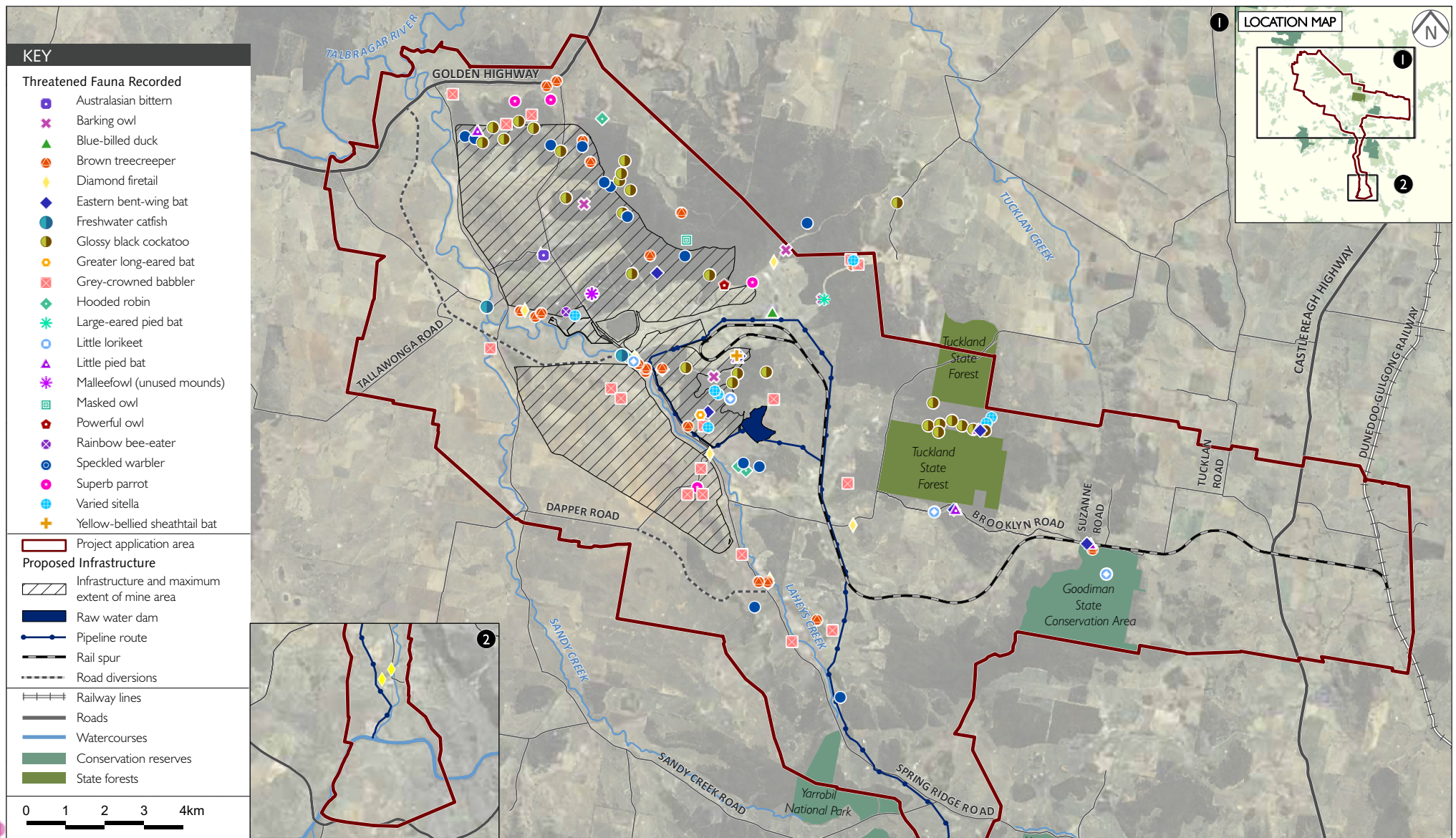




Threatened Fauna Species of the PAA  
Cobbora Coal Project - Environmental Assessment  
Figure 10.9

### 10.4.2 Mitigation

A biodiversity management plan will be prepared that details measures to minimise the potential impacts on terrestrial and aquatic biodiversity. It will include adaptive management measures, including monitoring (see Section 10.6), to manage, protect and enhance vegetation and fauna habitat within the mine area and its surrounds. A rehabilitation management plan will also be prepared for the Project to detail the progressive rehabilitation methods according to the rehabilitation strategy (Appendix F 'Mine rehabilitation strategy'). The key management measures are described below.

#### i Mitigation measures – operation

Mitigation measures to minimise biodiversity impacts during operations will include the following:

- before any native vegetation is cleared, an experienced ecologist will complete pre-clearing surveys to identify trees occupied by fauna or that provide fauna habitat, as well as any threatened flora species;
- native vegetation to be retained will be demarcated on site as a 'no-go' zone for clearing and operations;
- weed control will be undertaken in retained vegetation and rehabilitated areas;
- a two-stage clearing protocol will be adopted where non-habitat trees are cleared 24 hours before any habitat trees are cleared, to allow fauna time to move out of an area;
- experienced fauna rescue personnel will be engaged where any habitat trees are to be cleared and will be present during any habitat tree clearing works;
- native, locally sourced seed will be used for rehabilitation activities, where possible;
- clearing works will coincide with tree seeding to maximise seed collection activities, where possible;
- clearing footprints will be minimised during staged clearing works and mined areas will be progressively rehabilitated;
- clearing zones will be demarcated to restrict access to retained vegetation during staged clearing;
- habitat features important to threatened fauna species will be retained and stored for reinstatement within rehabilitated areas;
- habitat features, such as large logs and rocks from cleared areas, will be relocated to rehabilitated areas;
- methods to mitigate the loss of hollow-bearing trees (eg installing nest boxes) and the loss of rocky outcrops (eg installing artificial cave roosts) will be investigated and implemented during the early stages of clearing for the Project;
- methods will be formulated and implemented to minimise potential introduction and spread of soil pathogens and disease before clearing;

- road kill will be monitored on access roads during operation with appropriate actions taken if it is found to be causing a substantial increase in wildlife road kill;
- identified habitat links severed for the Project will be reconnected as part of the rehabilitation;
- feral animal management will be used in areas surrounding the progressive clearing and rehabilitation areas, in coordination with local NPWS and State Forests;
- planting guides are to be prepared for all rehabilitation areas, including species lists and recommended planting densities;
- topsoil in cleared areas will be managed to preserve soil seed banks in areas containing native vegetation for progressive rehabilitation;
- light use will be minimised near remnant habitat areas to prevent light spill;
- monitor dust deposition in areas containing Ingram's zieria, which are to be retained, with appropriate actions taken if it is found to be affecting plant health;
- the controlled release of clean water (see Chapter 8 'Surface water') may be used to maintain water levels in persistent pools along Laheys and Sandy creeks if these are reduced by groundwater drawdown; and
- if hydrological and ecological monitoring of persistent pools indicates that impacts to freshwater catfish are likely to occur and that these impacts will not be mitigated by the controlled release of clean water, compensation measures for the loss of habitat will be provided.

## ii Mitigation measures – construction

Mitigation measures to minimise biodiversity impacts during construction will include the following:

- fauna fencing or mitigation structures (eg underpasses), as required, are to be installed during construction; and
- coffer dams are to be used for any in-stream works and these areas revegetated in accordance with the rehabilitation strategy.

The requirements for progressive clearing works during operations discussed in Section 10.4.2, will also be incorporated into during construction where clearing is required.

## 10.5 Impacts

### 10.5.1 Ecological communities

Up to 1,867 ha of woodland vegetation and 1,640 ha of grasslands will be directly disturbed by the Project. The majority of vegetation to be removed is within the proposed mining areas. Some smaller areas occur along the road diversions, pipeline route and rail spur corridor. This is 20% of the vegetation within the PAA and 7% of the non-reserved native vegetation within the Talbragar Catchment Management Area sub-region (clipped to the Dubbo 1:250,000 map sheet) (Table 10.5).

Progressive clearing in the Project footprint will mean that only a proportion of the total vegetation will be removed at any one time. Progressive rehabilitation will reinstate more than 2,200 ha of woodland representative of the existing vegetation types, and 1,700 ha of pasture. The area of woodland vegetation in the PAA will be maintained and increased in the long term as a result of the rehabilitation program and the implementation of the offset strategy (see Section 10.7).

**Table 10.5 Vegetation clearing for the Project by vegetation type**

| Vegetation community                                    | Biometric vegetation type (and code)                                                                                                      | TEC                          | Area to be cleared (ha) | Percent of vegetation type to be removed in the PAA |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------|-----------------------------------------------------|
| Blue-leaved Ironbark Woodland                           | W115 Blue-leaved Ironbark woodland on sandy uplands and slopes of the Darling Riverine Plains Bioregion                                   | -                            | 1,018                   | 19%                                                 |
| Box Gum Grassy Woodland                                 | CW112 Blakely's Red Gum – Yellow Box grassy woodland of the NSW South Western Slopes Bioregion                                            | Box Gum Woodland EEC         | 7                       | 1%                                                  |
| Cypress Pine Woodland                                   | CW107 Black Cypress Pine – Narrow-leaved Stringybark heathy woodland of the southern Brigalow Belt South Bioregion                        | -                            | 191                     | 39%                                                 |
| Dwyer's Red Gum Woodland                                | CW133 Dwyer's Red Gum – Currawang grassy mid-high woodland of central NSW                                                                 | -                            | 83                      | 64%                                                 |
| Fuzzy Box Woodland                                      | CW138 Fuzzy Box – Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion       | Fuzzy Box Woodland EEC       | 13                      | 10%                                                 |
| Grey Box Woodland                                       | CW145 Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions        | Inland Grey Box Woodland EEC | 54                      | 8%                                                  |
| Mugga Ironbark Grey Box Woodland                        | CW155 Mugga Ironbark – Inland Grey Box – pine tall woodland of the NSW South Western Slopes Bioregion                                     | -                            | 1                       | 2%                                                  |
| Red Stringybark Woodland                                | CW177 Red Stringybark woodland of the dry slopes of the South Western Slopes Bioregion                                                    | -                            | 22                      | 2%                                                  |
| Regrowth                                                | CW115 Blue-leaved Ironbark woodland on sandy uplands and slopes of the Darling Riverine Plains Bioregion                                  | -                            | 365                     | 45%                                                 |
| Rough-barked Apple Woodland                             | CW111 Blakely's Red Gum – Rough-Barked Apple flats woodland of the NSW western slopes                                                     | Box Gum Woodland EEC         | 5                       | 2%                                                  |
| Scribbly Gum Open Forest                                | CW176 Red Stringybark – Scribbly Gum – Red Box – Long-leaved Box shrub – tussock grass open forest the NSW South Western Slopes Bioregion | -                            | 5                       | 100%                                                |
| Slaty Gum Woodland                                      | CW191 Slaty Gum woodland of the slopes of the southern Brigalow Belt South Bioregion                                                      | -                            | 103                     | 12%                                                 |
| <b>Total clearing for remnant woodland and regrowth</b> |                                                                                                                                           |                              | <b>1,867</b>            | <b>-</b>                                            |
| Native Pasture in low condition                         | Does not meet any vegetation types                                                                                                        | -                            | 967                     | 32%                                                 |

**Table 10.5**      **Vegetation clearing for the Project by vegetation type (Cont'd)**

| <b>Vegetation community</b>               | <b>Biometric vegetation type (and code)</b> | <b>TEC</b> | <b>Area to be cleared (ha)</b> | <b>Percent of vegetation type to be removed in the PAA</b> |
|-------------------------------------------|---------------------------------------------|------------|--------------------------------|------------------------------------------------------------|
| Introduced Pasture/Disturbed (non-native) | Does not meet any vegetation types          | -          | 1,796                          | 26%                                                        |

Of the vegetation to be cleared, 79 ha are TECs. This includes 13 ha of Box Gum Woodland (incorporating Box Gum Grassy Woodland, Blakely's Red Gum Woodland and Rough-barked Apple Woodland vegetation types), 12 ha of Fuzzy Box Woodland and 54 ha of Inland Grey Box Woodland (Table 10.5). TECs account for about 4% of the total native vegetation to be cleared. Assessments of significance for these communities, done in accordance with Section 5A of the EP&A Act, have found this impact is significant but will be compensated through the biodiversity offset strategy (see Section 10.7).

Areas containing the lowland Darling River aquatic TEC (Talbragar River and Sandy and Laheys creeks) will not be directly disturbed by the Project. However, indirect impacts from altered hydrology may impact the aquatic TEC. Hydrological modelling shows changes to flow volumes in Sandy Creek ranging from an increase of 12% to 17% to a decrease ranging from 0.7% to 4.6% (Appendix E 'Surface water assessment') during the operation of the Project. Potential reduced flows are considered to be minor within a system that has highly variable flows from alterations to surface water flows. Further impacts are likely when coupled with any groundwater drawdown in the alluvium, which has a weak connection with the deeper aquifer systems that will be impacted by the project (see Appendix D 'Groundwater assessment'). Alluvial aquifers feed persistent pools and provide refuge to fauna that are part of the aquatic TEC. However, such impacts are not considered to be significant in accordance with Section 5A of the EP&A Act, for the aquatic TEC, given the mitigation measures proposed for the Project.

### 10.5.2 Groundwater dependent ecosystems

#### i Terrestrial vegetation

Only 2 ha of woodland that may opportunistically use groundwater (of the 4.5 ha mapped where the alluvium is within 3 m of the surface) occurs within the potential groundwater drawdown zone (Appendix D 'Groundwater assessment'). If groundwater availability is reduced in these areas as a result of the Project, impacts on terrestrial vegetation in these areas are not likely to be significant due to the likely opportunistic use of this resource by the vegetation.

#### ii Base flow to streams

There appears to be some connection of the persistent pools along Sandy Creek, Laheys Creek and the Talbragar River with the alluvium aquifer where it occurs. These persistent pools are considered to be GDEs where alluvium is close to the surface (Appendix D 'Groundwater assessment'). Where these occur within the potential groundwater drawdown zone, it is likely that there will be impacts on groundwater base flow into these pools (Appendix D 'Groundwater assessment'). This may increase drying events during operation of the Project, particularly when coupled with reduced surface water runoff into the waterways.

Increased drying events may impact on these drought refuges that provide habitat for macroinvertebrates and fish. However, as these pools naturally dry out during extended dry periods, the species that inhabit these areas are already tolerant of such impacts. Other drought refuges also occur in the locality outside of the potential groundwater drawdown zone, and controlled releases of clean water may be used to maintain the persistent pools of the PAA if significant impacts are identified during operation of the Project (as per the monitoring program outlined in Section 10.6).

### 10.5.3 Threatened flora

Four threatened flora species recorded within the PAA will be directly impacted by the Project. Impacts to Ausfeld's Wattle are not considered to be significant in accordance with Section 5a of the EP&A Act, given that only 0.4% of the local known population will be directly impacted. The Threatened Species Profile Database shows that this species can only withstand a loss of five individuals within the Central West CMA. However, impacts as a result of the Project are considered to be minimised by the high abundance of the species within the study area. While a significant impact is not considered likely for this species, impacts will still be compensated within the Biodiversity Offset Strategy.

Significant impacts are likely for Ingram's Zieria, *Homoranthus darwinioides* and *Tylophora linearis*, as the Project will remove between 58%, 53% and 100% respectively of the locally identified populations (Table 10.6). This loss will be compensated through biodiversity offsets (see Section 10.7). Biodiversity offsets will include:

- the identification, protection and management of additional populations of these species, where possible within the offset sites;
- the investigation of translocation and/or propagation of plants to be introduced into offset areas; and
- funding for conservation management in the region where land-based offsets are not available.

**Table 10.6 Threatened species directly impacted by the Project**

| Species or community                         | Status  |          | Number to be removed                 | Percent of identified individuals removed from the PAA |
|----------------------------------------------|---------|----------|--------------------------------------|--------------------------------------------------------|
|                                              | TSC Act | EPBC Act |                                      |                                                        |
| Ausfeld's wattle ( <i>Acacia ausfeldii</i> ) | V       | -        | 200 individuals in 1 sub-population  | 5%                                                     |
| Ingram's zieria ( <i>Zieria ingramii</i> )   | E       | E        | 551 individuals in 8 sub-populations | 51%                                                    |
| <i>Tylophora linearis</i>                    | V       | E        | 9 individuals in 2 sub-populations   | 100%                                                   |
| <i>Homoranthus darwinioides</i>              | V       | V        | 10 individuals in 1 sub-population   | 5%                                                     |

Note: 1. TSC Act – Threatened Species Conservation Act 1995 (NSW), EPBC Act – Environment Protection and Biodiversity Conservation Act 1999 (Cth), V – vulnerable, E – endangered.

#### 10.5.4 Threatened fauna

Thirty nine threatened fauna species, of which 20 were recorded in the PAA, may be directly or indirectly impacted by the Project. Due to the progressive removal of foraging and breeding habitat, significant impacts in accordance with Section 5A of the EP&A Act are likely for:

- forest owls: barking owl, masked owl and powerful owl;
- woodland birds: brown treecreeper, diamond firetail, glossy black-cockatoo, grey-crowned babbler, hooded robin, speckled warbler and varied sittella; and
- microbats: southern long-eared bat and yellow-bellied sheath-tail bat, large-eared pied bat, little pied bat.

These species are associated with the PAA's woodland areas, depending on habitat resources such as hollow-bearing trees and cliff-lines. Progressive rehabilitation during mining will include replanting woodland habitat, the reinstatement of habitat features, such as fallen timber and rock salvaged during clearing, and methods to compensate for the loss of hollow-bearing trees. This will help bird and bat species to maintain territories in the locality, by providing habitat features in the medium to long term.

Habitat resources also occur outside the disturbance footprint, with abundant similar habitat available in the proposed offset areas next to the Project area. In addition, large areas of contiguous vegetation occur for these species in nearby conservation areas in the PAA and the locality, including Goonoo SCA and the Goulburn River NP. Offsets will aim to improve the connectivity of conservation areas and the quality of remnant vegetation within the locality and region. This will potentially increase movement corridors for genetic exchange, foraging habitat and increase breeding resources for threatened fauna species.

Due to the indirect impacts on natural flow regimes and aquatic drought refuge, significant impacts in accordance with Section 5A of the EP&A Act are likely for freshwater catfish.

The waterways of the PAA are largely ephemeral, with small isolated pools that sustain small populations of the freshwater catfish. As the Project may result in more frequent drying in pools during operation, there may be a temporary loss of this species within Sandy and Laheys creeks.

The design and layout of mining areas have been altered to minimise impacts on the creeks. The current Project design avoids creek diversions, which were originally proposed, substantially reducing potential impacts to this species. In addition, mitigation measures to increase water flow in the lower reaches of Sandy and Laheys creeks through freshwater releases during operations, will minimise potential impacts to this species.

#### i Key threatening processes

The Project is likely to result in key threatening processes listed under the TSC Act and EPBC Act, including alteration to the natural flow regime of streams and their floodplains, bush rock removal, clearing of native vegetation and loss of hollow-bearing trees. Potential impacts on threatened species as a result of key threatening processes will be minimised through implementing the environmental management measures (see Section 10.4 and 10.7).

## ii Habitat corridors

The largest local habitat corridor extends along the north-eastern side of the PAA (Figure 10.10). This corridor has the potential to link Cobbora SCA and Goonoo SCA in the north-west, through Tuckland State Forest and Goodiman SCA, to Yarrobil National Park in the south-east of the PAA (Figure 10.10). However, the corridor contains agricultural areas and disturbance in a number of locations. The Project will encroach on the edge of the corridor area; however, it will not fragment any existing linked areas. The rehabilitation strategy and biodiversity offset strategy will improve the connectivity and quality of habitat within this identified corridor (see Section 10.7).

Minor habitat corridors along the northern part of Spring Ridge Road and in an east-west direction across the PAA may be impacted temporarily as a result of the Project (Figure 10.10). Progressive clearing and rehabilitation of native vegetation in these areas will minimise impacts to these corridors over the life of the Project. The offset strategy will improve the connectivity and quality of habitat in the locality.

## iii Critical habitat

Critical habitat has not been declared under the TSC Act or EPBC Act for any species, population or community that occurs in the PAA. Critical habitat has been broadly defined in the draft NSW recovery plan for Box Gum Woodland (DECCW 2010b) as occurring on the moderate to highly fertile soils of the western slopes of NSW. The PAA occurs within this region and consequently all remnant areas identified as Box Gum Woodland EEC are considered critical habitat under the draft recovery plan.

The Project will rehabilitate disturbed areas with species indicative of this community. Areas of critical habitat for Box Gum Woodlands will also be included within offset sites, where remnants of the community will be rehabilitated, improved and protected.

### 10.5.5 Protected areas

The Project will not have any direct impacts on any protected areas reserved under the *National Parks and Wildlife Act 1974*, *Brigalow and Nandewar Community Conservation Area Act 2005*, or *Forestry Act 1916*. The *Guidelines For Developments Adjoining Land and Water Managed by the Department of Climate Change and Water* (DECCW 2010) were used to assess the proposed rail loop which is in proximity to the Goodiman SCA, and the pipeline which occurs near Yarrobil NP in some locations. Potential indirect impacts on biodiversity values in these areas as a result of the Project will be minimised through implementing the recommended environmental management measures. Management actions will be coordinated with the local National Parks and Wildlife Service and Forestry offices under the biodiversity management plans to ensure consistency with current management techniques.

## i Impacts to matters of National Environmental Significance

Matters of NES identified within the PAA include threatened ecological communities, plants, birds, bats, and migratory species. Two EPBC Act-listed TECs will be impacted by the Project:

- 54 ha of Grey Box Grassy woodlands and Derived Native Grasslands of South-eastern Australia; and
- 12 ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The Project is also likely to result in significant impacts for EPBC Act-listed Ingram's zieria, *T. linearis* and *H. darwinioides*. Significant impacts are also likely for the large-eared pied bat and southern long-eared bat with the loss of 1,400 ha of foraging habitat. Potential roosting and breeding habitat constituting 16 km of cliff line will also be lost for the large-eared pied bat. Impacts to matters of NES are discussed further in Appendix H.

#### 10.5.6 Cumulative impacts

Cumulative impacts to biodiversity may result from the accumulation and interaction of impacts from past, present or future activities. The loss of native vegetation, habitat values and alteration to flow regimes in the PAA from the Project may combine spatially and temporally to result in cumulative impacts locally and within the region.

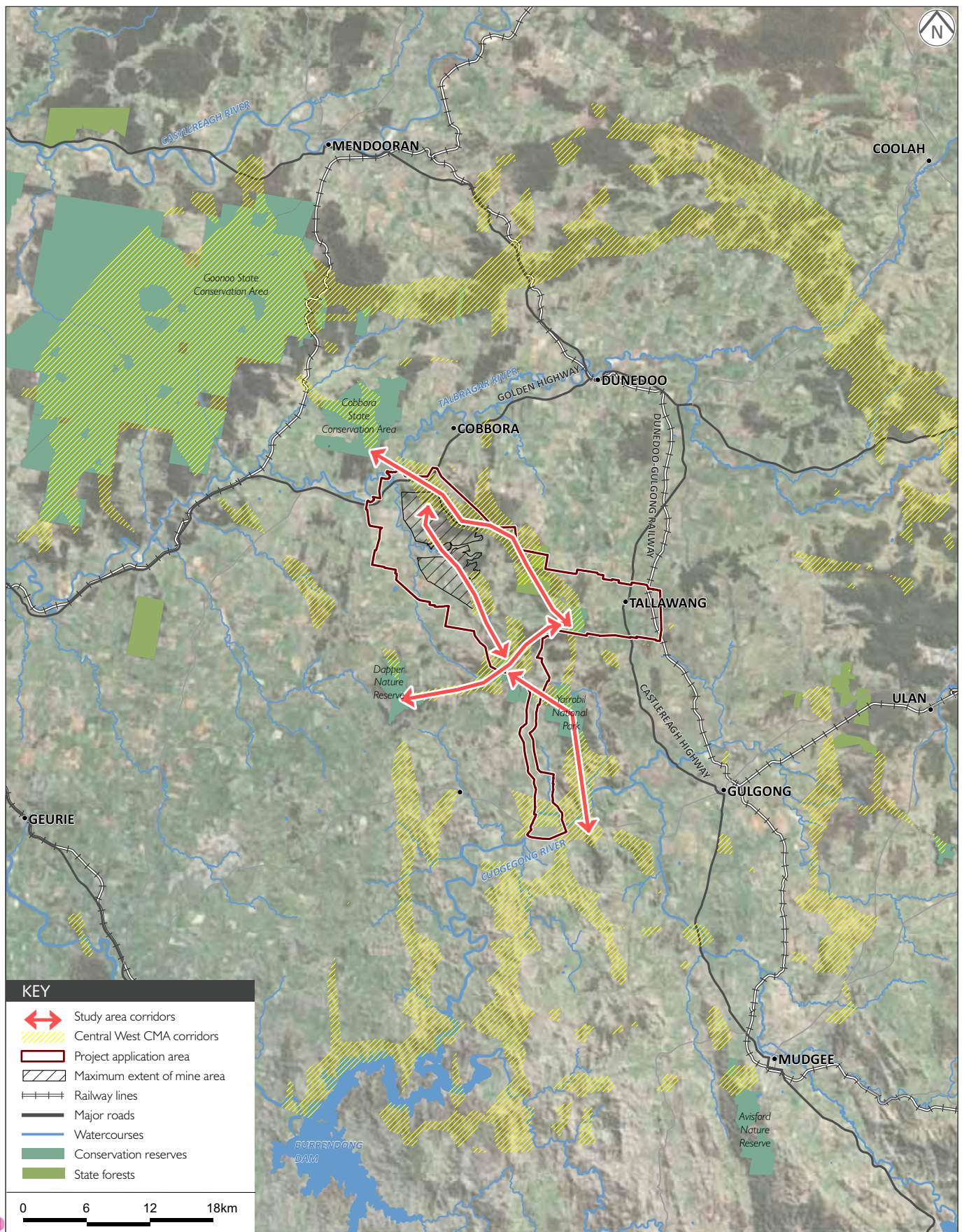
The Project occurs in an area that has been subject to historical clearing and disturbance as a result of agricultural activities. On a local scale, more than 60% of the PAA has been cleared of all native vegetation, with remaining areas in varying stages of regeneration or subjected to continue grazing and wood collection activities. Most of the higher conservation areas within the PAA and its surrounds have already been conserved under the *Brigalow and Nandewar Community Conservation Area Act*.

The areas disturbed by the Project will be rehabilitated and improved, with rehabilitated woodland areas comparable to existing conditions. The offset strategy will improve the quality of woodland between conservation areas and add to the amount of reserved vegetation in the area. Therefore potential negative local cumulative impacts will be temporary and small in comparison to the cumulative improvements as a result of the Project.

The Project occurs on the edge of a potential growth region for coal mining (Franks et al. 2010). Therefore impacts from the Project may accumulate with existing and future mining projects within the region, particularly for TECs, threatened flora and threatened fauna. However, the Project is also likely to have a beneficial cumulative impact through the investment in biodiversity offsets and rehabilitation efforts, which will add to the conservation network and to habitat corridors within the wider region.

### 10.6 Monitoring

Monitoring will allow for the adaptive management of biodiversity values during the life of the Project and beyond, focusing on rehabilitation works and threatened species, populations and communities in the PAA. The aim of biodiversity monitoring for the Project will be to determine the effectiveness of the mitigation and offset measures in the PAA and its surrounds and to adapt these if required. Monitoring will be detailed in the biodiversity management plan and will be based on quantitative measures with specific triggers to detect impacts on threatened species, populations and communities as a result of the Project. Contributions and partnerships to facilitate environmental education and research will be integrated into the Project where possible.



Habitat Corridors of the PAA and Surrounds

Cobora Coal Project - Environmental Assessment

Figure 10.10

## 10.7 Biodiversity offset strategy

Biodiversity offsets are required to compensate for impacts to threatened species, populations and communities and their habitats that cannot be avoided, minimised or mitigated by the Project. The offset strategy provides a framework for identifying and ranking offset requirements. The resultant offset package, which will be agreed with OEH and the SEWPaC when finalised, will ensure the Project results in a 'maintain or improve' or net gain outcome for biodiversity values in the region.

### 10.7.1 Offset principles

The biodiversity offset strategy was developed under the NSW *OEH Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, State Significant Development (SSD) and State Significant Infrastructure (SSI) projects* (the OEH policy) (Appendix H 'Terrestrial ecology assessment'). The strategy uses the Biobanking assessment methodology to quantify vegetation and habitat impacts. Biodiversity credits are used under this methodology to quantify the loss of biodiversity values as a result of a development, or gain in biodiversity values from offsetting.

The biodiversity offset strategy has also been developed in accordance with the principals within the Commonwealth *Draft Policy Statement: Use of Environmental Offsets under the EPBC Act* (DEWR 2007), the Commonwealth *Draft Environmental Offsets Policy* (SEWPaC 2011) and the *Principles for the use of biodiversity offsets in NSW* (OEH 2011a).

In line with the guiding offset principles, the Project offsets will:

- provide a net improvement in the quantity, quality and conservation of biodiversity values within the region in the medium to long term through:
  - rehabilitation and protection of woodland, particularly the Box Gum Woodland, Inland Grey Box Woodland and Fuzzy Box Woodland TECs; and
  - protection of threatened flora and fauna habitat and habitat features (eg hollow-bearing trees).
- provide long-term protection for threatened flora and fauna and TECs;
- improve vegetation and habitat connectivity between existing conservation areas within the locality; and
- protect areas identified as key corridors within the Central West Catchment Action Plan (CW CMA 2011) and as NPWS conservation priorities.

### 10.7.2 Offset strategy

In accordance with the OEH Policy and relevant offsetting principles, the key objectives of the biodiversity offset strategy are to:

- provide a minimum of 'like for like' land-based offsets representing a 'no net loss' outcome for red flags (TECs and over-cleared vegetation types identified within the OEH vegetation types database for the Central West CMA) and threatened flora species for which species credits have been identified, and TECs based on the BioBanking assessment requirements (Tier 2 'no net loss' outcome under the OEH Policy);

- provide a minimum of a negotiated 'mitigated net loss' outcome using the variation criteria within the OEH Policy 2:1 (offset to cleared area) ratio in land-based offsets for all other vegetation communities (negotiated Tier 3 'mitigated net loss' outcome under the OEH Policy); and
- ensure a minimum of 80% of offset requirements are being land-based offsets, with remaining offsets, including investment in key projects, aimed at threatened species management in the region and enhancement of land-based offsets.

The Project will cause impacts equivalent to 124,091 ecosystem credits according to the Biobanking calculator due to clearing of native vegetation communities in moderate to good condition. In addition, impacts on threatened species will cause impacts equivalent to 49,541 species credits. Thus the offset strategy will need to provide compensation by providing equivalent ecosystem and species credits in offset areas in accordance with the key objectives.

The offset strategy will result in up to 980 ha of TECs conserved, managed and enhanced in offset areas (based on preliminary calculations of likely offset requirements). Other vegetation types will be offset with a minimum 4,450 ha conserved in offset areas. These areas represent threatened fauna habitat. Project offsets for other vegetation types have been based on offset ratio of 3:1, which is higher than the required 2:1 ratio in the OEH Policy (using variation rules).

The OEH was consulted to ensure offsets are in line with regional conservation priorities. High priority areas have been identified within and surrounding the PAA, south of Goodiman State Conservation Area (SCA) outside the disturbance areas on CHC-owned land (Figure 10.11). Significant wildlife corridors will be created in such areas by the permanent dedication and management of CHC lands. The aim of on-site offsets will be to provide vegetated links to nearby conservation areas by protecting land that has no potential for coal mining (potential on-site offsets). These areas contain known habitat for a number of threatened species and ecological communities and create links between existing conservation areas and large areas of retained native vegetation.

### 10.7.3 Offset package

A total of 5,667 ha of CHC-owned land has been identified as biodiversity offset areas (Figure 10.11). These areas will be conserved in perpetuity to protect and enhance the ecological values present. The offsets include approximately 1,758 ha of pasture areas within the identified offset properties which will be rehabilitated to represent adjacent remnant vegetation. More than 458 ha of TECs have been identified within the CHC-owned offset sites and an additional 991 ha will be rehabilitated within the offset areas (Table 10.7).

Offsets will be protected using formal conservation agreements and potential dedication to the reserve network. An Offset Management Plan will be prepared to ensure biodiversity values are protected and enhanced. With the proposed compensatory measures outlined, the Project will improve the connectivity of remnant habitat within the locality.

Offset to impact ratios have been calculated for the TECs and for all vegetation to be impacted by the Project. The ratios achieved are considered adequate to compensate for impacts to the Box Gum Woodland EEC and Grey Box Woodland EEC, when compared with other recent offset precedents in the region. However, additional offsets are required to compensate for the loss of Fuzzy Box Woodland (Table 10.7). For this community, the offset to impact ratio for vegetation in moderate to good condition, including the proposed rehabilitation in offset areas is 2.6:1. Rehabilitation areas have been discounted to account for 50% of the area of good quality remnants for ratio calculations. It is considered that additional areas are required to increase this to at least 3:1 to be in line with other recent offset precedents.

**Table 10.7** Vegetation types identified in CHC-owned offset sites

| Vegetation                            | Area to be impacted (ha) | Area in offsets (ha) <sup>1</sup> | Area to be rehabilitated in offset areas (ha) (discounted value in brackets <sup>2</sup> ) | Offset to impact ratio including rehabilitation <sup>2</sup> |
|---------------------------------------|--------------------------|-----------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Box Gum Woodland EEC                  | 12                       | 347                               | 270 (135)                                                                                  | 40:1                                                         |
| Grey Box Woodland EEC                 | 54                       | 111                               | 684 (342)                                                                                  | 8.4:1                                                        |
| Fuzzy Box Woodland EEC                | 13                       | 0                                 | 37 (8.5)                                                                                   | 1.4:1                                                        |
| Other vegetation (mod–good condition) | 1,788                    | 3,451                             | 767 (383.5)                                                                                | 2.1:1                                                        |
| <b>Total</b>                          | <b>1,867</b>             | <b>3,909</b>                      | <b>1,758 (879)</b>                                                                         | <b>2.6:1</b>                                                 |

Note: 1. Does not include areas to be rehabilitated within the offset areas.

2. Rehabilitation areas have been discounted by 50% in the calculations of ratios

In accordance with the OEH Offset Policy, the biodiversity values of the identified offset areas have been calculated using the Biobanking assessment methodology to compare biodiversity credit outcomes. CHC is committed to aiming for a 'no net loss' outcome for red flag vegetation types, which includes TECs and over-cleared vegetation types.

A total of 7,954 ecosystem credits were generated by the Project for the seven red flag vegetation types to be impacted. The offsets generated a total of 26,393 ecosystem credits. This is triple the required credits when red flag vegetation types are combined, and represents a 'no net loss' outcome for all but one of these vegetation types, Fuzzy Box Woodland.

An additional 35,959 ecosystem credits were generated in the offset areas for other vegetation types not identified as red flags. These areas provide habitat for threatened species not identified as requiring species credits. The credits generated by the offsets do not meet the credits required to gain a 'no net loss' outcome. Therefore non red flag vegetation types will be offset according to a 'mitigated net loss' outcome under the Offset Policy. CHC is committed to a minimum offset to impact ratio of 3:1 for these vegetation types using the variation criteria in the Offset Policy.

Additions to the offset package are being negotiated to meet outstanding ecosystem credit requirements. The unsecured offsets represent an additional 1,543 ha adjacent to the Project. These areas will be surveyed from Spring to Summer 2012 for biodiversity values and are likely to contain similar values to the existing offset areas given their proximity. It is likely that the minimum ecosystem offsets are achievable with these proposed potential additions to the offset package.

## ii Threatened species

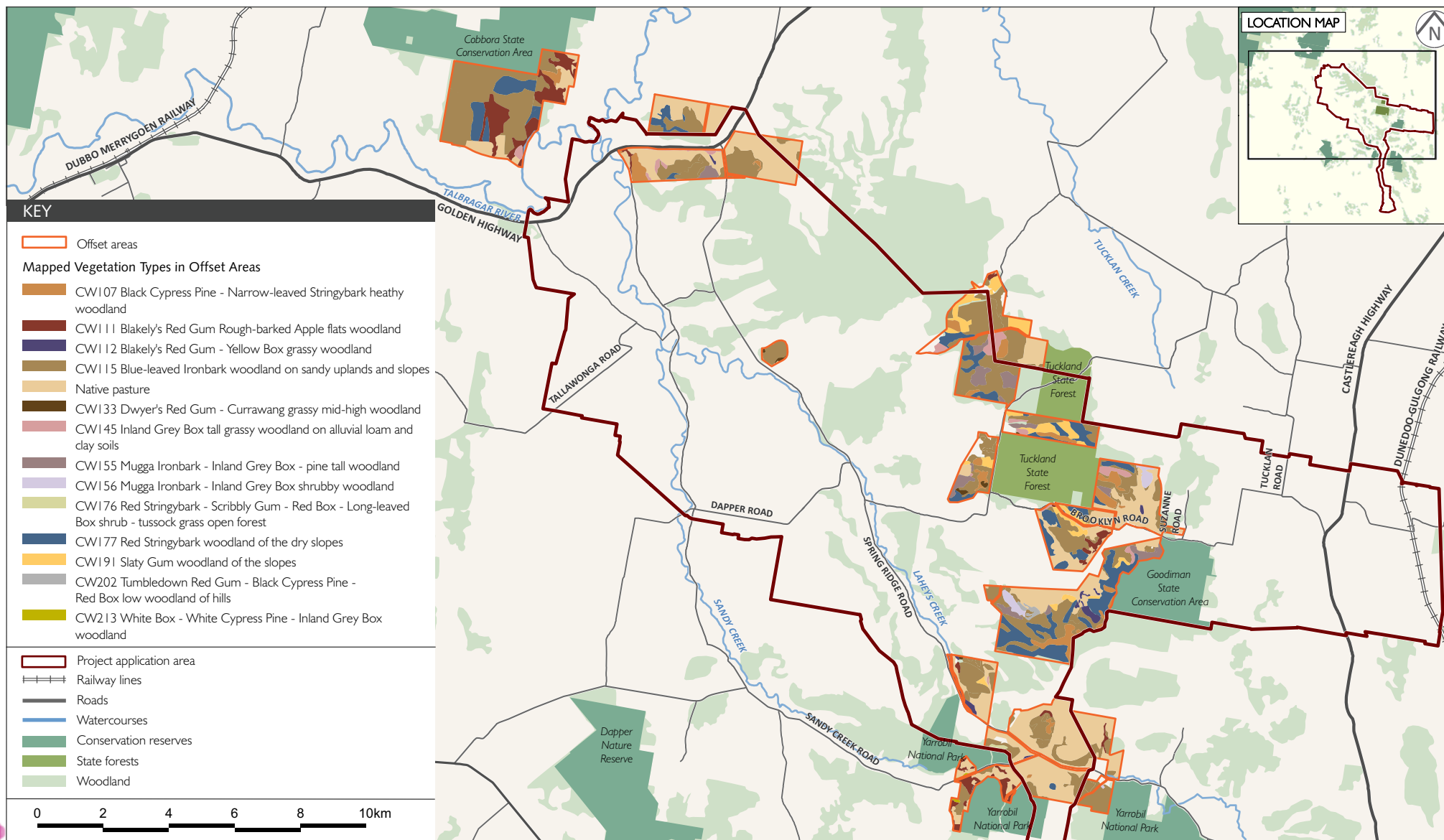
CHC is committed to a 'no net loss' outcome under the Offset Policy for threatened species which have generated species credits. Species credits were generated within the offset areas for five of the seven affected threatened species. Species credits have been met for three of these. Additional credits are required for *H. darwinioides*, *T. linearis*, Ingram's zieria and large-eared pied bat breeding habitat to meet the desired outcome.

Proposed offset additions will add threatened species habitat to the package. Targeted surveys will be conducted in spring/summer to confirm the presence of threatened species and their habitat in the offset areas. Should further surveys and additional offsets still not meet the requirements for species credits, indirect offsets will be investigated and negotiated with OEH and SEWPaC or the outcome goal may be reduced to a 'mitigated net loss'.

## 10.8 Biodiversity outcomes

The Project will impact on local populations of threatened species, populations and communities within the PAA. Avoidance, minimisation and mitigation measures have been devised in the design phase and will be incorporated into the construction and operation phases of the Project. Any remaining impacts will be compensated through an offset package. Although the package has not been finalised, it is likely that it will compensate for the Biobanking ecosystem and species credits required in accordance with the OEH Offset Policy.

The offset package will improve the connectivity of remnant habitat in the area. Along with rehabilitation of the disturbance area and lower quality vegetation in the offset areas, this will result in an improvement to the quality, quantity and protection of biodiversity within the region in the medium to long term.



Offset Areas

Cobbora Coal Project - Environmental Assessment

Figure 10.11

