6A(1) - THE LAND VALUE IS THE FREEHOLD VALUE OF THE LAND EXCLUDING ANY STRUCTURAL IMPROVEMENTS
OTHER ALLOWANCES/CONCESSIONS:	NOT APPLICABLE

THE CURRENT VALUING YEAR FOR RATING PURPOSES IN THE LOCAL GOVERNMENT AREA OF TAMWORTH REGIONAL IS 1 JULY 2010.

PRODUCED: 3 JULY 2013 16:02:37 PROPERTY STATUS AT THIS DATE: CURRENT

THIS LAND VALUE SEARCH DOES NOT CONVEY A RIGHT OF OBJECTION TO THE LAND VALUE.

THE VALUES SHOWN ARE CURRENT AT TODAY'S DATE. THE VALUER GENERAL CONDUCTS ONGOING REVIEWS OF LAND VALUES AND THEREFORE THE VALUES SHOWN MAY CHANGE.

THE LAND VALUE RECORDED ON THIS LAND VALUE SEARCH HAS BEEN DETERMINED UNDER THE VALUATION OF LAND ACT 1916 (AND THE HERITAGE ACT 1977, WHERE APPLICABLE) FOR RATING AND TAXING PURPOSES. LAND VALUES HAVE REGARD TO THE REQUIREMENTS OF RATING AND TAXING LEGISLATION AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE WITHOUT THE SPECIFIC AGREEMENT OF THE VALUER GENERAL.

*** END OF SEARCH ***

CLIENT REFERENCE: 17596961

Land and Property Information Division
ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT Land & Property Information
A division of the Department of Finance & Services

LAND VALUE FOR NON OWNERS

Title Reference: 10/1125418

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - LAND VALUE SEARCH

PROPERTY NO:	1871191 LGA: TAMWORTH REGIONAL
ADDRESS OF PROPERTY:	BUKIT PADANG, 3976 NUNDLE RD, BOWLING ALLEY POINT NSW 2340
DESCRIPTION OF LAND:	1, 2, 3, 4/241578 10/1125418
PROPERTY AREA:	537.4 HECTARES (CALCULATED)
PROPERTY DIMENSIONS:	NOT AVAILABLE
VALUING YEAR:	01/07/2012 DATE VALUATION WAS MADE: 05/09/2012
ZONING USED FOR VALUATION:	PRIMARY PRODUCTION
LAND VALUE AUTHORITY:	14A(1) - ANNUAL REVALUATION
GROSS LAND VALUE:	$999,000
DIVISION 3 AND 4 ALLOWANCES:	NOT APPLICABLE
NET LAND VALUE:	$999,000
LAND VALUE BASIS:	6A(1) - THE LAND VALUE IS THE FREEHOLD VALUE OF THE LAND EXCLUDING ANY STRUCTURAL IMPROVEMENTS
OTHER ALLOWANCES/CONCESSIONS:	NOT APPLICABLE

THE CURRENT VALUING YEAR FOR RATING PURPOSES IN THE LOCAL GOVERNMENT AREA OF TAMWORTH REGIONAL IS 1 JULY 2010.

PRODUCED: 2 JULY 2013 18:40:57 PROPERTY STATUS AT THIS DATE: CURRENT

THIS LAND VALUE SEARCH DOES NOT CONVEY A RIGHT OF OBJECTION TO THE LAND VALUE.

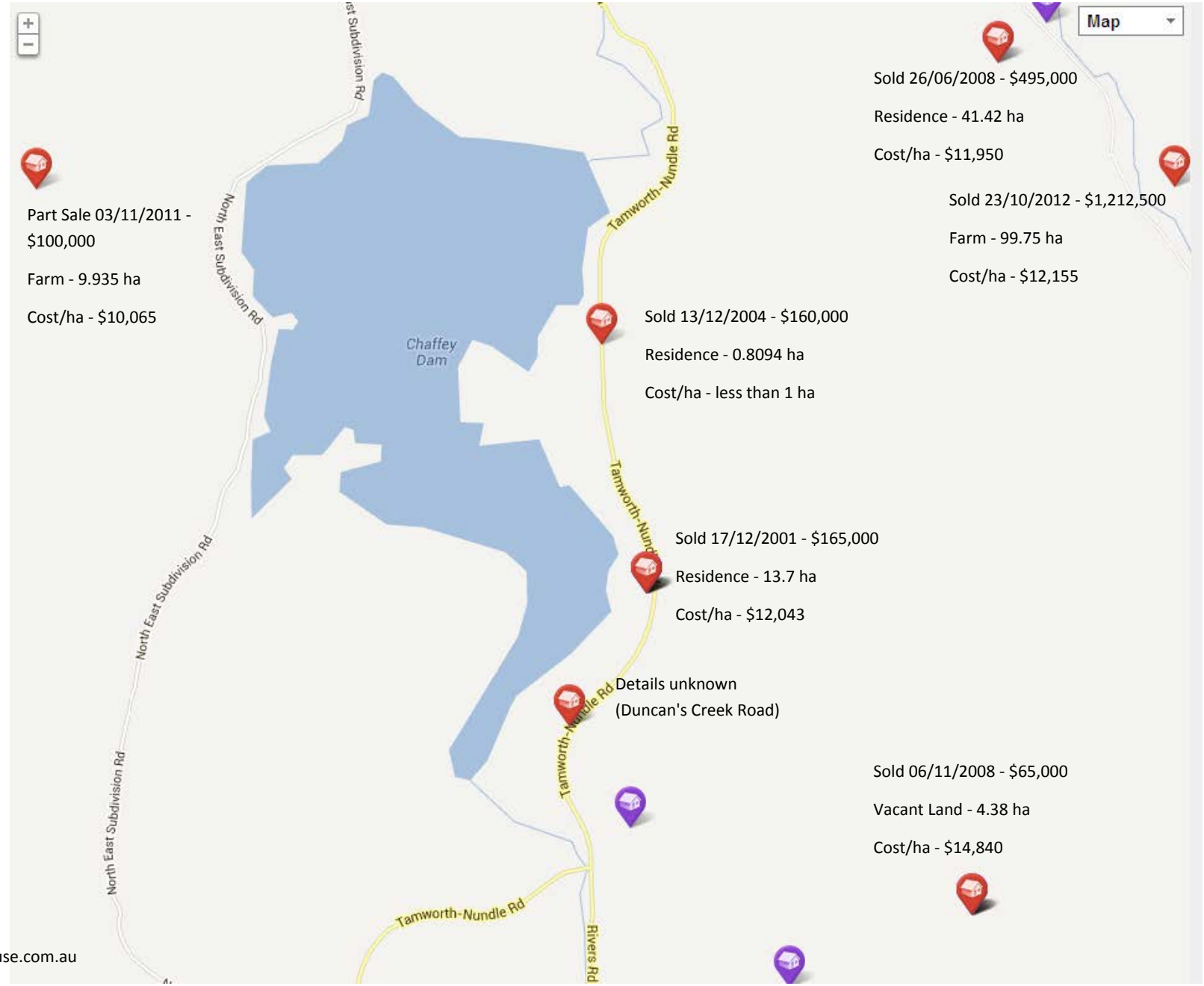
THE VALUES SHOWN ARE CURRENT AT TODAY'S DATE. THE VALUER GENERAL CONDUCTS ONGOING REVIEWS OF LAND VALUES AND THEREFORE THE VALUES SHOWN MAY CHANGE.

THE LAND VALUE RECORDED ON THIS LAND VALUE SEARCH HAS BEEN DETERMINED UNDER THE VALUATION OF LAND ACT 1916 (AND THE HERITAGE ACT 1977, WHERE APPLICABLE) FOR RATING AND TAXING PURPOSES. LAND VALUES HAVE REGARD TO THE REQUIREMENTS OF RATING AND TAXING LEGISLATION AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE WITHOUT THE SPECIFIC AGREEMENT OF THE VALUER GENERAL.

*** END OF SEARCH ***

CLIENT REFERENCE: 17581180

ATTACHMENT B – PAST PROPERTY SALES NEAR CHAFFEY DAM



SOURCE:

http://www.onthehouse.com.au

Appendix 2: BioBanking Assessment Methodology Credit Statement

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BIOBANKING CREDIT STATEMENT - DEVELOPMENT SITE

BioBanking Credit Calculator

NSW GOVERNMENT | Office of Environment & Heritage

BioBanking credit report

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

Date of report: 3/05/2013 Time: 3:42:13PM Tool version: 2.0

Development details

Proposal ID:	0035/2013/0467D
Proposal name:	Chaffey Dam Augmentation
Proposal address:	Chaffey Dam Nundle NSW 2340
Proponent name:	State Water Corporation
Proponent address:	PO Box 1018 Dubbo NSW 2830
Proponent phone:	1300662077
Assessor name:	Brooke Marshall
Assessor address:	PO Box 470 Bega NSW 2550
Assessor phone:	6492 8333
Assessor accreditation:	0035

Improving or maintaining biodiversity

An application for a red flag determination is required for the following red flag areas

Red flag	Reason
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Vegetation type being > 70% cleared; or it contains an endangered ecological community;

The application for a red flag determination should address the criteria set out in the BioBanking Assessment Methodology. Please note that a biobanking statement cannot be issued unless the determination is approved.

Additional information required for approval:

- ☐ Change to percent cleared for a vegetation type/s
- ☐ Use of local benchmark
- ☐ Change negligible loss
- ☐ Expert report
- ☐ Predicted threatened species not on site
- ☐ Change threatened species response to gain (Tg value)

Ecosystem credits summary

Vegetation type	Area (ha)	Credits required	Red flag
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	89.58	4,617	Yes
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	3.11	218	No
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	62.77	3,511	Yes
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	0.54	36	No
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	5.71	323	No
Total	161.71	8,705	

Credit profiles

1. Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196)

Number of ecosystem credits required	218
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

Offset options - vegetation types	Offset options - CMA sub-regions
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196) Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands, (CW102) Blakely's Red Gum - Rough-Barked Apple flats woodland of the NSW western slopes (Benson 281), (CW111) Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 277), (CW112) White Box - Apple Box valley herbaceous woodland mainly of the NSW western slopes (Benson 275), (CW207) White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282), (CW209) White Box grassy woodland on well drained podsolic clay soils on hills in the NSW South Western Slopes Bioregion (Benson 266), (CW216) Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands, (HU526) Blakely's Red Gum - Yellow Box grassy open forest or woodland of the	Peel - Namoi Wollemi (Part A) Yengo - Hunter/Central Rivers Wyong Armidale Plateau Stanthorpe Plateau

New England Tablelands, (NA113) Black Sallee grassy woodland of the New England Tablelands, (NR113) Blakely's Red Gum - Yellow Box grassy open forest or woodland of the New England Tablelands, (NR127) Broad-leaved Stringybark - Blakely's Red Gum grassy woodlands of the New England Tablelands, (NR131) Candlebark - Manna Gum woodland of the New England Tablelands, (NR146) Fuzzy Box open forest of the New England Tableland Bioregion (Benson 203), (NR165) Manna Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tablelands and North Coast, (NR186) New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tablelands, (NR214) Snow Gum - Black Sallee grassy woodland of the New England Tablelands, (NR237) Snow Gum - Mountain Gum - Mountain Ribbon Gum grassy open forest of the New England Tablelands, (NR238) Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest of the eastern New England Tablelands and North Coast, (NR239) Snow Gum woodland of the New England Tablelands and North Coast, (NR240) Yellow Box - Broad-leaved Stringybark shrubby open forest of the New England Tablelands, (NR282) Yellow Box - Grey Box - Red Gum woodland of the central eastern parts of the New England Tablelands, (NR283)	

2. Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196)

Number of ecosystem credits required	36
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

Offset options - vegetation types	Offset options - CMA sub-regions
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196) Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands, (CW102) Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands, (HU526) Blakely's Red Gum - Yellow Box grassy open forest or woodland of the New England Tablelands, (NA113) Black Sallee grassy woodland of the New England Tablelands, (NR113) Blakely's Red Gum - Yellow Box grassy open forest or woodland of the	Peel - Namoi Yengo - Hunter/Central Rivers Wyong Armidale Plateau Stanthorpe Plateau

New England Tablelands, (NR127) Broad-leaved Stringybark - Blakely's Red Gum grassy woodlands of the New England Tablelands, (NR131) Candlebark - Manna Gum woodland of the New England Tablelands, (NR146) Fuzzy Box open forest of the New England Tableland Bioregion (Benson 203), (NR165) Manna Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tablelands and North Coast, (NR186) New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tablelands, (NR214) Snow Gum - Black Sallee grassy woodland of the New England Tablelands, (NR237) Snow Gum - Mountain Gum - Mountain Ribbon Gum grassy open forest of the New England Tablelands, (NR238) Snow Gum - Mountain Gum - Mountain Ribbon Gum open forest of the eastern New England Tablelands and North Coast, (NR239) Snow Gum woodland of the New England Tablelands and North Coast, (NR240) Yellow Box - Broad-leaved Stringybark shrubby open forest of the New England Tablelands, (NR282) Yellow Box - Grey Box - Red Gum woodland of the central eastern parts of the New England Tablelands, (NR283)	

3. Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion, (NA237)

Number of ecosystem credits required	4,617
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

Offset options - vegetation types	Offset options - CMA sub-regions
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion, (NA237) Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 277), (CW112) White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282), (CW209) White Box grassy woodland on well drained podsolic clay soils on hills in the NSW South Western Slopes Bioregion (Benson 266), (CW216) Grey Box - Blakely's Red Gum - Yellow Box grassy open forest of the Nandewar Bioregion and New England Tablelands, (NA144) White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions, (NA226) White Cypress Pine - Silver-leaved Ironbark grassy woodland of the Nandewar Bioregion, (NA230)	Peel - Namoi Tingha Plateau Kerrabee - Hunter/Central Rivers

Species credits

Common name	Scientific name	Extent of impact	Number of species credits required
Booroolong Frog	Litoria booroolongensis	4.77	119

BIOBANKING CREDIT STATEMENT - OFFSET SITE

BioBanking Credit Calculator

BioBanking credit report

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

Date of report: 3/05/2013 Time: 11:12:45AM Tool version: 2.0

Biobank details

Proposal ID:	0035/2013/0507B
Proposal name:	Chaffey Dam Offsets
Proposal address:	Chaffey Dam Nundle NSW 2340
Proponent name:	State Water Corporation
Proponent address:	PO Box 1018 Dubbo NSW 2830
Proponent phone:	1300662077
Assessor name:	Brooke Marshall
Assessor address:	PO Box 470 Bega NSW 2550
Assessor phone:	6492 8333
Assessor accreditation:	0035

Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report
- ☐ Change threatened species response to gain (Tg value)

Ecosystem credits summary

Vegetation type	Area (ha)	Credits required	Red flag
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	76.60	906	No
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	48.98	594	No
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	91.29	874	No
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	19.98	192	No
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	53.30	554	No
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	557.31	6,436	No
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	142.75	1,465	No
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	3.50	25	No
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	1.60	14	No
Total	995.31	11,060	

Credit profiles

1. Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196)

Number of ecosystem credits required	874
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

2. Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands, (NA196)

Number of ecosystem credits required	6,436
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

3. White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions, (NA226)

Number of ecosystem credits required	554
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

4. White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions, (NA226)

Number of ecosystem credits required	1,465
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

5. Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion, (NA237)

Number of ecosystem credits required	906
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

6. Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion, (NA237)

Number of ecosystem credits required	594
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

7. River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84), (NA191)

Number of ecosystem credits required	206
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	11-30%
Minimum adjacent remnant area class	>100 ha

8. River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84), (NA191)

Number of ecosystem credits required	25
CMA sub-region	Peel - Namoi
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

Species credits

Common name	Scientific name	Extent of impact	Number of species credits required
Border Thick-tailed Gecko	Underwoodisaurus sphyrurus	2.00	12
Booroolong Frog	Litoria booroolongensis	31.82	112

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	Cat and/or Fox control
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	Exclude miscellaneous feral species
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)	Feral and/or native herbivore control/ exclusion (eg rabbit, goats, deer etc)
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Cat and/or Fox control
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Exclude miscellaneous feral species
Rough-barked Apple - Silvertop Stringybark - Red Stringybark grassy open forest of south western New England Tablelands	Feral and/or native herbivore control/ exclusion (eg rabbit, goats, deer etc)
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Cat and/or Fox control
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Exclude miscellaneous feral species
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	Feral and/or native herbivore control/ exclusion (eg rabbit, goats, deer etc)
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Cat and/or Fox control
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Exclude miscellaneous feral species
Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion	Feral and/or native herbivore control/ exclusion (eg rabbit, goats, deer etc)

Appendix 3: EPBC Offsets Assessment Guide Output

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Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	White Box-Yellow Box-Blakely's Red
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Clearing or indundation of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	**Area**	7.38	Hectares	Field survey and GIS analysis (nghenvironmental 2013a, 2013d)
			Quality	**8**	Scale 0-10	
			Total quantum of impact	5.90	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)		% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																					
Area of community	Yes	5.90	Adjusted hectares	North-Western Offset Site	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	207	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	5%	10.35	70%	7.24	1.94	17.96	304.18%	Yes		
									Future area without offset (adjusted hectares)	186.3	**Future area with offset (adjusted hectares)**	196.7									
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**8**	2.00	85%	1.70	0.88					
Threatened species habitat																					
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**										
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0									
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**										
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**		**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																				
Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																					
Birth rate e.g. Change in nest success	No																				
Mortality rate e.g Change in number of road kills per year	No																				
Number of individuals e.g. Individual plants/animals	No																				

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	5.904	17.96	304.18%	**Yes**	$0.00	N/A	$0.00
					$0.00	**$0.00**	**$0.00**