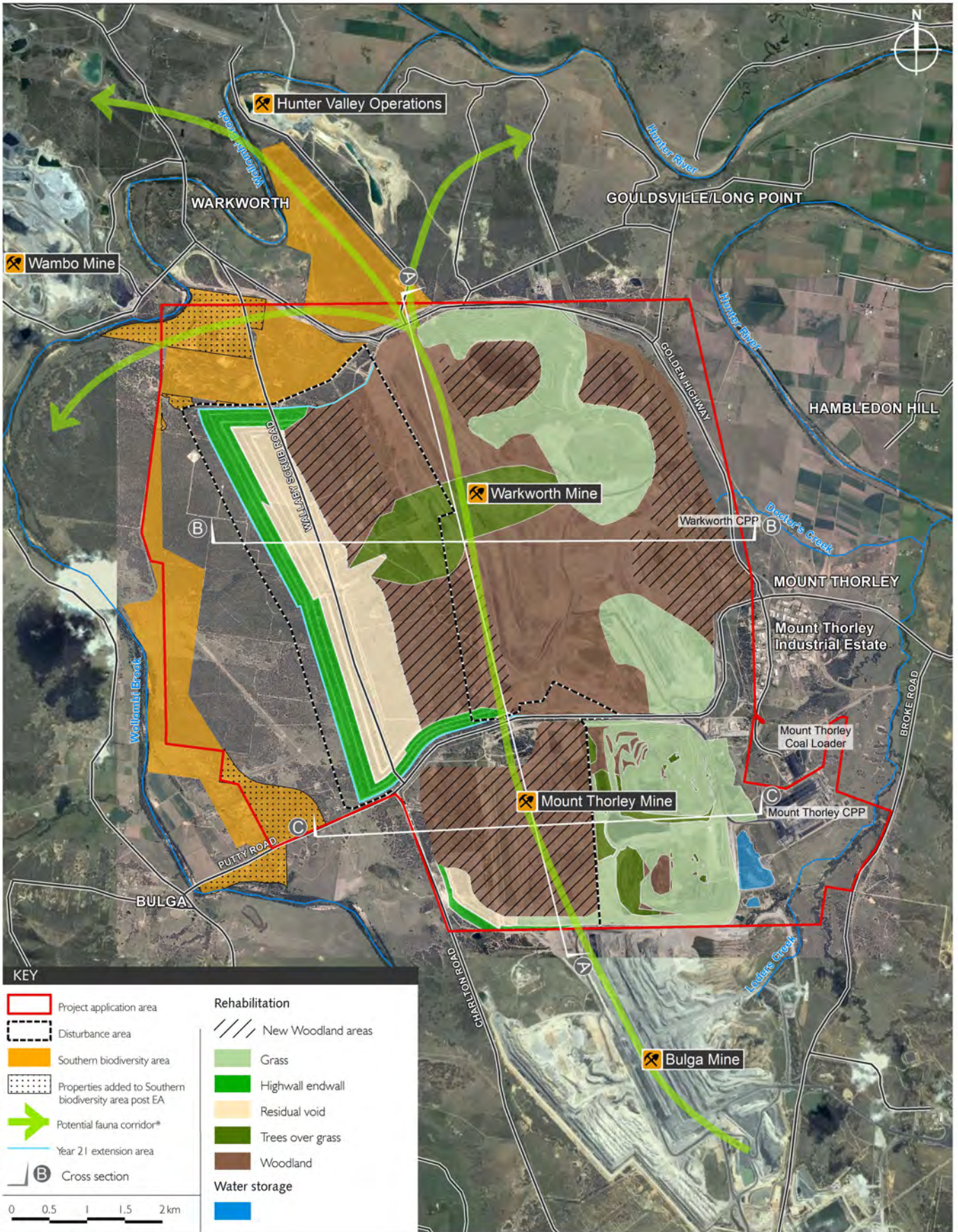


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Indicative final landform and Southern biodiversity area

Proposed Warkworth Extension - Preferred Project Report

FIGURE 2.6

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## 2.3 Biodiversity areas

To offset the loss of vegetation as a result of the proposed Warkworth Extension, a number of biodiversity management areas were proposed in the EA, including the Southern Biodiversity Area, Northern Biodiversity Area and Goulburn River Biodiversity Area. These biodiversity management areas were described in Section 5.13.4 and 8.4.3 of the EA (Volume 1) as well as the ecology study in Annex E (Volume 2). They were shown in Figures 5.8, 8.4, 8.5 and 8.6 of the EA (Volume 1).

The Southern Biodiversity Area was proposed to be approximately 718 ha in area and provide long term protection for approximately 534.6 ha of forest and woodland.

The Northern Biodiversity Area was proposed to be approximately 342 ha in area and provide long term protection of approximately 123.3ha of woodland, including approximately 20 ha of WSW. It also was to provide for the re-establishment of approximately 195.8 ha of WSW on WSG.

The Goulburn River Biodiversity Area was proposed to be approximately 1,299 ha in area and offer the long term protection of approximately 1,063.5 ha of forest and woodland (of which 140 ha was proposed to set aside as offset requirements for the HVO South Project Approval).

It should be noted that between the public exhibition of the EA and the publication of the RTS, two other biodiversity management areas were added to the proposed offset strategy; the Seven Oaks Biodiversity Area and the Putty Biodiversity Area in response to feedback from the Commonwealth that further offsets were required to offset the EPBC Act fauna species; swift parrot and regent honeyeater.

Since the publication of the RTS there have been substantial additional commitments to the proposed offset package, including the biodiversity management areas. These changes are summarised below and described in more detail in Chapter 3.

**Increase in size and biodiversity value of the Southern Biodiversity Area** – the Southern Biodiversity Area has been increased in size from 718 ha to approximately 977.5 ha. It will now provide the long term protection of approximately 661 ha of forest and woodland, including the long term protection of approximately 110.6 ha of WSW. In addition, it will now provide for the re-establishment of approximately 38.6 ha of WSW on WSG. The increase in the Southern Biodiversity Area is a result of WML purchasing the Springwood property (on the northern side of the Southern Biodiversity Area), reserving three parcels of land straddling Putty Road (on the southern side of the Southern Biodiversity Area) and reserving land containing WSW within the Buffer Land (see Figure 2.6).

**Provision of additional biodiversity area and strategic offsets** – Following public exhibition of the EA, two additional biodiversity management areas were added to the offset package including the Seven Oaks Biodiversity Area and the Putty Biodiversity Area. The Seven Oaks Biodiversity Area is located in close proximity to the Goulburn River Biodiversity Area and the Putty Biodiversity Area is located adjacent to Wollemi and Yengo national parks, see the RTS, Section 2.5. Since the publication of the RTS, an additional property for inclusion in the offset package has been acquired, namely Bowditch Biodiversity Area (refer to Figure 3.1).

The Bowditch property was identified to provide a strategic regional offset to compensate for the loss of ironbark communities and to provide habitat for a range of threatened fauna species potentially impacted by vegetation clearance. The property is strategically located in relation to conservation reserves and/or large tracts of Crown land and is located within the Great Eastern Ranges corridor.

The proponent, with the agreement of OEH, has also committed to acquire a further 750 ha of woody vegetation within 12 months of the project approval to further enhance the offset package.

These additional offsets would substantially increase the offset ratios for the proposed Warkworth Extension.

The Bowditch Biodiversity Area contains approximately 519.7 ha of open forest and woodland, and derived grassland. The Goulburn River, Seven Oaks, Putty and Bowditch Biodiversity Areas are all strategically located close to conservation areas such as national parks and are located within the Great Eastern Ranges corridor.

The proponent also committed to the re-establishment of vegetation in the biodiversity management areas that comprise derived native grasslands (refer to Table 2.1 and Statement of Commitments in Appendix H) including Southern, Northern, Putty, Seven Oaks and Bowditch biodiversity management areas.

In addition a number of non-land based or 'indirect' offsets proposed for addition to the offset package and these are:

- contribution of an additional \$500,000 for the research currently being undertaken by the UNE into WSW as a Stage II programme complementing the existing research programme. The Stage II programme would involve investigating seed collecting protocols, the evaluation of provenance via genetic assays and stress tests for five key species and the initial collection of seed supplies for re-establishment works. The research would assist in better understanding possible climate change impacts on WSW and management measures required to assist in the community adapting to climate change;
- the preparation of a Recovery Plan for the WSW in consultation with government, including OEH and neighbouring mines including Bulga Coal and Wambo Mine;
- trials to rehabilitate an old quarry and revegetation of WSW on the old quarry site (approximately 1 ha) within the Southern Biodiversity Area. The old quarry would be backfilled with material, including a sand layer, sourced from the extension area and the profile would be reconstructed and shaped with regard to the surrounding landscape. A revegetation trial of key WSW species would follow with guidance provided by UNE; and
- contribution of up to \$500,000 towards research aimed at improving rehabilitation of ground stratum plant species of the Central Hunter Grey Box-Ironbark-Spotted Gum communities.

All additional indirect offsets are referenced in the Statement of Commitments in Appendix H.

A summary of the current offset package is provided in Table 2.1.

**Table 2.1 Summary of offset package**

Area	Existing woodland (ha)	Re-establishment of woodland (ha)	Grassland (ha)	Total (ha)
<b>Land based offsets</b>				
Southern Biodiversity Area	661	316.5	-	977.5
Northern Biodiversity Area	123.3	218.9	-	342.2
Goulburn River Biodiversity Area	1,063.5	-	235.8 (EEC)	1,299.3
Putty Biodiversity Area	366.6	12.2	-	378.8
Seven Oaks Biodiversity Area	354	168.7	-	522.7
Bowditch Biodiversity Area	517.5	2.3	-	519.8
Strategic offsets <sup>#</sup>	750	-	-	750 <sup>#</sup>
<b>Sub-total</b>	<b>3,835.9</b>	<b>718.6</b>	<b>235.8</b>	<b>4,790.3</b>
Rehabilitation	-	2,114.0	1,233.0	3,347.0
<b>Total</b>	<b>3,835.9</b>	<b>2,832.6</b>	<b>1,468.8</b>	<b>8,137.3</b>
<b>Non-land based offsets</b>				
Continuation of five year research programme by UNE for WSW (Stage I)				
Contribution of additional \$500,000 for Stage II research programme by UNE for WSW				
Preparation of recovery plan for WSW				
Trials to rehabilitate and revegetate old sand quarry				
Contribution of up to \$500,000 to research into rehabilitation of ironbark communities				

Notes: <sup>#</sup> Strategic offsets of nominally 750 ha of woody vegetation will be secured within 12 months of project approval to the acceptance of OEH.

\* Total includes area of grassland and trees over grassland.

The offset package results in a ratio of approximately 6:1 of the area of woodland to be cleared (764.7 ha) in the form of woodland conserved in the long term (inclusive of the future strategic offsets and re-establishment of woodland on derived native grassland), which is more than double the ratio (2.5:1) provided in the EA and close to double the ratio (3.2:1) provided in the RTS. With the inclusion of the improvements made to the rehabilitation component where 2,114 ha of woodland will be rehabilitated (refer to Section 3.2.2), the overall ratio has increased to 8.7:1 from a previous overall ratio of 3.5:1 provided in the EA and 4.2:1 provided in the RTS. The ratio calculations are summarised below.

$$\begin{aligned}
 \text{Woodland ratio} &= (\text{total area of offset} \text{ minus } \text{total area of grassland} \text{ minus } \text{area of woodland rehabilitation}) \text{ divided by } \text{area of woodland clearing} \\
 &= (8,137.3 - 1,468.8 - 2,114.0) \div 764.7 \\
 &= 6:1
 \end{aligned}$$

$$\begin{aligned}
 \text{Overall woodland ratio} &= (\text{total area of offset} \text{ minus } \text{total area of grassland}) \text{ divided by } \text{area of woodland clearing} \\
 &= (8,137.3 - 1,468.8) \div 764.7 \\
 &= 8.7:1
 \end{aligned}$$

The development of the revised offset package has been undertaken in consultation with government, including DP&I and OEH. The State government agency responsible for biodiversity management in NSW, OEH, wrote to DP&I, by email, on 11 July 2011 and on 29 August 2011 stating that overall, they are supportive of the offset package, including the commitment to acquire 750 ha of woody vegetation in strategic offsets to the acceptance of OEH within 12 months of project approval.

## 2.4 Summary

This PPR formally outlines the proposed changes to the Warkworth Extension Project. The majority of these changes relate to the proposed offset package designed to mitigate against biodiversity impacts associated with the clearing of woodland. As discussed in Chapter 3, it is clear that the revised offsets package will more than compensate for the losses of vegetation and habitat caused by the proposed Warkworth Extension project. In confirmation of this, OEH had given its overall support to the package.

The offset package results in a ratio of approximately 6:1 for woodland conserved in the long term (inclusive of the future strategic offsets), which is more than double the ratio (2.5:1) provided in the EA and close to double the ratio (3:2.1) given in the RTS. With the inclusion of the improvements made to the rehabilitation component (refer to Section 3.2.2), the overall ratio has increased to 8.7:1 from a previous overall ratio of 3.5:1 provided in the EA and 4.2:1 provided in the RTS.

An economic assessment was undertaken of the proposed Warkworth Extension and reported in the EA. It examined the proposal in two ways: comparing the social, environmental and economic benefits with its costs, and determining the project’s economic stimulus in the region.

The benefit cost analysis considered measurable positive and negative outcomes from the proposal and concluded that there would be substantial net social, environmental and economic benefit to society from the proposal, estimated at \$1,862M over its life. This means that the benefits of the proposed Warkworth Extension significantly out-weigh the costs and the project is clearly in the public interest.

The economic assessment indicated that the large investments necessary to realise the proposed Warkworth Extension project in construction, operation and additional employment would provide a substantial stimulus to the region’s economy. Over its life, the proposed Warkworth Extension project would produce an additional \$16,754M in regional output or general business turnover, taking into account both direct and indirect effects. It would also provide 44,675 jobs to the region over the life of the project where a ‘job’ is defined as full-time employment for a person for at least one year. Royalty payments to the NSW government were estimated at \$679M based on the current State Government royalty rates. The economic benefits of the proposal to the economy generally would therefore be considerable.

A summary of the key components of the proposed Warkworth Extension (as outlined in Section 5 of the EA) and improvements made to the project since the exhibition of the EA is provided in Table 2.2 below.

Project Component	EA	PPR*
Mining	Approval is sought to extend operations at Warkworth Mine for 21 years	No change
	Extending the two main pits at Warkworth Mine (North and West pits) to the west	No change
	Continuation of maximum production rate (18 Mtpa of ROM)	No change
	Continuation of maximum capacity of the Warkworth CPP (13 Mtpa)	No change
	Continuation of integrated management systems for rejects and water	No change
Rehabilitation	Completion, filling and rehabilitation of other smaller pits (CD, South and Woodlands pits)	No change
Final landform	Rehabilitation of 781 ha of EEC woodland	Rehabilitation of 2,114 ha of EEC woodland

Project Component	EA	PPR*
Overburden	communities, approximately 218 ha of trees over grass and 1,313 ha of grassland communities	communities, approximately 305 ha of trees over grass and 928 ha of grassland communities
	Transfer of overburden and coal, between Warkworth Mine and Mount Thorley Mine	No change
Equipment	Average overburden emplacement height of 160 m RL at Warkworth and 155 m RL at Mount Thorley Mine	No change
	Progressive replacement of the aging equipment fleet to allow for improved mining efficiencies	A programme of fitting attenuation packages on some existing Warkworth and Mount Thorley Mines haul fleet has also been developed: <ul style="list-style-type: none"> <li>• 40% of truck fleet will be attenuated by end of Year 1</li> <li>• 50% of truck fleet attenuated by end of Year 2</li> <li>• 60% of truck fleet attenuated by end of Year 5</li> <li>• 80% of truck fleet attenuated by end of Year 6</li> </ul>
Infrastructure	Upgrading of some support infrastructure	No change
Wallaby Scrub Road	Preferred option of closure of Wallaby Scrub Road, however would relocate if required to by government	No change
Interaction with Mount Thorley Mine	Continuing the life of the Mount Thorley CPP (at maximum capacity) and other infrastructure at Mount Thorley Mine currently used as part of the integrated MTW operations beyond expiry of the Mount Thorley development consent in 2017	No change
Land based 'direct' offset package	Long term protection of: <ul style="list-style-type: none"> <li>• Northern Biodiversity Area (342.2 ha)</li> <li>• Southern Biodiversity Area (718 ha)</li> <li>• Goulburn River Biodiversity Area (1,299.3 ha)</li> </ul>	Long term protection of: <ul style="list-style-type: none"> <li>• Northern Biodiversity Area (342.2 ha)</li> <li>• Southern Biodiversity Area (977.5 ha)</li> <li>• Goulburn River Biodiversity Area (1,299.3 ha)</li> <li>• Putty Biodiversity Area (378.8 ha)</li> <li>• Seven Oaks Biodiversity Area (522.7 ha)</li> <li>• Bowditch Biodiversity Area (519.8 ha)</li> <li>• Further strategic offsets of 750 ha of woody vegetation to be acquired to the satisfaction of OEH</li> </ul>
Non-land based 'indirect' offset package	<ul style="list-style-type: none"> <li>• Continuation of five year research programme by UNE for WSW (Stage I)</li> </ul>	<ul style="list-style-type: none"> <li>• Continuation of five year research programme by UNE for WSW (Stage I)</li> <li>• Preparation of recovery plan for WSW</li> <li>• Contribution of additional \$500,000 for Stage II research programme by UNE for WSW</li> <li>• Trials to rehabilitate and revegetate old sand quarry</li> <li>• Contribution of up to \$500,000 to research into rehabilitation of ironbark communities</li> </ul>

\*This includes all offers made in the RTS

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## 3 Ecology

### 3.1 Introduction

Since the lodgement of the RTS with DP&I, a consultant review of ecology was undertaken by Mr Travis Peake from Umwelt Australia. Mr Peake submitted a series of information requests to assist in his review and each has been responded to with several responses containing information about ecology aspects of the project.

The sections below provide a summary of the principal changes to the ecological components of the project since the exhibition of the EA and the RTS.

### 3.2 Compensatory offset package

As described in Section 2, the compensatory offset package has been modified to increase the long term conservation values and biodiversity outcomes resulting from the project. The package has been modified in three key areas, with these being:

- an increase in the number of properties to be included within biodiversity management areas;
- an increase in area of rehabilitation to Woodland, mainly Ironbark-Grey Box-Spotted Gum vegetation communities, in the rehabilitated areas of mined lands; and
- an increase in the contribution to indirect offsetting mechanisms including research programmes regarding the re-establishment of vegetation communities subject to clearing.

The sections below describe these changes to the ecological compensatory measures for the project since the preparation of the EA through to the final package.

#### 3.2.1 Biodiversity management areas

##### i Environmental Assessment

The compensatory offset package that formed part of the exhibited EA comprised the following areas that provided long term protection of biodiversity including:

- Northern Biodiversity Area;
- Southern Biodiversity Area; and
- Goulburn River Biodiversity Area.

The abovementioned biodiversity management areas nominated in the EA provide for the long term protection and enhancement of some 1,917.2 ha of vegetation, including 1,226 ha of endangered ecological communities (EECs). The proposed biodiversity management areas provide significant proportion of like-for-like woodland to conservation in the vicinity of Warkworth mine and surrounds at a ratio of 2.5:1, including a ratio of 1.6:1 of EECs. The rehabilitation area provided a further 780.6 ha of woodland within mined lands which would provide long term offsets of 2,697.8 ha in total which would provide an additional 1:1 of offsets, therefore providing a total long-term offset ratio of 3.5:1.

## ii Response to Submissions

In recognition of feedback received during the public exhibition period, the proponent undertook further exhaustive searches for offset lands. An additional 901.5 ha of forest and open woodlands (including areas that will regenerate over time and be returned to forest and open woodland) were proposed to be added to the compensatory offset package to increase the habitat values for the threatened birds predicted to be impacted by the project following feedback from the Commonwealth Department of Sustainability, Water, Environment, Population and Communities (DSEWPC). These additions were described in the RTS report and comprised of the following biodiversity management areas:

- Putty Biodiversity Area; and
- Seven Oaks Biodiversity Area.

Within the RTS compensatory offset package, significant areas of re-establishment of vegetation were also included. These were:

- re-establishment of some 12.2 ha of grassland to woodland within Putty Biodiversity Areas; and
- re-establishment of some 168.7 ha of grassland to woodland within Seven Oaks Biodiversity Areas.

The Goulburn River Biodiversity Area, together with the two additional biodiversity management areas of Putty and Seven Oaks are considered strategic regional offsets, and were carefully selected for a number of reasons:

- they contain freehold land containing a mixture of remnant vegetation and native vegetation with regeneration potential. These lands with the proposed change of land use and management from grazing to conservation provide current and long term potential regenerating habitat for native fauna;
- they are strategically linked to national parks and nature reserves and to conservation initiatives such as the Great Eastern Ranges Initiative (GERI);
- they are located in a critical area of the state where climate change is anticipated to impact and will provide a transition zone especially along the 17km of riparian vegetation, for threatened fauna and non threatened fauna to move from the central western region of the state toward the east as climate change dries the inner areas; and
- they do not contain mining tenements and are not as threatened by future growth of State significant industries as other lands considered.

Based on the above additions to the offset package a ratio of 3.2:1 for woodland conserved resulted, being an increase of 0.7:1 over that given in the EA. This ratio represented an overall ratio of 4.2:1 including rehabilitation of mined lands to woodland.

## iii Final composition of biodiversity offsets

Since the RTS and following detailed discussions with DP&I and OEH, further additions have been made to the compensatory offset package. The discussions with government agencies focussed on the offsetting requirements on the EECs impacted from the project; principally Central Hunter Grey Box Ironbark woodland (inclusive of Spotted Gum) and WSW.

The key additions to the compensatory offset package resulting from these discussions to address these EECs are listed below:

- inclusion of an additional property (known as Springwood) acquired by the proponent at a substantial premium to be included as part of the Southern Biodiversity Area, consisting of:
  - provision of an additional 18.1 ha of WSW;
  - provision of an additional 22.4 ha of Central Hunter Grey Box Ironbark woodland;
  - re-establishment of an additional 5.8 ha of WSG to WSW; and
  - re-establishment of an additional 54.1 ha of derived native grassland to Central Hunter Grey Box Ironbark woodland.
- inclusion of 7.1 ha of WSW from within the Buffer Lands within the Southern Biodiversity Area;
- inclusion of additional parcels of land (known as Areas 1, 2 and 3) from within the Mining Lease that will not be subject to open-cut mining and will now be conserved in the long term within the Southern Biodiversity Area:
  - provision of an additional 57.4 ha of Central Hunter Grey Box Ironbark woodland; and
  - re-establishment of an additional 83.7 ha of derived native grasslands to Central Hunter Grey Box Ironbark woodland.
- inclusion of the Bowditch Biodiversity Area, which includes:
  - provision of 517.5 ha of woodland, including 18.8 ha of Hunter Lowlands Red Gum Forest EEC;
  - re-establishment of 2.3 ha of derived native grassland to Narrow leaved Ironbark woodland.
- inclusion of additional strategic offset properties for long term protection of 750 ha of woody vegetation. These offsets shall be secured within 12 months of project approval to the acceptance of OEH.

The above additional components are contained within the Statement of Commitments in Appendix H.

In summary, the total compensatory offset for the long term protection and enhancement of biodiversity values is summarised in Table 3.1 and a breakdown of the EECs protected is provided in Table 3.2. The biodiversity areas included within the final offset package are shown in Figure 3.1. The Southern Biodiversity Area inclusive of the additions since the EA is shown in Figure 3.2.

**Table 3.1 Summary of biodiversity areas**

Area	Existing woodland (ha)	Re-establishment or rehabilitation of woodland (ha)	Grassland (ha)	Total (ha)
Southern Biodiversity Area	661	316.5	-	977.5
Northern Biodiversity Area	123.3	218.9	-	342.2
Goulburn River Biodiversity Area	1,063.5	-	235.8 (EEC)	1,299.3
Putty Biodiversity Area	366.6	12.2	-	378.8
Seven Oaks Biodiversity Area	354	168.7	-	522.7
Bowditch Biodiversity Area	517.5	2.3	-	519.8
Strategic offsets <sup>#</sup>	750	-	-	750 <sup>#</sup>
<b>Total</b>	<b>3,835.9</b>	<b>718.6</b>	<b>235.8</b>	<b>4,790.3</b>

Notes: # Further additional strategic offsets of 750 ha woody vegetation will be secured within 12 months of project approval to the acceptance of OEH.

Based on the package outlined in Table 3.1 above, the final compensatory offset package results in a ratio of approximately 6:1 of the area of woodland to be cleared (764.7 ha) in the form of woodland conserved in the long term (inclusive of the future strategic offsets and re-establishment of woodland on derived native grassland), which is close to double the ratio (3:2.1) given in the RTS. With the inclusion of the significant additional commitment made to increase the area of rehabilitation (2,114 ha of woodland EEC, refer to Section 3.2.2), the overall ratio has increased to 8.7:1 from a previous overall ratio of 4.2:1.

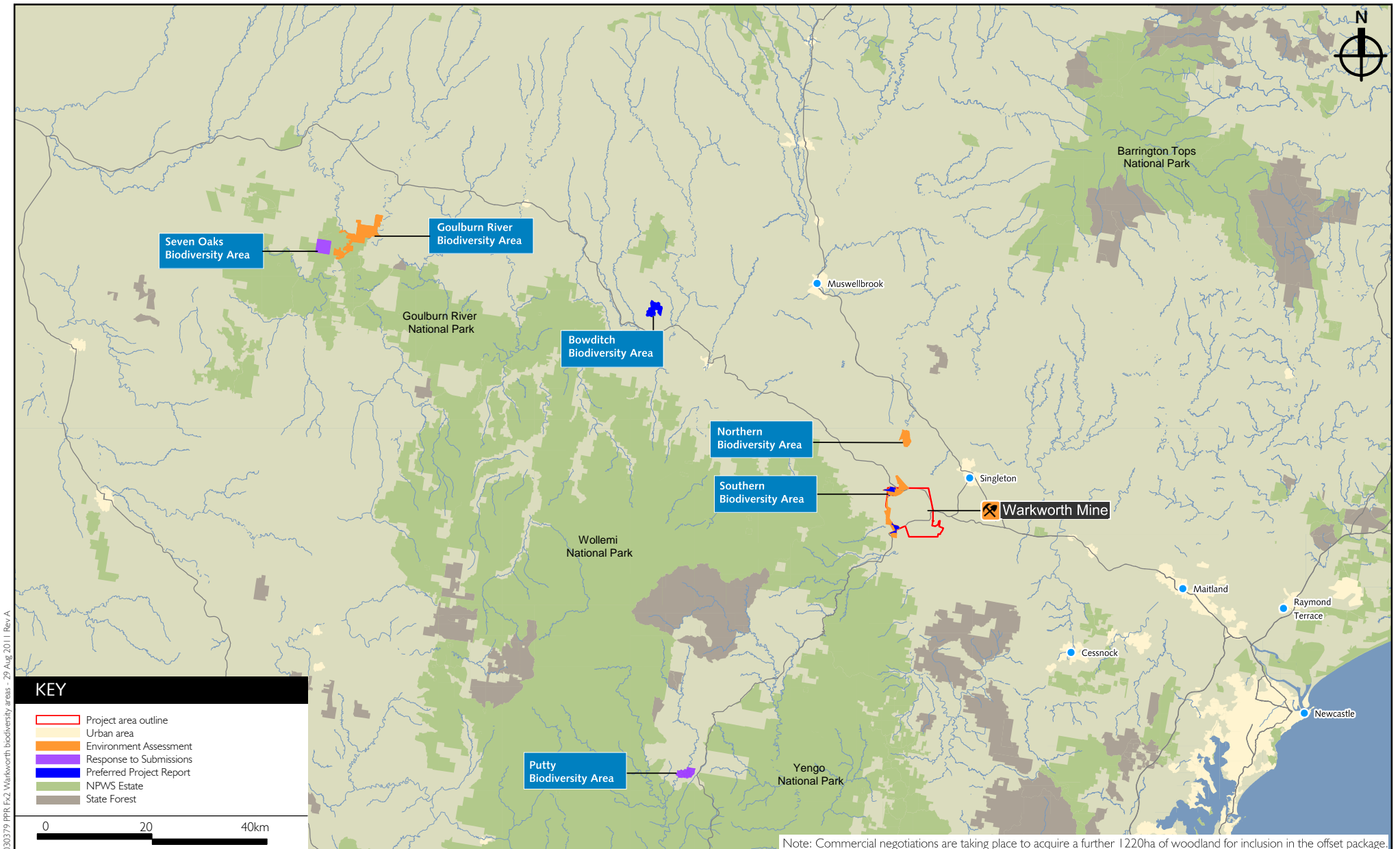
**Table 3.2 Summary of EECs within biodiversity areas**

Area	Existing woodland EEC (ha)	Re-establishment of woodland EEC (ha)	Total (ha)
Southern Biodiversity Area	634.8	316.5	951.3
Northern Biodiversity Area	123.3	218.9	342.2
Goulburn River Biodiversity Area	337.1	-	337.1
Putty Biodiversity Area	-	-	-
Seven Oaks Biodiversity Area	-	-	-
Bowditch Biodiversity Area	18.8	-	18.8
Strategic offsets <sup>#</sup>			
<b>Total</b>	<b>1,114</b>	<b>535.4</b>	<b>1,649.4</b>

Notes: # Further additional strategic offsets of 750 ha woody vegetation will be secured within 12 months of project approval to the acceptance of OEH.

In terms of EECs (refer to Table 3.2), the final offset package results in a ratio of 1.5:1 for affected endangered woodland communities and 4.9:1 when re-establishment within the biodiversity management areas and rehabilitation of mined lands is included (see below). Depending upon the woodland vegetation contained in the strategic offsets, these ratios may increase.

$$\begin{aligned}
 \text{EEC ratio} &= \text{total area of existing woodland EEC} \div \text{area of woodland EEC clearing} \\
 &= 1,114 \div 764.7 \\
 &= 1.5:1
 \end{aligned}$$



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