



Pacific National Pty Ltd  
Greta Provisioning Facility  
EPBC Act Biodiversity Offset Assessment

April 2013



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# 1. Introduction

## 1.1 Overview

GHD was commissioned by Pacific National (the Proponent) to oversee the provision of biodiversity offsets for the proposed development of a Train Support Facility at Greta, in the Hunter Valley, New South Wales (the Project).

The Project comprises the construction of a series of rail sidings, maintenance facilities and staff car parking on an approximately 49 ha site, referred to in this document as the 'subject site'. The subject site is a former rural property containing a mix of near-intact and regenerating bushland and cleared land.

The Project is being assessed under Part 3A of the NSW Environmental Planning and Assessment Act 1979 (EPA Act) and will result in impacts on native biota. The Part 3a assessment must demonstrate that the Project will 'improve or maintain' biodiversity values. An ecological impact assessment of the Project has been performed and has identified and quantified the impacts on native biodiversity along with proposed measures to avoid and mitigate these impacts (SKM, 2010a, 2010b). The outcome of this assessment is that the Project would result in residual impacts including the removal of EECs and habitat for threatened species (SKM, 2010b). Therefore biodiversity offsets are required to compensate for residual impacts on EECs, threatened species and their habitats and clearing of native vegetation.

The Project is a controlled action under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and so the Project environmental assessment and biodiversity offset must also satisfy the requirements of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). Consultation with DSEWPaC established a requirement for biodiversity offset for removal of vegetation within a 20.47 hectare development area that also includes areas that may be developed at some point in the future.

A biodiversity offset comprises one or more appropriate actions that are put in place to counterbalance specific impacts on native biota and their habitats. Appropriate actions are considered to be long-term management activities that aim to improve biodiversity conservation. This can include legal protection of land (i.e. an offset site) to ensure security of management actions and remove threats (DECC, 2008).

GHD have identified appropriate biodiversity offsets for the Project via a staged approach. A desktop assessment has been conducted, including a summary of biodiversity impacts requiring offset, identification of potential offset sites and identification of a suitable offset mechanism. These results were presented in the Offset Strategy for the Project (GHD, 2010a, 2010b). The Offset Strategy determined that the preferred offset mechanism for the Project is the assessment and conservation of offset sites within the framework of the NSW Biodiversity Offsets and Banking Scheme (BioBanking).

The Interim policy for assessment of biodiversity offsets for Part 3A Projects (OEH 2011) [the 'interim policy'] provides a framework for determining biodiversity offsets for Part 3A Projects using a modified form of the BioBanking methodology. The interim policy sets out the NSW OEH and DPIs preferred approach to biodiversity offsetting and has also been endorsed by DSEWPaC. An offset package has been presented that includes the purchase and retirement of biodiversity credits using the BioBanking methodology and the interim policy.

The offset package includes the conservation of two biobank sites:

- A portion of the subject site outside of the development footprint, which is referred to as the 'Greta biobank site'.
- A privately owned site at The Branch, which is referred to as the 'Branch Lane biobank site'.

The BioBanking assessment methodology has been used to develop the GHD (2012) offset package as follows:

- Desktop application of the BioBanking methodology to determine impacts of the development and the Project offsetting requirements in terms of biodiversity credits
- Site survey of the Greta biobank site and the Branch Lane biobank site using the BioBanking plot/transect methodology Assessment of the biobanks using the BioBanking methodology to determine the biodiversity credits that will be generated when biobanking agreements are obtained for the sites and they are formally set aside and managed for conservation
- Comparison of the biodiversity credit profiles of the development site and biobank sites to demonstrate that the biobanks are appropriate to offset biodiversity impacts of the Project
- Finalisation of the offset package using the OEH (2011) interim policy and associated

This EPBC Act Offset Assessment has been prepared to demonstrate that the offset package will adequately offset the impacts arising from the Project upon matters protected under the EPBC Act. Specifically the Project must comply with the Commonwealth Conditions of Approval dated 13 May 2011, which includes within conditions 12 and 13:

- The person taking the action must submit a Biodiversity Offset Package for the Minister's approval.
- The Biodiversity Offset Package outlined in Condition 12 must also provide for the conservation and management in perpetuity of an area of habitat for listed threatened species and ecological communities equal or greater in size to that determined by the NSW Biodiversity Banking and Offsets Scheme methodology.

## 1.2 Relationship with Existing Reports

This EPBC Act Offset Assessment has been prepared giving consideration to information contained in the following:

- Sinclair Knight Mertz (SKM) (2010a) *Train Support Facility, Greta, NSW Ecological Impact Assessment*
- Monteath and Powers Pty Ltd (2010) *Environmental Assessment for Pacific National Train Support Facility at Greta in the Cessnock City Council Local Government Area*
- Monteath and Powers Pty Ltd (2010b) *Submissions and Preferred project report for or Pacific National Train Support Facility at Greta in the Cessnock City Council Local Government Area.*
- SKM (2010b) *Addendum Report Train Support Facility Greta, NSW Ecological Impact Assessment.*

Ecological values and impacts referred to in this report are referenced from the ecological assessments (as above) for the Project's study areas. These reports contain information relevant to the offset package, including vegetation type and condition, legislative requirements and status, impact assessment and suggested mitigation measures.

It is recommended that this EPBC Act Offset Assessment be read in conjunction with the GHD (2012) *Greta Provisioning Facility Biodiversity Offsets Package.*

### 1.3 Site Location

The subject site, including the location of the proposed facility is Lot 1 DP 1129191 and has frontage onto Mansfield Street, Greta, NSW. It is geographically located in the Hunter Valley in the Local Government Area of Cessnock near the Township of Greta. The Township of Greta is located approximately 50 kilometres northwest of Newcastle and 20 kilometres north of Cessnock.

The subject site is located on the southwestern side of, and adjacent to the Great Northern Railway at Greta and adjacent to the route for the proposed Hunter Expressway. The proposed development extends northwest from near Greta Railway Station for a distance of about 2.4 kilometres and extends southwest to the proposed corridor for the new freeway.

The regional location of the subject site is shown in Figure 1 along with location of the development footprint and the biobank within the subject site.

The subject site contains the development footprint for the Project as well as the Greta biobank site, which will be set aside as a biodiversity offset for the Project.

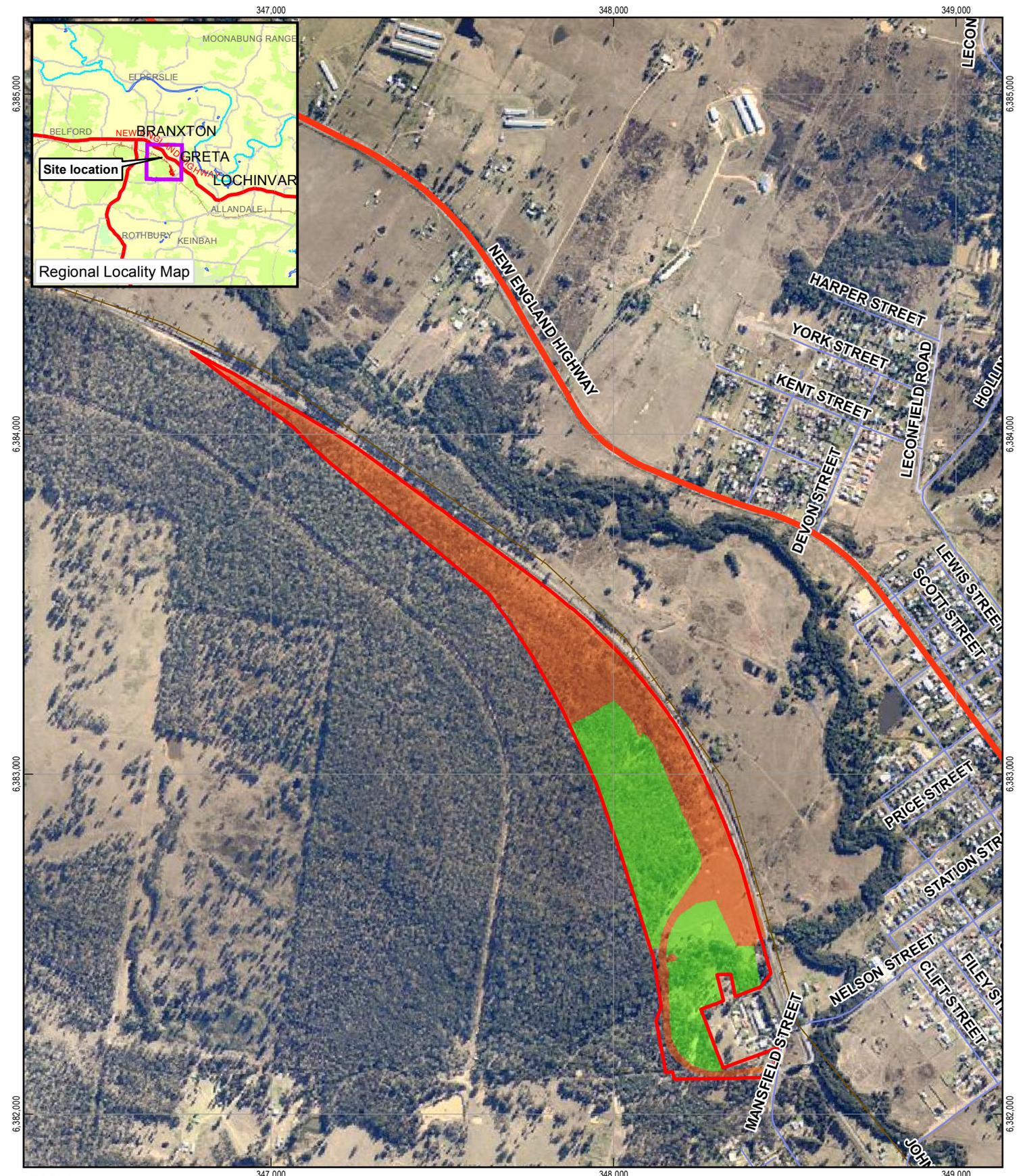
Consultation with DSEWPaC revealed that the Department would require biodiversity offset for areas of the subject site that may be developed at some point in the future in addition to areas within the development footprint for the Project. Therefore the development area for this BioBanking assessment is a greater area than the 19.8 hectare development footprint for the Project presented in the environmental assessment (DOP, 2010).

The development footprint has also changed since the determination of the environmental assessment (DOP, 2010) due to the purchase of a small portion of the site by the Australian Rail Track Corporation (ARTC) to accommodate rail infrastructure. This approximately 0.3 hectare area in the south-east of the study area was divided from Lot 1 DP 1129191, set aside for use by the ARTC and the site layout for the Project modified accordingly.

The development area for this biodiversity offset assessment is shown on Figure 1 and comprises:

- The development footprint, which is 24.22 hectares in area and contains 19.8 hectares of native vegetation.
- The potential future use area, which is 2.38 hectares in area and contains 0.67 hectares of native vegetation.

Only removal of native vegetation requires biodiversity offsets in the offset package and so the development area included in the BioBanking credit calculations is 20.47 hectares.



LEGEND

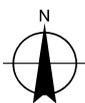
- Site Location
- Development Area (27.63 hectares, 20.47 hectares vegetation clearing)
- Biobank Site (20.3 hectares)

1:15,000 (at A4)

0 50 100 200 300 400 500

Metres

Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia (GDA)  
Grid: Map Grid of Australia 1994, Zone 56



Pacific National  
Greta Provisioning Facility  
EPBC Act Biodiversity Offset Assessment

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Subject Site Location and Layout **Figure 1**

## 1.4 BioBanking

The NSW Biodiversity Banking and Offsets Scheme (BioBanking) has been established by the New South Wales Office of Environment and Heritage (OEH) to help address the loss of biodiversity and threatened species. BioBanking is outlined in Section 7A of the NSW Threatened Species Conservation Act 1995 (TSC Act). The scheme attempts to create a market framework for the conservation of biodiversity values and the offsetting of development impacts. The scheme is currently voluntary.

To establish credits for a biobank site a landholder must commit to enhancing and protecting biodiversity values over time. A biobanking agreement is entered into and registered on the title of the land, binding both the current and future landholders to maintaining biodiversity through the completion of a range of management actions on the site. Each biobank site may generate a number of different ecosystem credits and any of these credits may be sold separately or as a group.

Developers can also apply for a BioBanking statement that specifies the number and class of credits that must be acquired to counterbalance or offset the impacts on biodiversity values that are likely to occur as a result of development. The scheme provides an alternative path to the threatened species assessment of significance process required under the EP&A Act.

The BioBanking Assessment Methodology (the methodology) sets out how biodiversity values will be assessed, establishes rules for calculating the number and class of credits, and determines the trading rules that will apply. The methodology includes a software package known as the BioBanking Credit Calculator (the credit calculator) which processes site survey and assessment data. The credit calculator specifies the type and extent of surveys required for a BioBanking assessment and then processes survey data to calculate the number and type of biodiversity credits that are either required at a development site or will be generated at a biobank site.

The BioBanking Trust Fund ensures that landowners have the money needed to carry out the management actions required each year and provides a financial incentive to landowners to carry out those actions. The scheme is administered by DECCW and ensures accountability and compliance through legislation, regular reporting requirements and financial measures.

Overall, it is hoped the scheme will conserve areas with high biodiversity values by providing incentives for conservation and disincentives for loss.

The DECC (2009) BioBanking methodology aims to encourage and secure investment in conservation and to provide financial incentives for the protection of biodiversity values by:

- Providing a measurable, consistent, transparent, and robust framework for the assessment and management of biodiversity offsets;
- Creating new opportunities for conservation on private land;
- Providing permanent security and management for biodiversity offsets; and
- Providing a secure mechanism for investment in biodiversity conservation.

## 1.5 Glossary of Terms

<b>biobank site</b>	Land that is designated by a biobanking agreement to be a biobank site.
<b>biobanking agreement</b>	An agreement entered into between the landowner and the Minister under Part 7A of the TSC Act for establishing a BioBanking site.
<b>BioBanking Assessment Methodology</b> (the methodology)	The rules of the BioBanking Scheme established under the TSC Act that determine credits created, credits required and the circumstances that improve or maintain biodiversity values.
<b>BioBanking Scheme</b> (BioBanking; the scheme)	The NSW biodiversity banking and offsets scheme established under Part 7A of the TSC Act.
<b>biobanking statement</b>	Specifies the number and class of biodiversity credits to be retired for a particular development. A BioBanking statement can only be issued in circumstances that improve or maintain biodiversity values.
<b>BioBanking Trust Fund</b>	Means the BioBanking Trust Fund established under Part 7A of the TSC Act to hold funds from the sale of credits.
<b>biodiversity credit</b>	Registered biodiversity credits are created for management actions that have been carried out or are proposed to be carried out, in accordance with the biobanking agreement.
<b>biodiversity offsets</b>	Actions put in place to counterbalance (offset) an impact on biodiversity values.
<b>biodiversity values</b>	The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats.
<b>BioBanking credit calculator (the credit calculator)</b>	The credit calculator is the software component of the methodology. It is a database that contains threatened species, habitat and vegetation data. The credit calculator determines the number of ecosystem credits and species credits required at a development site and the number of ecosystem credits and species credits created at a biobank site. It does this on the basis of the existing biodiversity data, equations, information collected at the site and GIS calculations according to the assessment process outlined in the methodology.
<b>Development site</b>	Land that is designated by a BioBanking statement to be a development site.
<b>The development footprint</b>	The portion of the subject site that is proposed for development as part of the current Project
<b>development area</b>	The area assessed for development impacts in the offset package and this Report. Comprises the development footprint as well as potential future use areas that may be developed in the future
<b>ecosystem credit</b>	A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
<b>management action</b>	An action or proposed action in respect of which a biodiversity credit may be created.

**red flag area**

An area of land that is identified by the methodology as having high biodiversity conservation values. A development cannot be determined as improving or maintaining biodiversity values, and a BioBanking statement cannot be issued, if the development directly impacts on a red flag area; unless, the Director General makes a determination that it is possible for the development to be regarded as improving or maintaining biodiversity values.

**species credit**

A credit that relates to an individual threatened species that cannot be reliably predicted based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database.

## 2. Methodology

### 2.1 Desktop Assessment

#### 2.1.1 Literature and Database Review

The following resources were reviewed to describe the existing environment of the subject site and to, as far as possible, obtain the necessary site data to perform BioBanking credit calculations:

- The Project environmental assessment (SKM, 2010a, 2010b; Monteath and Powys, 2010)
- DECC (2008a) *NSW (Mitchell) Landscapes Version 3* (2008)
- DECC (2008b) *Descriptions for NSW (Mitchell) Landscapes*
- DECCW (2010a) *Vegetation Types Database*
- DECCW (2010b) *Threatened Species Profile Database*
- DECCW (2010c) NSW Interim Vegetation Extent remote sensing imagery
- Aerial photographs and satellite imagery of the study area
- LHCCREMS Vegetation Mapping.

#### 2.1.2 Geographical Information System (GIS) Analysis

Geographical Information System (GIS) was used in the current assessment as follows:

- Plotting of the site, development site and biobank site boundaries on a high resolution aerial photo base
- Preliminary mapping of vegetation types across the site, based on available information
- Assessment of native vegetation cover, extent and connectivity at the landscape scale
- Stratification and mapping of the site and calculation of the extent of vegetation patches.

### 2.2 BioBanking Assessment and Credit Calculation

Biodiversity credits were estimated at the development site according to the methodology presented in the DECC (2009) *BioBanking Assessment Methodology and Credit Calculator Operational Manual*. The credit calculator is the software version of the methodology. Data is entered into the credit calculator based on information collected in the desktop assessment, site surveys and from using GIS mapping software.

The BioBanking assessment methodology was used to develop the Offset Strategy for the Project as follows (GHD, 2010a, 2010b):

- Desktop application of the BioBanking methodology to determine impacts of the development and the Project offsetting requirements in terms of biodiversity credits using Version 1.2 of the credit calculator.
- Application of the BioBanking methodology to portions of the subject site that would be set aside as a biobank and managed for conservation.
- Comparison of the credit profiles of the development site and biobank site to determine the residual impacts of the development and the requirement for an additional biobank site to offset impacts of the Project.

- Identification of potentially suitable additional biobank sites containing appropriate biodiversity credits to offset residual impacts of the Project.

The BioBanking assessment for the Project has been finalised in the GHD (2012) offset package as follows:

- Site survey of the Greta biobank site and the Branch Lane biobank site using the BioBanking plot/transect methodology and additional targeted surveys appropriate to biodiversity values at the sites.
- Supplementary site survey of the Greta study area to determine if any Slaty Red Gum (*Eucalyptus glaucina*) or its hybrids are present and would be removed by the development. Slaty Red Gum is listed as a vulnerable species under the TSC Act and the species and associated hybrids are listed as vulnerable under the EPBC Act.
- Assessment of the biobanks using the BioBanking methodology and Version 2.0 of the credit calculator to determine the biodiversity credits that will be generated when biobanking agreements are obtained for the sites and they are formally set aside and managed for conservation.
- Comparison of the biodiversity credit profiles of the development site and biobank sites to demonstrate that the biobanks are appropriate to offset biodiversity impacts of the Project.
- Finalisation of the offset package using the OEH (2011) policy and associated variation criteria.

The methodology establishes two classes of biodiversity credits that may be created:

- Ecosystem credits – these are created or required for all impacts on biodiversity values (including threatened species that can be reliably predicted by habitat surrogates), except the threatened species or populations that require species credits; and
- Species credits – these are created or required for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database (DECCW, 2010b).

The credit calculator produces a number of reports, including the threatened species predicted to occur, survey effort required at the site and the biodiversity credit profile.

### 2.3 Potential Offset Property Comparison

GHD performed a desktop assessment of potential offset properties. The property comparison desktop review involved the following tasks:

1. Locate chosen property/s on Google Earth/Six Viewer
2. Overlay with available vegetation mapping and estimated whether relevant vegetation types to offset the impacts arising from the project may be present on the site
3. Estimate the vegetation percentage cover based on air photo interpretation, 'local' knowledge and topographic features
4. Revise the LHCCREMS vegetation mapping (if required) and estimate the approximate area of each vegetation type on the site if more than one vegetation type potentially present based on air photo interpretation, 'local' knowledge and topographical features
5. Estimate whether vegetation appears to be regrowth from air photo interpretation, 'local' knowledge and topographical features

6. Estimate the condition of vegetation at the site as either 'low' or 'moderate to high' according to the BioBanking methodology (DECC, 2009).

A summary of the potential offset sites considered in this assessment is provided in the Offset Strategy (GHD, 2010a, 2010b).

## 2.4 Site Survey

Ecological surveys of the subject site and Branch Lane biobank were conducted according to the BioBanking methodology to supplement the Project ecological assessment and to meet DSEWPaC assessment requirements. Survey effort is summarised in Table 1 and described below.

Table 1 GHD Survey Effort

Date	Survey	Survey Effort	Survey Methods
1 and 2 February 2011	The subject site	2 ecologists for 2 days 8 plot / transects	20 m x 50 m BioBanking plot / transect surveys within the Greta biobank site.  Targeted search for <i>Eucalyptus glaucina</i> , opportunistic fauna and threatened plant observations within the entire subject site.
29 April 2011	The subject site	2 ecologists for 1 day	Supplementary targeted search for <i>Eucalyptus glaucina</i> , including plotting of intergrades with <i>E. tereticornis</i> , opportunistic fauna and threatened plant observations within the entire subject site.
14 to 17 February 2012	The Branch Lane biobank site	2 ecologists for 4 days 14 plot /transects	Broad-scale vegetation survey, vegetation mapping, opportunistic fauna and threatened plant observations within the entire biobank site.  20 m x 50 m BioBanking plot / transect surveys
26 April 2012	The Branch Lane biobank site	2 ecologists for 1 day 2 plot /transects	Supplementary 20 m x 50 m BioBanking plot / transect surveys.  Opportunistic fauna and threatened plant observations within the entire biobank site.

Plot and transect surveys were conducted in accordance with the procedures provided in DECC (2009). The Site Value was determined by assessing ten site condition attributes against benchmark values. Benchmarks are quantitative measures of the range of variability in condition in vegetation with relatively little evidence of alteration, disturbance or modification by humans since European settlement. A total of eight plots were described within the biobank site assessed within the subject site.

A targeted search for Slaty Red Gum (*Eucalyptus glaucina*) was conducted through all areas of suitable habitat within the subject site by checking all red gum species for diagnostic features. A

voucher specimen of the species was collected from a mature, fruiting Slaty Red Gum outside the subject site to allow for field checking of diagnostic features. No Slaty Red Gums were recorded on the subject site. A supplementary survey for *E. glaucina* hybrids / intergrades with *E. tereticornis* was also conducted. No Slaty Red Gum hybrids were recorded within the development area. No systematic targeted surveys for other threatened species were conducted. Opportunistic observations of fauna and threatened plants were recorded and the locations of threatened species were captured with a handheld GPS.

## 2.5 Staff Qualifications

This report, including all BioBanking credit calculations, was prepared by Ben Harrington. The assessment was peer reviewed by Jayne Tipping. Staff qualifications are presented in Table 2

Table 2 GHD Ecology Personnel and Qualifications

Name	Position / Project Role	Qualifications	Relevant Experience
Ben Harrington	Senior Ecologist / desktop assessment, site surveys, credit calculations and reporting	BSc, MSc (Physical Geography) BioBanking Assessor Accreditation*	7+ years
Anders Bofeldt	Botanist / site surveys	Dip. Hort.	18+ years
Mark Aitkens	Senior Ecologist / desktop assessment, and reporting	BSc (Env Biology)	14+ years
Jayne Tipping	Principal Ecologist / Peer review and planning	B. App. Sc. BioBanking Assessor Accreditation*	17+ years
* Refer to DECCW (2010c) list of accredited assessors.			

## 3. Development Area

### 3.1 Approach

The following section describes the natural environment of the development area as a guide to the scale and type of biodiversity offsets that will be required to address residual impacts of the Project. This description is based on information presented in the Project environmental assessment included in SKM (2010a, 2010b) and Monteath and Powys (2010) and supplementary site surveys conducted by GHD ecologists.

### 3.2 Subject Site Location

The subject site is dominated by intact native vegetation in good condition. It occurs within an approximately 100 hectare parcel of open space administered by Pacific National. Historical land uses appear to include timber getting, grazing, servicing of the mining industry and construction of railway infrastructure adjoining the site. Disturbed areas include dirt tracks, farm dams, borrow pits and construction lay down areas.

The main Hunter east-west railway lies to the north and east of the subject site and beyond that rural-residential land and the township of Greta. The subject site adjoins over 500 hectares of vegetated open space to the west and south-west. The train line to the east of the site would comprise a hostile gap for many fauna species known or likely to occur at the site. Broad, vegetated corridors connect the site with other patches of native vegetation in all other directions. There are extensive vegetated corridors to the west and north.

### 3.3 Vegetation and Habitat Resources

SKM (2010a, 2010b) vegetation mapping was ground-truthed during the GHD site survey and matched to DECCW (2010b) NSW Vegetation Types and BioBanking condition classes. Three distinct vegetation zones (vegetation types and broad condition classes) were identified in the subject site, including vegetation consistent with two Endangered Ecological Communities (EECs) listed under the TSC Act. Vegetation within the development area are presented in Table 3 and mapped on Figure 2.

The most extensive vegetation type is Grey Ironbark - Spotted Gum - Grey Box open forest in good condition. This vegetation appears to be approximately 50 year old regrowth though there are occasional pre-European age trees. There are some areas of moderate condition vegetation comprising younger regrowth associated with disturbed areas such as easements, quarries and laydown areas.

Forest Red Gum - Grey Gum dry open forest is the next most dominant vegetation type. It includes a variety of condition classes influenced by a variety of past and present land uses, including clearing for grazing and rail infrastructure. There is an area of low condition Forest Red Gum - Grey Gum dry open forest that is dominated by native grasses and environmental weeds with very occasional native shrubs and trees. There are localised patches of wind and bird-borne environmental weeds along the edges of tracks and cleared land and adjacent to existing railway infrastructure.

The site contains a number of farm dams dominated by Common Reed (*Phragmites australis*), and Cumbungi (*Typha orientalis*).

There is a small, channel confined, intermittent drainage line in the south of the subject site that did not contain surface water at the time of the survey. This drainage line is in moderate condition with mostly intact geomorphology, moderate in-stream and fringing vegetation, moderate riparian vegetation and good in-stream leaf litter and woody debris. The drainage line

features severe infestation with noxious and environmental weeds, including Lantana (*Lantana camara*). The access road within the proposed development footprint would remove riparian habitat and alter the structure and flow-regime of this drainage line.

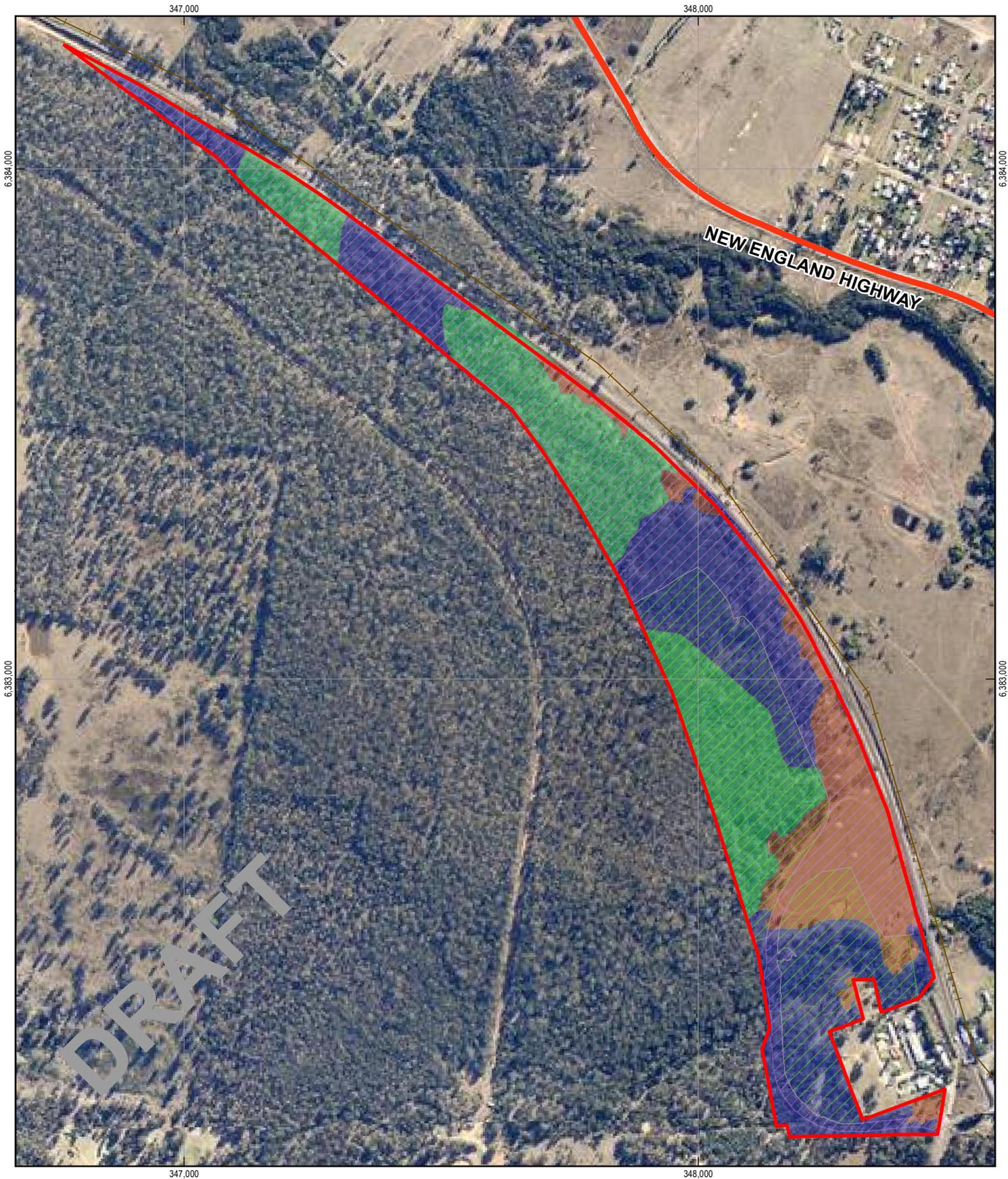
Areas of moderate and good condition vegetation within the development footprint are equivalent to undisturbed vegetation for the majority of BioBanking site attribute variables (over-, mid- and understorey vegetation cover, weed cover, quantities of woody debris and overstorey regeneration). The site contains relatively few hollow-bearing trees.

The Project ecological assessment identified areas of lower ecological value, comprising cleared land and land currently used for access which featured minimal native vegetation (SKM, 2010a, 2010b). These areas were not mapped as native vegetation and were not included in vegetation clearing estimates for the Project (SKM, 2010a, 2010b). Offsetting of Low condition vegetation is not required in BioBanking assessments of development sites. Low condition vegetation may be included in BioBanking assessments of biobank sites since these areas may be actively managed and allowed to regenerate into native vegetation. Therefore for the purposes of this assessment cleared areas within the subject site have been identified as Low condition forms of the native vegetation type that was likely to be present before clearing, as shown on Figure 2.

Table 3 Vegetation Zones within the Development Area

Vegetation Type	Condition	SKM (2010) Map Unit	Area within Development Area (hectares)	Conservation Significance	Description (SKM, 2010a)
Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin	Moderate/good	1: Spotted Gum – Ironbark Forest	9.79	EEC listed on the TSC Act (Central Hunter Spotted Gum – Ironbark – Grey Gum Forest)	This community is associated with higher elevated slopes of the study area. It supports an open canopy ranging between 15-20 m dominated by Spotted Gum ( <i>Corymbia maculata</i> ) and Narrow-leaved Ironbark ( <i>Eucalyptus crebra</i> ) along with occasional Grey Box ( <i>Eucalyptus moluccana</i> ). The mid-storey contains Bulloak ( <i>Allocasuarina luehmannii</i> ) and the understorey features a mix of shrub and groundcover species, including Black Thorn ( <i>Bursaria spinosa</i> ), Gorse Bitter - pea ( <i>Daviesia ulicifolia</i> ), Needlebush ( <i>Hakea sericea</i> ), Narrow - leaved Geebung ( <i>Persoonia linearis</i> ), Rice Flower ( <i>Pimelea linifolia</i> subsp. <i>linifolia</i> ), Purple Wiregrass ( <i>Aristida ramosa</i> ), Three - awn Spear - grass ( <i>A. vagans</i> ), Weeping Grass ( <i>Microlaena stipoides</i> ) Many-flowered Mat-rush ( <i>Lomandra multiflora</i> ) and Poverty Raspwort ( <i>Gonocarpus tetragynus</i> ).
Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin	Moderate/good	2: Forest Red Gum – Ironbark Forest	10.68	EEC listed on the TSC Act (Hunter Lowland Red Gum Forest)	This community is associated with lower elevated areas of the study area, including open depressions and slopes surrounding drainage lines. It supports an open canopy ranging between 15-20 m dominated by Forest Red Gum ( <i>Eucalyptus tereticornis</i> ) and Narrow-leaved Ironbark along with Rough-barked Apple ( <i>Angophora floribunda</i> ), Grey Gum ( <i>E. punctata</i> ) and Spotted Gum. Some areas support a high abundance of regenerating trees with larger trees interspersed. A moderate abundance of small-medium sized trees (4-8 m high) are present including <i>Melaleuca decora</i> , Prickly-leaved Paperbark ( <i>Melaleuca nodosa</i> ) and Bulloak.  Dominant shrub species include Gorse Bitter - pea, Needlebush, Narrow - leaved Geebung, Coffee Bush, Rice Flower, <i>Acacia falcata</i> , Silver - stemmed Wattle ( <i>Acacia parvipinnula</i> ) and <i>Leptopsermum</i>

Vegetation Type	Condition	SKM (2010) Map Unit	Area within Development Area (hectares)	Conservation Significance	Description (SKM, 2010a)
					<i>parvifolium</i> . Groundcover species include Weeping Grass and Barbed - wire Grass, with other grasses occurring in lower abundance forbs such as Rough Raspwort ( <i>Haloragis heterophylla</i> ), White Root, Mat - rush ( <i>Lomandra longifolia</i> ) and Blue Bottle - daisy ( <i>Lagenophora stipitata</i> ).
Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin	Low	3: Regenerating Shrubland and unmapped areas of cleared land	-*	EEC (Hunter Lowland Red Gum Forest)	<p>Regenerating shrubland adjoins cleared land and features a moderate density of the shrub Needlebush with regenerating Eucalypt species. These areas are considered to be regenerating examples of the surrounding forest types.</p> <p>Cleared land, features a derived grassland of Cooch (<i>Cynodon dactylon</i>) and speargrasses (<i>Aristida</i> spp.) with very occasional seedlings of native trees and shrubs and occasional native herbs.</p>
Total		20.47			



**Legend**

- Subject Site
- Forest Red Gum - Grey Gum dry open forest (Low condition)
- Development Area
- Forest Red Gum - Grey Gum dry open forest (Moderate/good condition)
- Biobank Site
- Grey Ironbark - Spotted Gum - Grey Box Open forest (Moderate/good condition)

<p>0 50 100 200 300 400 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: Geocentric Datum of Australia (GDA) Grid: Map Grid of Australia 1994, Zone 56</p>		 <small>CLIENTS PEOPLE PERFORMANCE</small>	<p>Pacific National Greta Provisioning Facility EPBC Act Biodiversity Offset Assessment</p>	<p>Job Number   22-15502 Revision   A Date   27 Sep 2012</p>
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**Subject Site Vegetation Zones** Figure 2

## 3.4 Conservation Significance

### 3.4.1 Threatened Flora Species

On the basis of regional records, reports and the presence of suitable habitat, a total of six threatened flora species potentially occur in the vicinity of the subject site: North Rothbury Persoonia (*Persoonia pauciflorai*), Bynoe's Wattle (*Acacia bynoeana*), Leafless Tongue Orchid (*Cryptostylis hunteriana*), Slaty Red Gum (*Eucalyptus glaucina*), *Eucalyptus parramattensis* subsp. *decadens* and Small-flower Grevillea (*Grevillea parviflora* subsp. *parviflora*). SKM (2010) undertook targeted searches for these threatened flora species that they considered to have a high-moderate potential to occur in the study area. The outcome of this assessment was that each species was not found in the study area, that the study area does not provide optimal habitat for these species and that they are unlikely to occur (SKM, 2010a).

GHD ecologists undertook a supplementary targeted search of the subject site in January 2011 targeting Slaty Red Gum (*Eucalyptus glaucina*). Slaty Red Gum is listed as a vulnerable species under the TSC Act and the species and associated hybrids and intergrades are listed as vulnerable under the EPBC Act. A flowering Slaty Red Gum was observed approximately 10 kilometres from the subject site and a voucher specimen was collected to assist with field identification of the species. No Slaty Red Gums were observed in the subject site. A large number of Forest Red Gums (*Eucalyptus tereticornis*) were observed, including some with physical characteristics that suggested genetic influence of Slaty Red Gum. A second site survey was conducted in April 2011 targeting intergrades between *E. glaucina* and *E. tereticornis*. Based on the results of SKM (2010a; 2010b) and subsequent GHD site surveys the project would not remove any Slaty Red Gum individuals. The NSW TSC Act definition of Slaty Red Gum does not include hybrids and OEHL do not require assessment of hybrids as a threatened species (Lewer, S., OEHL, pers. comm.). Therefore it is not necessary to specifically address Slaty Red Gum in the BioBanking credit calculations.

Preliminary consultation with DSEWPaC revealed that they considered hybrid or intergrades as equivalent to Slaty Red Gum individuals and that removal of Slaty Red Gum intergrades would also require offsets. The DSEWPaC conditions of approval for the Project require offsets for removal of Slaty Red Gum intergrades through conservation of at least four intergrades for every one intergrade to be removed. Detailed design has ensured that the final development area for the Project does not contain any Slaty Red Gum intergrades. Therefore no specific offsets for intergrades have been included in the offset package. Nonetheless it should be noted that there are 11 likely Slaty Red Gum intergrades within the Greta biobank site.

### 3.4.2 Endangered Ecological Communities

SKM (2010a) identified two listed EECs (Schedule 1 part 3; TSC Act) within the subject site:

- Lower Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion
- Hunter Lowland Redgum Forest in the Sydney Basin and North coast Bioregions.

SKM subsequently revised their description of areas mapped as Lower Hunter Spotted Gum – Ironbark Forest and reclassified them as Central Hunter Spotted Gum – Ironbark – Grey Box Forest (SKM, 2010b). GHD site surveys support the identification of Central Hunter Spotted Gum – Ironbark – Grey Box Forest on the subject site.

The majority of the area of these EECs across the site is intact forest in 'high' condition and would provide habitat for a diverse range of native flora and fauna species, including rare and threatened species (SKM, 2010a). Some areas of regenerating forest are present which represent early stages of recovery of these EEC types and were assumed to comprise a low-

condition form of Hunter Lowland Redgum Forest that meets the DECC (2009) definition of 'low' condition vegetation.

No EECs listed under the EPBC Act were identified in the subject site or are otherwise of relevance to this assessment.

### 3.4.3 Threatened and Migratory Fauna Species

Three threatened fauna species were recorded in SKM (2010a, 2010b) field surveys:

- Squirrel Glider (*Petaurus norfolcensis*) - vulnerable species (TSC Act);
- Grey-crowned Babbler (eastern subsp.) (*Pomatostomus t. temporalis*) - vulnerable species (TSC Act); and
- Speckled Warbler (*Pyrrholaemus saggitatus*) - vulnerable species (TSC Act).

The authors identified critical foraging habitat for the Grey-headed Flying-Fox (vulnerable species listed under the EPBC Act and TSC Act) as defined in the Draft Recovery Plan for the species and habitat for a number of other threatened fauna species (SKM, 2010a).

GHD ecologists also recorded Grey-crowned Babblers at the subject site.

Potential habitat for a number of threatened and/or migratory species listed under the EPBC Act was identified within the development footprint. This suite of listed fauna was considered 'subject species' for the impact assessment. Assessments of significance under the EP&A Act and EPBC Act found that the Project would be unlikely to have a significant negative impact on any of these listed fauna species (SKM, 2010a, 2010b).

To address impacts on MNES the offset package will consider the removal of habitat for the following listed biota:

- Swift Parrot (*Lathamus discolor*)
- Spotted-tail Quoll (*Dasyurus maculatus*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Migratory birds of woodland, forest and grasslands.

## 4. Biodiversity Offset

### 4.1 On-site Conservation

The site for the Project contains intact native vegetation that would not be cleared for construction of the proposed rail facility. Approximately 20.3 hectares will be set aside as an on-site biobank (the Greta biobank) and will directly contribute to the offset package for the Project. Additional areas of native vegetation outside of the development footprint will be retained but will not be formally included in the offset package. These areas have been included in the 'development area' for this assessment because they may be required for future development as described in Section 1.3.

#### 4.1.1 The Greta Biobank

The Greta biobank immediately adjoins the development footprint and contains vegetation and habitats which are covered by the overall description of the subject site provided by SKM (2010a, 2010b). GHD surveys of the Greta biobank included collection of site condition data using the BioBanking methodology which were included in BioBanking credit calculations in the offset package.

The most extensive vegetation type in the Greta biobank is Forest Red Gum - Grey Gum dry open forest in moderate-good condition. This vegetation appears to comprise approximately 50 year old regrowth though there are occasional pre-European age trees. There are some areas of moderate condition vegetation comprising younger regrowth and low condition vegetation where the forest has been converted to shrubland or grassland.

Areas of moderate and good condition vegetation within the biobank site are equivalent to undisturbed vegetation for the majority of BioBanking site attribute variables (over-, mid- and understorey vegetation cover, weed cover, length of fallen logs and over storey regeneration). The site contains relatively few hollow-bearing trees. Low condition vegetation is in much poorer condition than undisturbed vegetation with respect to over- and mid-storey vegetation cover, quantities of fallen timber and numbers of hollow bearing trees. However site attributes for weed cover, native understorey vegetation cover and over storey regeneration were relatively good. Overall the Greta biobank contains a mixture of near-intact, regenerating and highly-disturbed native vegetation that would benefit from conservation and active management. The Greta biobank is likely to develop increased native vegetation cover and diversity and quantities of habitat resources with management.

The Greta biobank contains two farm dams containing freshwater wetlands dominated by Common Reed. These are artificial features and have not been mapped as separate vegetation types. These freshwater wetlands would provide habitat resources for native fauna and so would not be removed or otherwise altered as part of the management of the Greta biobank.

There is a small, channel confined, intermittent drainage through the biobank site that is in moderate condition aside from localised infestation with noxious and environmental weeds. The biobank would provide for active management of weeds and potentially also restoration of aquatic and riparian habitat resources.

#### 4.1.2 Retained Native Vegetation

There are areas of native vegetation within the subject site that will be retained but may be required for potential future use. Vegetation types within these areas are equivalent to those within the Greta biobank. These areas would be managed during and post- construction through implementation of a Construction Environmental Management Plan (CEMP). The main focus of the CEMP will be avoiding impacts on retained native vegetation during construction,

management of environmental weeds and closure and rehabilitation of access tracks. These activities will be aligned with the management plan for the Greta biobank as far as is practicable, however would not be included in the offset package. Since these areas of retained native vegetation will not be formally set aside and titled for conservation they may be cleared or modified as a result of future land uses within the subject site. Therefore these areas have been included in the 'development area' for this assessment as described in Section 1.3.

Table 4 Vegetation Zones within the Great Biobank

Vegetation Type (DECCW, 2010b)	Condition	Area within Greta biobank (ha)	Conservation Significance	Description
Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin	Moderate/good	7.45	EEC listed on TSC Act (Spotted Gum – Ironbark – Grey Gum Forest)	<p>This vegetation type is equivalent to the community identified by (SKM, 2010a) and presented in Table 3 It is an open forest of Spotted Gum and Narrow-leaved Ironbark with occasional Grey Box, mid-storey of and moderately diverse understorey of native shrubs, grasses and herbs.</p> <p>BioBanking habitat attribute data was collected in plots and confirms that this vegetation is near-intact and in good condition. Canopy, shrub and understorey vegetation cover was equivalent to undisturbed remnants. There are good quantities of woody debris and leaf litter, but relatively few hollow-bearing trees.</p> <p>This vegetation type has good potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, removal of exotic plants and management of pest fauna.</p>
Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin	Moderate/good	9.85	EEC listed on TSC Act (Hunter Lowland Red Gum Forest)	<p>This vegetation type is basically equivalent to the community described by (SKM, 2010a) and presented in Table 3. Some areas of Forest Red Gum - Grey Gum dry open forest within the Greta biobank are in poorer condition, featuring patches of sub-mature regrowth of Forest Red Gum. Mature stands are an open forest of Forest Red Gum and Narrow-leaved Ironbark along with Rough-barked Apple and Spotted Gum. Some areas support dense patches of regenerating Forest Red Gum forming a low closed forest with larger trees interspersed. There are localised, dense stands of smaller trees in the mid storey including <i>Melaleuca</i> spp. and Bulloak. There is a moderately diverse understorey of native shrubs, grasses and herbs.</p> <p>BioBanking habitat attribute data was collected in plots and confirms that this vegetation is near-intact and in moderate to good condition. Canopy, shrub and understorey vegetation cover is highly variable and includes vegetation equivalent to undisturbed remnants as well as sub-mature regrowth. There</p>

Vegetation Type (DECCW, 2010b)	Condition	Area within Greta biobank (ha)	Conservation Significance	Description
				<p>are good quantities of woody debris and leaf litter, but relatively few hollow-bearing trees.</p> <p>This vegetation type has very good potential for achieving gains in biodiversity values through management within a biobank site. Improvement in biodiversity value good be obtained through development of vegetation structure and habitat resources (particularly in stands of immature regrowth), removal of exotic plants, remediation of a drainage line including removal of a severe weed infestation and through management of pest fauna.</p>
Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin	Low	3.00	EEC (Hunter Lowland Red Gum Forest)	<p>This vegetation type includes the Regenerating Shrubland described by SKM (2010a) and presented in Table 3 as well as some areas of un-mapped cleared land. It includes localised dense patches of the shrub Needlebush with regenerating Eucalypt species. It also includes a derived grassland of Cooch (<i>Cynodon dactylon</i>) and speargrasses (<i>Aristida</i> spp.) with very occasional seedlings of native trees and shrubs and occasional native herbs.</p> <p>This vegetation type has very good potential for achieving gains in biodiversity values through management within a biobank site. Improvement in biodiversity value could be obtained through development of vegetation structure and habitat resources, removal of exotic plants and through management of pest fauna. There are Eucalyptus seedlings spread throughout this vegetation type and it is likely that in the absence of grazing pressure or other disturbance it would regenerate into native forest.</p>
Total		<b>20.3</b>		

## 4.2 The Branch Lane Offset Site

The Greta biobank (described above) contains equivalent vegetation types to those within the development footprint and are continuous with large areas of native vegetation outside the site. These characteristics mean that vegetation retained on site meets the 'like for like' rule and other principals for biodiversity offsetting and would contribute to a suitable offset for the Project. However, these areas are too small (20.33 ha) to satisfy requirements for offsetting the removal of 20.47 hectares of vegetation within the development area. The total area of offset lands that would be required for the Project was calculated using the BioBanking methodology.

The offset package includes an additional offset site at The Branch: the Branch Lane biobank. Vegetation within the Branch Lane biobank is considered a suitable 'like for like' match with the development area within the variation rules of the OEH (2011) interim policy. The vegetation at the Branch Lane biobank that would form part of the offset package for the Project is described in Table 5.

Approximately 116 hectares of habitat would be specifically set aside to offset impacts of the Project within an overall 280 hectare offset site at The Branch. This offset site would be conserved under a biobank agreement as described in the GHD (2012) offset package. The specific offset package contributions comprise the purchase and retirement of 1085 biodiversity credits, which equates to an area of approximately 116 ha. The 116 ha area that would comprise the 'EPBC Act Biodiversity Offset Area' is shown on Figure 3. DSEWPaC have been provided with GIS shape files that delimit this area to ensure that this area will not be used to compensate for the impacts of any other development.

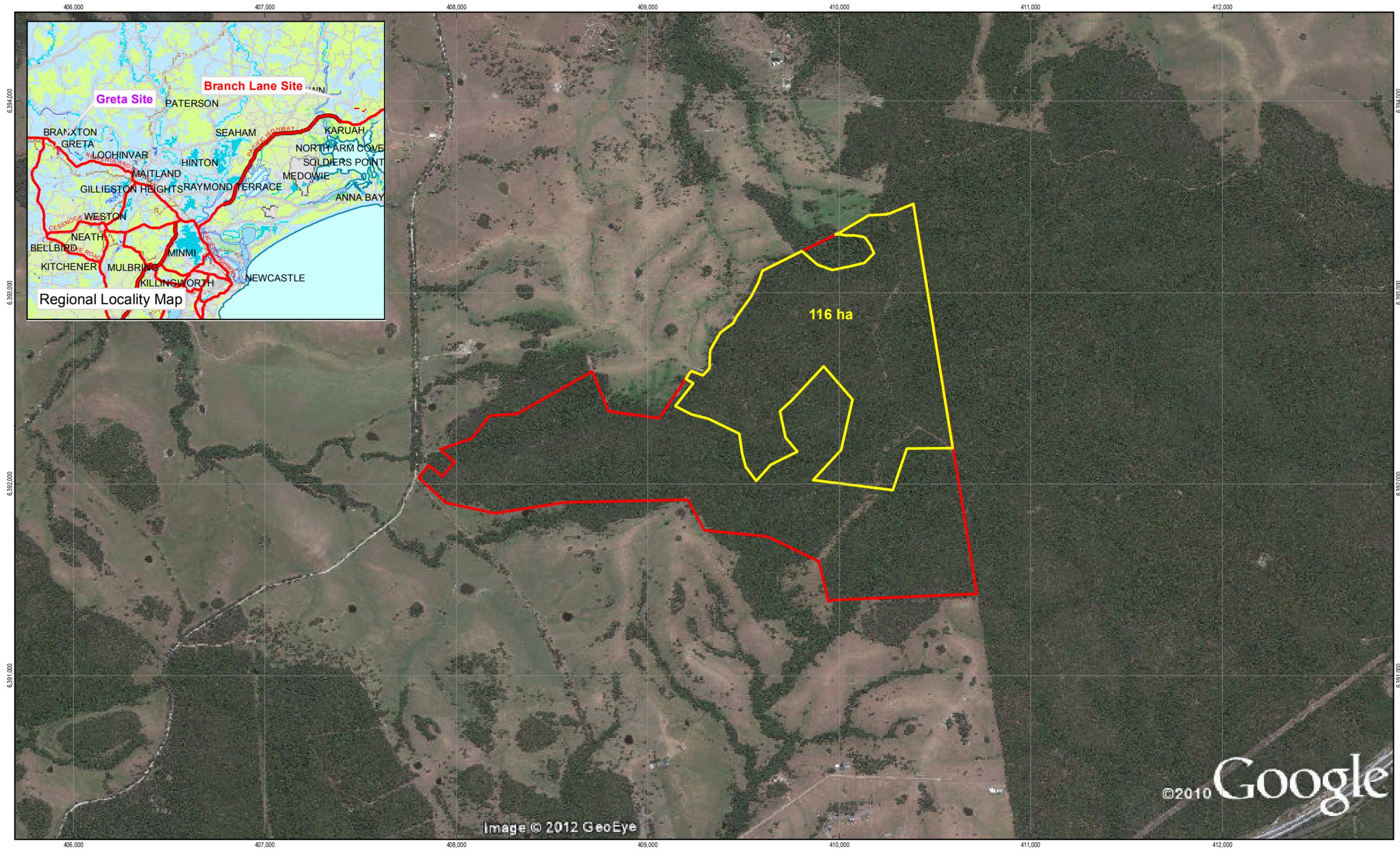
Table 5 Vegetation Zones within the Branch Lane biobank

Vegetation Type (DECCW, 2010b)	Condition	Area within Greta biobank (ha)	Conservation Significance	Description
Spotted Gum - Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast*	Moderate/good	116**	Native	<p>This vegetation type is associated with mid and upper slopes of the study area. The overstorey is 20-30 m tall and dominated by Spotted Gum (<i>Corymbia maculata</i>), Grey Gum (<i>Eucalyptus punctata</i>) and Grey Ironbark (<i>Eucalyptus siderophloia</i>) with a mixture of other ironbark and stringybark <i>Eucalyptus</i> species sub-dominant. The lower vegetation strata are diverse and structurally complex and vary between dry and wet aspects.</p> <p>The dry form comprises: sparse mid-storey of Black She- oak (<i>Allocasuarina littoralis</i>), <i>Melaleuca nodosa</i> and juvenile <i>Eucalyptus</i> species. an open shrub layer of Black Thorn (<i>Bursaria spinosa</i>), Narrow - leaved Geebung (<i>Persoonia linearis</i>), Silver-stemmed Wattle (<i>Acacia parvipinnula</i>) and Peach heath (<i>Lissanthe strigosa</i>); a groundcover dominated by grasses such as Three - awn Spear - grass (<i>Aristida vagans</i>), Weeping Grass (<i>Microlaena stipoides</i>) and Kangaroo Grass (<i>Themeda australis</i>); graminoids and sedges such as Many-flowered Mat-rush (<i>Lomandra multiflora</i>) and Variable Sword-sedge (<i>Lepidosperma laterale</i>); and occasional herbs such as Poverty Raspwort (<i>Gonocarpus tetragynus</i>) scramblers such as <i>Glycine</i> species. There is negligible exotic plant cover in this vegetation type.</p>
				<p>The wet form comprises: mid-storey of Forest Oak (<i>Allocasuarina torulosa</i>) and juvenile Turpentine (<i>Syncarpia glomulifera</i>) and <i>Eucalyptus</i> species. A locally dense shrub layer of Narrow - leaved Geebung (<i>Persoonia linearis</i>), Swamp Wattle (<i>Acacia elongata</i>) and Coffe Bush (<i>Breynia oblongifolia</i>); shade-tolerant grasses such as Weeping Grass (<i>Microlaena stipoides</i>) <i>Entolasia</i> spp. And <i>Oplismenus</i> spp.; graminoids and sedges such as Spike-headed Mat-rush (<i>Lomandra longifolia</i>) and Rough Sword-sedge (<i>Gahnia clarkii</i>); and a range of groundcover species such as Maidenhair fern (<i>Adiantum aethiopicum</i>), White Root (<i>Pratia purpurascens</i>), Indian Pennywort (<i>Centella asiatica</i>) and <i>Glycine</i> species.</p> <p>There is very little exotic plant cover in this vegetation type aside from occasional localised patches of Lantana (<i>Lantana camara</i>*).</p> <p>BioBanking site value data was collected in plot / transects and confirms that this vegetation is near-intact and in good condition. Species richness and canopy, mid storey and understorey vegetation cover was equivalent to undisturbed remnants. There are good quantities of woody debris and leaf litter and moderate numbers of hollow-bearing trees.</p>

Vegetation Type (DECCW, 2010b)	Condition	Area within Greta biobank (ha)	Conservation Significance	Description
				This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources and management of weeds and pest fauna.

\* Spotted Gum - Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops [HU630] is within the Dry Sclerophyll Forest vegetation formation along with Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin [HU556] and Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin [HU 630] and therefore may be traded according to variation criteria a) of the OEH (2011) interim policy.

\*\* The specific offset package contributions comprise the purchase and retirement of the 1085 biodiversity credits, which equates to an area of approximately 116 ha.



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Paper Size A3  
 0 95 190 380 570 760  
 Metres  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



LEGEND  
 EPBC Act Biodiversity Offset Area  
 Branch Lane biobank site boundary

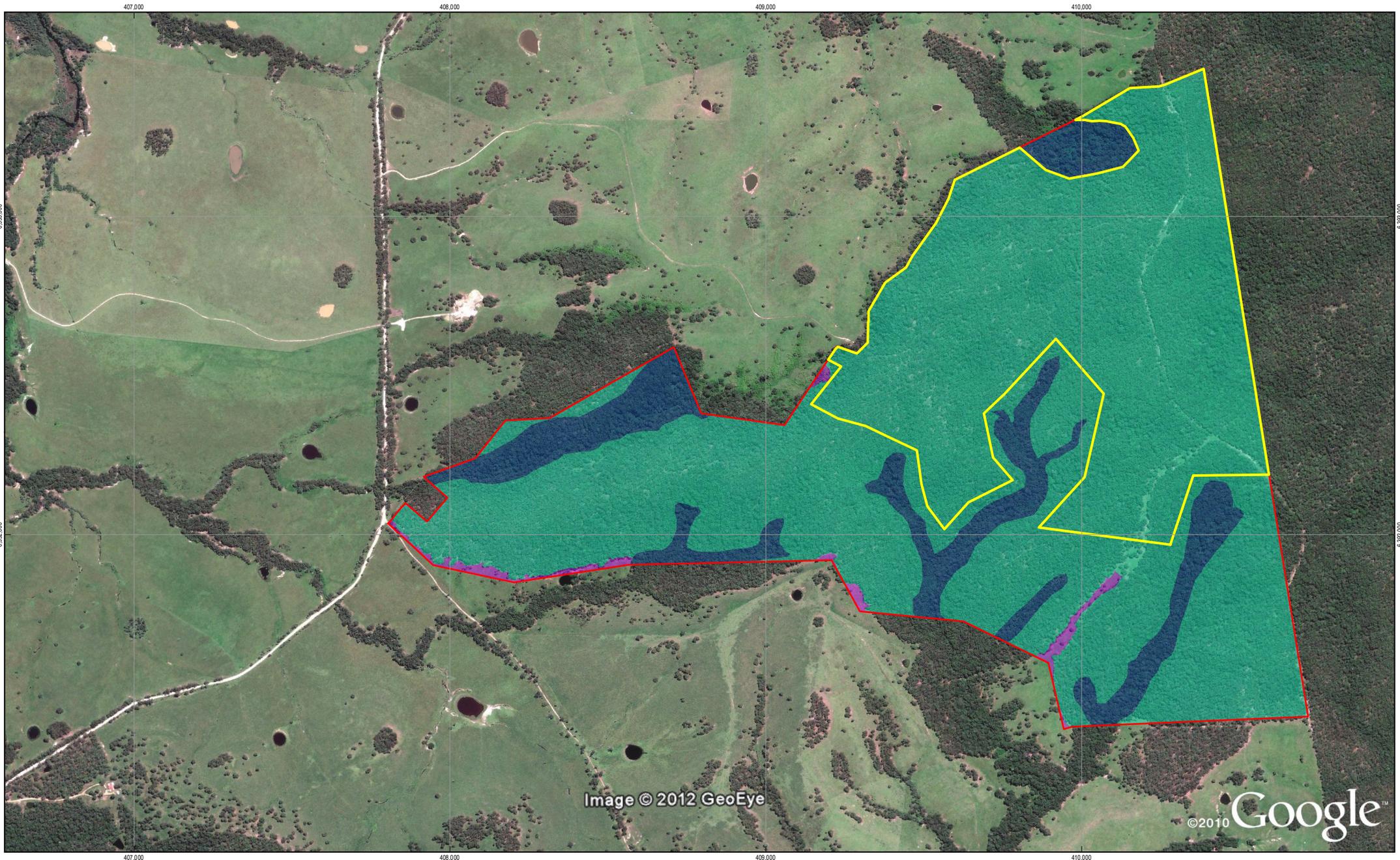


Pacific National  
 Greta Provisioning Facility  
 EPBC Act Biodiversity Offset Assessment

Job Number 22-15502  
 Revision A  
 Date 31 Oct 2012

Branch Lane Biobank  
 Site Location

Figure 3



Paper Size A3  
 0 75 150 300 450 600  
 Metres  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



LEGEND	
<span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span>	Branch Lane biobank site boundary
<span style="border: 2px solid yellow; display: inline-block; width: 15px; height: 10px;"></span>	EPBC Act Biodiversity Offset Area
Vegetation zone	
<span style="background-color: purple; display: inline-block; width: 15px; height: 10px;"></span>	HU630_Low (Cleared Spotted Gum - Grey Gum Ironbark Forest)
<span style="background-color: green; display: inline-block; width: 15px; height: 10px;"></span>	HU630_Moderate/Good (Spotted Gum - Grey Gum Ironbark Forest)
<span style="background-color: blue; display: inline-block; width: 15px; height: 10px;"></span>	HU642_Moderate/Good (Tallowwood - Brush Box - Sydney Blue Gum moist shrubby forest)



Pacific National  
 Greta Provisioning Facility  
 EPBC Act Biodiversity Offset Assessment  
**Branch Lane Biobank  
 Vegetation Zones**

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**Figure 4**

### 4.3 Comparison with Development Area

Table 6 presents a comparison of the area of native vegetation to be removed within the development area with the offset sites. A suitable offset package has been calculated using the BioBanking methodology yielding a total of 136.3 hectares of vegetation within the Greta biobank and Branch Lane biobank for the removal of 20.47 hectares within the development area. This offset package would yield an overall offset ratio of 6.66 to 1. This is greater than the required offsetting ratio of 5:1 presented in the Minister's Conditions of Approval and is also greater than the required number of biodiversity credits calculated with the BioBanking methodology.

Table 6 Comparison of Development Area within the Offset Sites

Vegetation Type	Development Area (ha)	Greta Biobank Site Area (ha)	Branch Lane Biobank Site Area (ha)	Offset Ratio	Offset Package Biodiversity Credit Comparison
Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin	9.79	7.45	73**	8.2:1	24 credit surplus, of credits within the same vegetation formation according to variation criteria a) of OEH (2011)***
Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin	10.68	12.85*	43**	5.2:1	33 credit surplus, of credits within the same vegetation formation according to variation criteria a) of OEH (2011)***
<b>Total</b>	<b>20.47</b>		<b>136.3</b>	<b>6.66:1</b>	<b>57 credit surplus</b>

\* Total area includes Low condition patches of this community within the Greta biobank.

\*\* hectares of Spotted Gum - Grey Ironbark forest based on an average 7.7 biodiversity credits per hectare.

\*\*\* Ecosystem credits for Spotted Gum - Grey Ironbark dry open forest of the lower foothills of the Barrington Tops [HU630] at the Branch Lane biobank were traded with Grey Ironbark - Spotted Gum - Grey Box open forest on hills of the Hunter Valley, Sydney Basin [HU556] and Forest Red Gum - Grey Gum dry open forest on hills of the lower Hunter Valley, Sydney Basin [HU 544] in the development area. All three vegetation types are within the Dry Sclerophyll Forest vegetation formation.

## 4.4 Offsets for Matters of National Environmental Significance

The offset package for the Project will conserve offset sites containing native vegetation and habitats equivalent to those within the development area using the framework of BioBanking. The following section describes how this approach will ensure that any impacts on MNES arising from the development are addressed by the offset package.

### 4.4.1 Threatened Flora

No threatened flora or EECs listed under the EPBC Act were identified in the subject site or are otherwise of relevance to this assessment. There is potential habitat for Slaty Red Gum (*Eucalyptus glaucina*), a Vulnerable species listed under the EPBC Act, within the subject site however surveys by SKM (2010a, 2010b) and supplementary targeted surveys for *E. glaucina* and potential *E. glaucina* hybrids/integrades by GHD did not detect any individuals of the species within the development area. BioBanking only requires specific offsets for threatened plants (i.e. purchase of species credits) where individual threatened plants are to be removed. Therefore the Offset Package will not include any specific offset contributions for *E. glaucina*. Nonetheless, the offset package will conserve 11 likely *E. glaucina* hybrids within the Greta biobank site.

### 4.4.2 Threatened Ecological Communities

No threatened ecological communities listed under the EPBC Act were identified in the development area or are otherwise of relevance to this assessment.

### 4.4.3 Threatened Fauna

The SKM (2009a, 2009b) ecological assessments included targeted field surveys for threatened fauna in conjunction with relevant database searches and assessments of fauna habitats and fauna species richness, distribution and abundance.

No EPBC Act-listed threatened fauna were directly recorded.

There is potential habitat for a number of threatened fauna listed under the EPBC Act within the development area: the Swift Parrot (*Lathamus discolor*), Regent Honeyeater (*Anthochaera phrygia*), Spotted-tailed Quoll (*Dasyurus maculatus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). Eucalyptus forest within the development area is critical foraging habitat for the Grey-headed Flying Fox as defined in the Draft Recovery Plan for the species (DECCW, 2009b). Potential habitat for a number of migratory species listed under the EPBC Act was identified within the development area. This suite of listed fauna was considered 'subject species' for the impact assessment.

Assessments of significance under the EP&A Act and EPBC Act found that the Project will be unlikely to have a significant negative impact on any of these listed fauna species (SKM, 2009a, 2009b).

Habitat assessments for threatened fauna were conducted within the development area and the biobank sites using the BioBanking assessment methodology (DECC, 2009). The BioBanking credit calculator queries a database of threatened biota records against the location of the site, landscape attributes and a series of habitat parameters in order to predict the suite of threatened fauna that are likely to be supported by habitats at the site. The development area and Greta biobank site share a common suite of native biota populations and associated habitat resources. Further, all of the species predicted to occur in association with habitats at the development area are also predicted to occur in association with habitats at the Branch Lane biobank site.

Each of the threatened fauna species that are predicted to use habitat within the vegetation types at the site has a 'Tg score' within the BioBanking credit calculator that feeds into the ecosystem credit calculations. The Tg score varies between threatened species depending on the ability of that species and its habitat resources to respond to management actions at a biobank site. Species which rely on habitat resources that take a long time to develop (e.g. hollow-bearing trees) have lower Tg scores. The lower the Tg score the greater the area of offsets that are required to address impacts on that species and all other species associated with the area of habitat. The fauna species with the lowest Tg score determines the overall offset requirement for the site. For the development area, the species with the lowest Tg score is the Spotted-tailed Quoll. The expert reports included as Appendix E of the GHD (2012) offset package concluded that the site does not contain breeding resources for forest owl species that would have had lower Tg scores than the Spotted-tailed Quoll if they were expected to breed on site. as Appendix E of the GHD (2012) offset package also provides the justification for a slight increase in the Tg score for the Spotted-tailed Quoll because the development area contains foraging habitat, but not permanent denning or breeding habitat for the species.

For the Greta biobank site, the species with the lowest Tg score is also the Spotted-tailed Quoll and the Tg score was also increased slightly.

For the Branch lane biobank the species with the lowest Tg score are the three forest owls: Powerful Owl; Sooty Owl and Masked Owl. The EPBC Act listed threatened species with the lowest Tg score is the Spotted-tailed Quoll. Based on habitat assessments conducted during the site surveys, the Branch Lane biobank site contains potential foraging, roosting/denning and breeding habitat for all four of these species.

The Tg score and offset calculations presented in the offset package are based on a robust methodology (DECCW, 2010b; DECC, 2009) and are likely to be more conservative than would be required to address impacts on EPBC act listed fauna alone.

There is approximately 20 hectares of critical foraging habitat for the Grey-headed Flying-Fox in the development area and the DSEWPaC Ministers Conditions of Approval (letter of 13 May 2011) specifically refer to offsetting requirements for this species. Critical foraging habitat for the Grey-headed Flying-Fox is also present in the Greta biobank site in both Spotted Gum-Ironbark Forest and Red Gum Forest.

The Branch Lane biobank site is under 10 kilometres from The Branch breeding camp (DSEWPaC, 2012a) and contains critical habitat for the Grey-headed Flying Fox as defined in the Recovery Plan for the species (DECCW 2009b). Specifically, the site:

- Would provide habitat resources for The Branch breeding camp (DSEWPaC, 2012a) and associated population of >30,000 individuals in the Hunter and Great Lakes regions
- Contains large numbers of Spotted Gum (*Eucalyptus maculata*) that flower during winter and spring (during food bottlenecks)
- Large numbers of Grey Gum (*Eucalyptus punctata*) that flower during summer and autumn (during the breeding season).

Dry sclerophyll forest within the Branch Lane biobank site contains Spotted Gum and other Myrtaceous, nectar-bearing tree species that would provide foraging resources for the Regent Honeyeater. Spotted Gum forests in the Hunter and adjoining coastal areas are thought to provide alternative foraging resources and refuge when the Regent Honeyeater's preferred box woodland foraging habitat west of the divide is affected by drought (DSEWPaC, 2012b). Similarly, these nectar-bearing trees at the Branch Lane biobank site would provide non-breeding season foraging resources for the Swift Parrot (DSEWPaC, 2012b).

The habitat resources present in the Branch Lane biobank are likely to be more valuable for threatened biota than those resources removed by the Project because they are continuous with >500 hectares of intact native vegetation whereas the subject site is a relatively small and fragmented area of habitat between the Hunter Expressway and railway line.

The DSEWPaC Conditions of Approval require that for each hectare of suitable habitat for the Grey Headed Flying Fox, the Regent Honeyeater, the Swift Parrot and other listed threatened species to be impacted by the action, the proposed offset site or sites must protect a minimum of 5 hectares of suitable habitat (5:1 ratio). Offsetting requirements for these threatened species are expressed in ecosystem credits calculated using the BioBanking methodology in Table 19 of the GHD (2012) offset package. In terms of hectares of habitat, this equates to the conservation of 136 hectares to offset the removal of 20.47 hectares or an offsets ratio of 6.66: 1. This is considerably greater than the required offsetting ratio of 5:1 presented in the Minister's Conditions of Approval.

# 5. Biodiversity Offset Site Management Framework

## 5.1 Summary

The offset package for the Project will identify biodiversity offset (biobank) sites that will be formally Titled and conserved under a biobanking agreement. To deliver the biodiversity outcomes required by a biobanking agreement, the following biodiversity management framework would be implemented at the biobank sites:

- Conservation – A ‘conservation covenant’ would be placed over the biobank site in perpetuity. This covenant extinguishes all potential future land uses other than exploration/mining rights.
- Vegetation Rehabilitation – Existing vegetation would have a ‘targeted’ weed control program applied to improve ‘condition’ throughout the biobank site. Revegetation activities would increase the extent of native vegetation, through time, of the biobank site. It is recommended these works be completed within the first five to ten years of management of the biobank site.
- Maintenance and monitoring – An annual maintenance and monitoring regime would be applied to the biobank site in perpetuity to ensure improvements in ecological values are maintained.

## 5.2 Conservation Covenant

Entering into a biobanking agreement places a conservation covenant over the land, regardless of zoning. The covenant is the strongest available on private lands and extinguishes all land uses other than conservation unless the biobanking agreement is overturned by the NSW Minister for the Environment to permit alternative uses. The covenant does not extinguish mining rights and, potentially, significant infrastructure but the BioBanking policy includes mechanisms to ensure any impacts from these activities are again suitably offset as an addition to any offsetting activities required by a given project in its own right. Further details of this policy are included in the GHD (2012) offset package or can be provided by the OEH BioBanking Unit.

Entering into a biobanking agreement places a conservation covenant over the land, regardless of zoning. The covenant is the strongest available on private lands and extinguishes all land uses other than conservation. The timeline for completing the biobanking agreements for both the Greta and Branch Lane biobank sites is shown in Table 7 below.

**Table 7 Program for completing biobanking agreements**

Task description	Timing – Branch Lane	Timing – Greta BioBank Site
Complete draft Management Actions Plan and costing template	6 months from approval of the Offsets Package	6 months from approval of the Offsets Package
Review Management Actions Plan (DSEWPaC) and approval by OEH	1 month prior to signing of biobanking agreement	1 month prior to signing of biobanking agreement
Biobanking agreement signed	29 January 2014	29 January 2014
Implementation of Management Actions Plan	29 April 2014	29 April 2014

Note: (1) These works will commence after construction is completed.

## 5.3 Management Actions

### 5.3.1 Overview

The following describes the actions that would likely be required for ongoing management of the area that would be conserved as a biobank site. A Management Actions Plan (prepared in accordance with the BioBanking Methodology), detailing rehabilitation activities and an associated management program, would be prepared and included in the final biobanking agreement. The Management Actions Plan forms the basis of the funds required to be placed in the BioBanking Trust when purchasing the credits. The BioBanking Trust then funds the biobank site owner to implement the management actions plan.

Biobank sites may have two types of management actions applied, these being:

- Standard Management Actions.
- Site Specific Management Actions.

The management actions applicable to the biobank site are described below.

### 5.3.2 Standard management actions

Standard management actions are those actions required on biobank sites to improve vegetation condition when entering into a biobanking agreement. The standard management actions for all biobank sites are:

- Management of grazing for conservation.
- Weed control.
- Management of fire for conservation.
- Management of human disturbance.
- Retention of regrowth and remnant native vegetation.
- Replanting or supplementary planting where natural regeneration would not be sufficient.
- Retention of dead timber.
- Erosion control.
- Retention of rocks.

biobanking agreements require all of the above management actions to be carried out. Completing such actions would also increase the credits calculated for a given biobank site. Further details of the rehabilitation and management actions proposed for the biobank site is shown in 4 of the GHD (2012) offset package. Management actions would be commenced within three months of the establishment of the biobanking agreement on the site.

The offset package identifies site specific vegetation rehabilitation and management actions appropriate for each biobank site. These items would be described in greater detail in the Management Actions Plan for each site, which would be completed during the preparation of the biobanking agreement.

### 5.3.3 Greta Site Specific Management Actions

Based on the habitat resources within the site and the suite of threatened species which are predicted to occur, the credit calculator nominates management actions that would be required to alleviate site-specific threats. Undertaking these actions is over and above the minimal requirements for a biobank site. Additional management actions required at the Greta biobank site are presented in Appendix A of GHD (2012) and summarised below:

- Cat and/or Fox control
- Exclude miscellaneous feral species
- Control of feral and/or overabundant native herbivores (e.g. rabbit, goats, deer etc)
- Maintain or reintroduce flow regimes (aquatic flora)

The Management Actions Plan will identify site specific vegetation rehabilitation and management actions appropriate for the Greta biobank site which would be completed during the preparation of the biobanking agreement.

Based on the results of the GHD site surveys these management actions would be applied at the Greta biobank site as follows:

- Rehabilitation of the drainage line in the south of the site, including treatment of locally severe infestation with Lantana (*Lantana camara*) and Camphor Laurel (*Cinnamomum camphora*)
- Revegetation of Forest Red Gum - Grey Gum dry open forest in Low condition including:
- De-commissioning of the current dirt access road in the south of the site and associated informal tracks. Assisted natural regeneration of these areas with brush matting, placement of woody debris etc.
- Revegetation of the horse track in the central portion of the site, including removal of fences, treatment of exotic pasture, supplementary planting and assisted natural regeneration through brush matting, placement of woody debris etc.
- Bush regeneration of Grey Ironbark - Spotted Gum - Grey Box open forest and Forest Red Gum - Grey Gum dry open forest in moderate/good condition, including treatment of localised Lantana and Prickly Pear (*Opuntia* sp.) infestations.
- Restoration of natural flow regimes in the drainage line in the south of the site through removal of barriers such as temporary access culvert and decommissioning the access track in the south of the site.

Regeneration activities would be coordinated with environmental management measures through the construction phase of the Project as described in the Abigroup (2011) *Greta Train Support Facility Flora and Fauna Management Plan* (the FFMP). The FFMP is a sub plan to the Construction Environment Management Plan for the Project. The FFMP has been developed to

provide a guide to minimising adverse impacts on flora and fauna and to meet the requirements of the Ministers Conditions of Approval and the Statement of Commitments (Abigroup, 2011). Rehabilitation of the access road and horse track would follow directly from rehabilitation of construction laydown areas and would utilise habitat resources salvaged from the development footprint under the FFMP. It is assumed that the construction laydown areas would contain an appropriate planting medium, including topsoil that would be conducive to regeneration of native vegetation within the biobank site.

These items would be described in greater detail in the Management Actions Plan.

**Table 8 Summary of Rehabilitation and Management for Greta biobank site**

Management Measure	Activities required	Timing
Management of grazing	Install stock fencing in accordance with the MAP	Within the first year of establishing the biobank site
	Maintenance and repair	Annually
Weed control	Control of noxious and large woody weeds (min 80% control)	Within first 3 years of establishing biobank site
	Completion of primary and secondary bush regeneration programs targeting other weeds	Within first 10 years of establishing biobank site
Management of human disturbance	Install controlled access point/s and fencing in accordance with the MAP	Within the first 6 months of establishing the biobank site
Retention of vegetation and retention of dead timber	Installation of protective fencing in accordance with MAP	Within first 6 months of establishing biobank site
Erosion control	Installation of erosion control measures in accordance with the MAP	Within first 3 months of establishing biobank site.
Slaty Red Gum Protection	Individuals of Slaty Red Gum 'hybrids' protected through appropriate temporary fencing throughout the construction phase and via a perimeter fence for the life of the biobank	Within first 3 months of establishing biobank site
Feral animal control	Trapping and targeted removal of pest species	Immediately upon establishment of biobank site and monitored regularly
Maintain or reintroduce flow regimes (aquatic flora)	Removal of any 'barriers' to flow regimes	Within first year of establishing biobank site.
Monitoring and Reporting	Reports will be prepared and issued in accordance with MAP by OEH. Provision will be made in the MAP copies of each report to be issued to the Minister of DSEWPaC.	Annually in perpetuity

#### 5.3.4 Branch Lane Site Specific Management Actions

Additional management actions required at the Branch Lane biobank site are presented in Table 9 and summarised below:

- Cat and/or Fox control
- Exclude miscellaneous feral species
- Control of feral and/or overabundant native herbivores (e.g. rabbit, goats, deer etc)
- Maintain or reintroduce flow regimes (aquatic flora).
- The Management Actions Plan will identify site specific vegetation rehabilitation and management actions appropriate for the Branch Lane biobank site which would be completed during the preparation of the biobanking agreement.
- Based on the results of the GHD site surveys these management actions would be applied at the Branch Lane biobank site as follows:
  - Monitoring of the condition of the drainage lines through Tallowood - Brush Box - Sydney Blue Gum moist shrubby forest at the site, including treatment of environmental weeds as required
  - Monitoring of local populations of threatened plants and communication with contractors to avoid accidental herbicide spraying or other impacts. The Management Actions Plan would include specific reference to these species and appropriate identification guidelines
  - Bush regeneration of Spotted Gum - Grey Gum Ironbark Forest and Tallowood - Brush Box - Sydney Blue Gum moist shrubby forest in moderate/good condition, including treatment of localised Lantana and herbaceous environmental weed infestations.

These items would be described in greater detail in the Management Actions Plan.

**Table 9 Summary of Rehabilitation and Management for Branch Lane biobank site**

Management Measure	Activities required	Timing
Management of grazing	NA	NA
Weed control	Control of noxious and large woody weeds	Within first 3 years of establishing biobank site
	Completion of primary and secondary bush regeneration programs	Within first 10 years of establishing biobank site
Management of human disturbance	Install controlled access point/s and fencing in accordance with the MAP	Within the first 6 months of establishing the biobank site
Retention of vegetation and retention of dead timber	Monitor human disturbance for things such as fire wood gathering	Within first 6 months of establishing biobank site
Erosion control	NA (not required at Branch Lane)	NA
Feral animal control	Trapping and targeted removal of pest species	Immediately upon establishment of biobank site and monitored regularly
Maintain or reintroduce flow regimes (aquatic flora)	Removal of any 'barriers' to flow regimes	Within first year of establishing biobank site.
Monitoring and Reporting	Reports will be prepared and issued in accordance with MAP by OEH. Provision will be made in the MAP copies of each report to be issued to the Minister of DSEWPaC.	Annually in perpetuity

## 5.4 Summary of Rehabilitation and Management Activities

The following general summary of management activities that would be adopted at the biobank sites outlines the minimum standards and measures that would be required. These activities will be described in greater detail in the Management Actions Plan (to be completed during the preparation of the biobanking agreement).

### 5.4.1 Targeted Weed Control

The biobank sites would be subjected to a targeted weed control program to treat noxious and large woody weeds. These works may require the use of mechanical tools such as chainsaws and 'high cutters' as well as the use of a variety of herbicides. As such, suitably qualified and experienced contractors only will complete these works. Follow-up weed control would be included in the bush regeneration program.

### 5.4.2 Bush Regeneration

A comprehensive bush regeneration program is to be implemented to improve the condition of existing remnant vegetation throughout the site. Bush regeneration activities will occur during the initial stages of the biobanking agreement (i.e. the first 10 years) and will be completed by appropriately qualified and experienced contractors. Primary bush regeneration activities will

focus on noxious weeds, woody weeds and ground covers. Follow-up bush regeneration activities will focus on small perennials, annuals and introduced grasses. It is anticipated that after the first 10 years bush regeneration activities will be limited to the monitoring of weed infestation and treatment as required.

#### 5.4.3 Weed Waste

It is recommended that weed material from bush regeneration works is piled and left *in situ* to break down. All weed propagules will be collected and 'bagged' on site and disposed of at a suitable waste facility.

#### 5.4.4 Seed Collection

Seed collection will require a 123c licence under the *National Parks and Wildlife Act 1974* (NPW Act) subject to approval from DECCW. Only experienced and qualified staff will perform seed collection activities. All seed collection, management, cleaning and storage will be in accordance with *Florabank Seed Collection Guidelines* (prepared by Greening Australia and now accepted as industry best practice).

All plant material to be used throughout the project will be of local provenance, collected from within a five kilometre radius of the site.

#### 5.4.5 Plant Propagation

Plant propagation refers to the germinating of collected seed and the 'growing on' of plants in enviro cells, hiko cells or forestry tubes. All plants will be produced from local provenance seed. This activity should be managed by a suitably qualified and experienced native plant production nursery.

#### 5.4.6 Revegetation Works

To supplement rehabilitation activities, it is recommended an experienced native plant nursery provide native tube stock to be planted in low condition portions of the Greta biobank site. All plants would be of local provenance. Revegetation activities would include the targeted planting of Slaty Red Gum.

There will be no revegetation activities at Branch Lane as the site is already covered in existing native vegetation, generally in good condition.

#### 5.4.7 Broadcasting of Native Seed

To supplement rehabilitation activities, it is recommended that pre-treated acacias, peas and native grass seed, comprising a suite of species representative of these Families within adjoining native vegetation, be broadcast throughout rehabilitation zones. This will add further diversity to the site, particularly in ground cover strata, and help improve native plant colonisation.

#### 5.4.8 Maintenance Activities

Maintenance activities would include but not be limited to:

- General maintenance activities such as repairing damaged tree guards, installing replacement plants where required, weeding inside the tree guards and continued follow-up spot weed spraying.

- Watering - plants should be watered in on installation. All plantings should then receive follow-up watering during the first eight weeks to assist plant establishment. Should weather conditions remain dry for an extended period of time, additional watering may be required.

Newly installed plants will require spot spraying of Round-up® and Biactive herbicides using back packs. Suitably qualified contractors would carry out all spraying.

## 5.5 Monitoring of Biobank sites

The purchase of credits includes two components: Part A being the cost of rehabilitation and management and, Part B being the 'profit' to the relevant landowner. The Part A funds are the equivalent of all costs associated with the rehabilitation, management and monitoring of the biobank site/s in perpetuity.

The BioBanking methodology includes preparation of a Management Actions Plan for each biobank site. The methodology also includes a credit pricing tool which places a commercial value for completing each of the actions listed in the Management Actions Plan. These funds are held by the BioBanking Trust and managed by OEH. The funds are provided to the land owner on an annual basis for the amount equivalent to works required in that year. The biobank owner is then required to submit standards reports, outlining the works completed, their success and monitoring results. OEH then review the reports and, if works have been completely satisfactorily, provide the next payment for the following years work. The OEH also include site visits as part of their auditing process.

Photo points were established within the Greta biobank site and the Branch Lane biobank site using the BioBanking methodology. These photo points would form the baseline for monitoring of the condition of the biobank sites. The biobanking agreements for the sites would include detailed monitoring requirements which would use these photo points as their focus. Further, once the biobanking agreement has been signed by the landholder it becomes their responsibility to undertake all monitoring and the results of such would be assessed when the OEH BioBanking Trust provides management funds at the beginning of each year.

The OEH will also provide copies of each annual report to DSEWPaC for their records, as required by conditions of consent.

## 5.6 Compliance Assurance

BioBanking includes a range of provisions to ensure delivery of the conservation outcomes. The OEH have the ability to:

- Enforce the provisions of the conservation covenant placed over the land.
- Adjust rehabilitation and management actions program depending on how the site responds.
- Includes contingency for things such as 'natural disasters which may impact on the success or otherwise of the program.
- Have the authority to take legal actions against biobank site owners for non-compliance including, as a last resort, acquisition of the land.

## 6. Conclusions

### 6.1 Development – Offset Comparison

The Project will remove 20.47 hectares of native vegetation, including habitat for threatened biota. This comprises an impact on MNES and will require commensurate biodiversity offsets to satisfy the requirements of the NSW EP&A Act as well as the EPBC Act. The subject site for the Project contains intact native vegetation that would not be cleared for construction of the proposed rail facility. An approximate 20.3-hectare area will be set aside as the Greta biobank and will directly contribute to the offset package for the Project.

The Greta biobank contains equivalent vegetation types to those within the development footprint that are continuous with large areas of native vegetation outside the site. These characteristics mean that vegetation retained on site meets the 'like for like' rule and other principals for biodiversity offsetting and would contribute to a suitable offset for the Project. However the Greta biobank is too small (20.3 ha) to satisfy requirements for offsetting the removal of 20.47 hectares of vegetation within the development area, as calculated using the BioBanking methodology.

The offset package includes an additional offset site at The Branch: the Branch Lane biobank to satisfy the total offset requirement for the Project. Vegetation within the Branch Lane biobank is considered a suitable 'like for like' match with the development area within the variation rules of the OEH (2011) interim policy.

The Branch Lane biobank site will contribute a further 116 ha of native vegetation and habitat to the offset package for the Project. It has attributes that make it highly suitable as an offset site including:

- Landscape context – the site is continuous with a patch of native vegetation and habitat of many thousands of hectares that is connected to Karuah National Park
- Conservation significance – the site:
  - is dominated by intact native vegetation in good condition
  - contains at least two threatened fauna species and important habitat associated with drainage lines, foraging resources and hollow-bearing trees that are likely to also support a number of other threatened species
- Conservation of habitat for MNES – the site contains habitat resources for all of the MNES that would be affected by the Project
- Improvements in biodiversity values – the site contains localised weed infestations that will be treated and habitat for threatened fauna that would benefit from the management of exotic predators.

The specific offset contributions within the offset package have been calculated using the BioBanking methodology and comprise the biodiversity credits presented in Table 6 of GHD (2012) which would be purchased and retired by Pacific National. This equates to a total of 136.3 hectares of vegetation within the Greta biobank and Branch Lane biobank. This offset package would yield an overall offset ratio of 6.66 to 1. This is greater than the required offsetting ratio of 5:1 presented in the Minister's Conditions of Approval.

Determination of the offset package using the BioBanking methodology has provided (GHD, 2012):

- A detailed, quantitative assessment of vegetation and habitat resources within offset sites and likely gains in biodiversity value through conservation and management

- That offset sites contain appropriate 'like for like' vegetation types and habitats via trading of ecosystem credits between the development and biobanks
- Appropriate offset ratios to ensure that the offset package meets OEH and DSEWPaC offsetting requirements as specified in the OEH (2011) interim policy
- Security of Titling of the offset sites in perpetuity under biobanking agreements
- Management of the biobank sites under a plan and monitoring framework, with secure funding from the BioBanking Trust Fund, in perpetuity.

## 6.2 Matters of National Environmental Significance

The offset package for the Project will conserve offset sites containing native vegetation and habitats equivalent to those within the development footprint using the framework of BioBanking. This approach will ensure that any impacts on MNES arising from the development are addressed by the offset package.

No threatened flora or EECs listed under the EPBC Act were identified in the subject site or are otherwise of relevance to this assessment. There is habitat for a number of threatened fauna listed under the EPBC Act within the development footprint, including the Swift Parrot, Regent Honeyeater, Spotted-tailed Quoll and Grey-headed Flying-fox. None of these threatened fauna species are of the type that require species credits within the BioBanking methodology. Offsets for removal of habitat for these species is linked to ecosystem credits associated with the vegetation types that are to be removed and to be conserved in the biobank sites.

Ecosystem credits required for the development will be matched to an appropriate number and type of ecosystem credits at the biobank sites. The BioBanking methodology provides a robust means for ensuring that vegetation types and habitats within the biobank site are an appropriate 'like for like' match with those within the development site and that the offset ratios are sufficient to improve or maintain biodiversity values. The GHD (2012) offset package includes a detailed comparison of the threatened fauna species that are predicted to occur at the development site and those associated with habitats to be conserved at the biobank site to ensure that offsetting requirements of all threatened biota and other MNES are met.

## 6.3 Ministers Conditions of Approval

The offset package for the Project has been prepared to comply with the Minister's Conditions of Approval as stated in the DSEWPaC (undated) letter. The conditions which pertain to the preparation of this offset package are summarised in Table 7 along with a summary of how each condition has been addressed in this offset package

**Table 10 Comparison of the offset package with DSEWPaC Conditions of Approval**

Condition	Offset Package
<p><i>"12. The person taking the action must submit a Biodiversity Offset Package for the Minister's approval to provide for the conservation and management in perpetuity of areas defined on the map at Annexure 1 as "Biobank site". The Biodiversity Offset Package must be approved by the Minister in writing prior to substantial commencement of the action and must include:</i></p>	<p>This offset package includes the Annexure 1 as "Biobank site" as the Greta biobank. The Greta biobank will be conserved under a biobanking agreement, which will provide for the protection of the site in perpetuity; prevent any future development activities; and ensure the active management of the vegetation and habitats within the site.</p>

Condition	Offset Package
<p><i>i. The registration of a conservation covenant under relevant nature conservation legislation on the areas referred to in this condition (Condition 12) within 18 months of the approval of the Biodiversity Offset Package, which must:</i></p> <p><i>a) provide for the protection of these areas in perpetuity;</i></p> <p><i>b) prevent any future development activities; and</i></p> <p><i>c) ensure the active management of the vegetation on-site.</i></p>	
<p><i>ii. Measures to be implemented to rehabilitate native vegetation within the areas referred to in this condition (Condition 12);</i></p>	<p>Measures to rehabilitate vegetation within the Greta biobank site are summarised in Section 5 above and described in detail in Section 7 of the GHD (2012) offset package.</p>
<p><i>iii. A summary of management measures consistent with advice from a suitably qualified expert, to be implemented on the areas referred to in this condition (Condition 12), and a summary of key milestones, monitoring, performance indicators, corrective actions and timeframes for the completion of all actions outlined in the Package; and</i></p>	<p>The management framework for the Greta biobank site is described in Section 7 of the GHD (2012) offset package.</p>
<p><i>13. The Biodiversity Offset Package outlined in Condition 12 must also provide for the conservation and management in perpetuity of an area of habitat for listed threatened species and ecological communities equal or greater in size to that determined by the NSW Biodiversity Banking and Offsets Scheme methodology. The Biodiversity Offset Package must be approved by the Minister in writing prior to substantial commencement of the action and must include</i></p> <p><i>i. The identification of the proposed offset site or sites;</i></p>	<p>The offset package includes the conservation of an area of land greater than that required by the BioBanking methodology are summarised in Section 5 above and described in detail in Section 7 of the GHD (2012) offset package. The offset package includes a total 57 credit surplus above that calculated using the BioBanking methodology.</p> <p>The offset package is based on the conservation of the Greta biobank, described above, and an additional offset site: the Branch Lane biobank as shown in Figure 3.</p>
<p><i>ii. The proposed offset site or sites referred to in Condition 13(i) must contain habitat of equal or greater quality to that to be removed within the development footprint for the Grey Headed Flying Fox, the Regent Honeyeater, the Swift Parrot and other listed threatened species likely to be impacted by</i></p>	<p>The Greta biobank contains habitat equivalent to that in the development area.</p> <p>The Branch Lane biobank contains habitat of greater quality than that to be removed within the development area because it contains similar vegetation types and habitat resources but is part of a large patch within a contiguous</p>

Condition	Offset Package
<i>the action;</i>	area of habitat of many 1000s of hectares (refer Section 4.2).
iii. <i>For each hectare of suitable habitat for the species described in Condition 13(ii) to be impacted by the action, the proposed offset site or sites must protect a minimum of 5 hectares of suitable habitat (5:1 ratio);</i>	The Greta and Branch Lane biobanks together contain 136 hectares of habitat for these threatened biota to offset the removal of 20.47 hectares of habitat within the development area (6.66:1 ratio).
iv. <i>For each Slaty Red gum (Eucalyptus glaucina) impacted by the action, the proposed offset site or sites must protect a minimum of 4 Slaty Red Gum specimens (4:1 ratio);</i>	There are no <i>Eucalyptus glaucina</i> nor <i>E. glaucina</i> hybrids within the development area.
v. <i>The offset site or sites referred to in Condition 13(i) must be located within 50km of the site for the action, unless otherwise agreed to by the Minister;</i>	The Greta biobank is located immediately adjacent to the development. The Branch Lane biobank is located approximately 60 km from the development area as shown on Figure 3. The preferred off-site offset site for the Project was well within 50 km of the development area but was not available because the landowner did not wish to participate. The Branch Lane biobank site was the next closest potential off-site offset site that was available for this Project. This minor inconsistency with the Condition does not significantly detract from the overall suitability of the Branch Lane biobank site as described in the offset package (GHD, 2012). Further, the Branch Lane biobank is contiguous with native vegetation and habitat that is well within 50 km of the development area.
vi. <i>The offset site or sites referred to in Condition 13(i) must be protected by a conservation covenant registered on the title of the offset site or sites under relevant nature conservation legislation within 12 months of the approval of the Biodiversity Offset Package;</i> vii. <i>The covenant referred to in Condition 13(v) must provide for:</i>  a) <i>The protection of the land in perpetuity;</i>  b) <i>The prevention of any future development activities; and</i>  c) <i>The active management of the land;</i>	The Greta and Branch Lane biobanks will be conserved under a biobanking agreement, which will provide for the protection of the sites in perpetuity; prevent any future development activities; and ensure the active management of the vegetation and habitat resources within the site.
viii. <i>A summary of management measures consistent with advice from a suitably qualified expert, to be implemented on the offset site or</i>	The management framework for the Greta and Branch Lane biobanks are summarised in Section 5 above and described in detail in

Condition	Offset Package
<p><i>sites referred to in Condition 13(i) and a summary of key milestones, monitoring, performance indicators, corrective actions and timeframes for the completion of all actions outlined in the Package.”</i></p>	<p>Section 7 of the offset package (GHD, 2012).</p>

## 7. References

Department of Environment and Conservation and Department of Primary Industries (DEC/DPI) (2005) *Draft Guidelines for Threatened Species Assessment, Department of Environment and Climate Change (NSW)*.

Department of Environment and Climate Change (DECC) (2007). *BioBanking Biodiversity Banking and Offsets Scheme, Scheme Overview*.

Department of Environment, Climate Change and Water (DECCW) (2010d). *Principles for the use of biodiversity offsets in NSW*. <

<http://www.environment.nsw.gov.au/biocertification/offsets.htm> >. Department of Environment, Climate Change and Water (DECC) (NSW).

Department of Environment, Climate Change and Water (DECCW) (2010a) *Vegetation Types Database*. <http://www.environment.nsw.gov.au/BioBanking/VegTypeDatabase.htm> (viewed on the 05/07/2010).

Department of Environment, Climate Change and Water (DECCW) (2010b) *Threatened Species Profile Database*. <http://www.environment.nsw.gov.au/biobanking/biobankingtspd.htm> (viewed on the 05/07/2010).

Department of Environment, Climate Change and Water (DECCW) (2010c) *List of BioBanking assessors* <<http://www.environment.nsw.gov.au/biobanking/Assessorlist.htm>>

Department of Environment and Climate Change (DECC) (2009a) *BioBanking Assessment Methodology and Credit Calculator Operation Manual*. State of NSW and Department of Environment and Climate Change, Sydney.

Department of Environment, Climate Change and Water NSW. (2009b). *Draft National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus*. Prepared by Dr Peggy Eby. Department of Environment, Climate Change and Water NSW, Sydney.

Department of Environment and Conservation (DEC) (2005) *Guidelines for Threatened species assessment*.

Department of Environment and Water (DEW) (2007). *Use of Environmental Offsets Under the Environment Protection and Biodiversity Conservation Act 1999 – Discussion Paper*.

Department of Environment and Climate Change (DECC) (2008b) *Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)* Based on descriptions compiled by Dr. Peter Mitchell. DECC, NSW.

Department of Planning (2011a) *Conditions of Consent*.

Department of Planning (2011b) *Director General's Environmental Assessment Section 75I of the Environmental Planning and Assessment Act 1979*.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012a), *Flying-foxes and national environmental law*

<<http://www.environment.gov.au/biodiversity/threatened/species/flying-foxes.html>>

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012a), *Species Profiles and Threats Database* <<http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna>>

GHD (2010a) *Greta Provisioning Facility Biodiversity Offsets Study, Stage 1*.

GHD (2010b) *Greta Provisioning Facility Biodiversity Offsets Study, Stage 2*.

Hunter Councils (2002) *Lower Hunter Central Coast Regional Environmental Mapping Survey (LHCCREMS)*. Hunter Councils, NSW.

Monteath and Powers Pty Ltd (2010) *Environmental Assessment for Pacific National Train Support Facility at Greta in the Cessnock City Council Local Government Area*.

Office of Environment and Heritage (OEH) (2011) *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects*.

Sinclair Knight Mertz (SKM) (2010a) *Train Support Facility, Greta, NSW Ecological Impact Assessment*.

Sinclair Knight Mertz (SKM) (2010b) *Addendum Report Train Support Facility Greta, NSW Ecological Impact Assessment*.

Abigroup (2011) *Greta Train Support Facility Flora and Fauna Management Plan*.

## 8. Disclaimer

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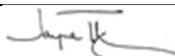
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