



Planning &
Environment

**STATE SIGNIFICANT DEVELOPMENT
ASSESSMENT
Mount Owen Continued Operations
Project (SSD 5850)**



Final Assessment Report
Section 89E of the
Environmental Planning and Assessment Act 1979
October 2016

Cover photo:
Mount Owen Mine - Departmental Site Visit, February 2013

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EXECUTIVE SUMMARY

This final assessment report for the Mount Owen Continued Operations Project has been prepared by the Department of Planning and Environment for consideration by the Planning Assessment Commission (Commission). It should be read in conjunction with the Department's preliminary Environmental Assessment Report for the project, dated November 2015.

This report focuses on the 24 recommendations identified in the Commission's *Mount Owen Continued Operations Project Review Report* of February 2016. These recommendations primarily relate to:

- *biodiversity* - adequacy of biodiversity offsets, need for stronger requirements for progressive regeneration and rehabilitation (including performance measures and trigger values), need for further clarity regarding potential for additional fauna corridors, suitability of short term foraging resources, potential impacts on the function of vegetation corridors over the project life;
- *air quality* - need for the Department to complete its assessment of air quality impacts, paying particular attention to any residual issues identified by agencies or the final air quality independent review;
- *final landform and rehabilitation* - provision of additional information and justification concerning the proposed final landform and rehabilitation measures, including consideration of the potential minimisation of final voids, incorporation of micro-relief and refinements to the proposed post-mining land uses.
- *other impacts* - need for further consideration and/or clarification of several other matters related to water resources, Aboriginal cultural heritage and the social and economic impacts of the project; and
- *community consultation* - opportunity for further consultation with the community prior to determination.

In response, Glencore made a number of concessions and material amendments to the mine plan, including a proposal to no longer mine the RERR Pit and thereby reduce the number of proposed final voids from three to two. These amendments were accompanied by revised final landform and rehabilitation plans and led to consequential changes to the predicted impacts of the project, including reduced air quality and noise impacts in the later years of mining, accelerated rehabilitation and revegetation activities, reduced water take in the final landform and refined net economic benefits.

This report sets out the Department's consideration of the Commission's recommendations, Glencore's response to these recommendations, advice from key NSW and Commonwealth Government agencies, public submissions received following the Commission's Review Report and the findings of separate air quality and economics independent reviews commissioned by the Department.

The Department considers that the assessment process for this project has been extensive, detailed and informed by relevant technical experts. The Department has paid close consideration to a number of key concerns raised by members of the community, government agencies and the Commission. To address these matters, the Department has sought a range of additional information and considers that its assessment process has led to the development of an improved mine plan for the site and better outcomes for the community.

The Department has implemented or otherwise addressed all of the Commission's recommendations. It has sought to address specific issues (particularly air quality and rehabilitation) through providing updated or additional conditions of consent that reflect the Commission's recommendations and the Department's final assessment of the project (see **Appendix E**). Where previous recommended conditions are considered to remain adequate, the Department has provided detailed support for this position.

The Department is satisfied that its recommended conditions provide a comprehensive, contemporary and precautionary approach to the regulation and management of the project. These conditions require appropriate and strict compliance with relevant performance measures and standards to ensure that any residual impacts are effectively minimised and mitigated. The Department is of the view that these conditions represent current best practice for the regulation of open cut coal mining projects in NSW, provide a high level of protection for the local environment and amenity of the local community and promote the orderly development of the region's significant coal resources.

The Department is satisfied that the benefits of the project outweigh its residual costs and considers that the project is in the public interest and should be approved, subject to strict conditions of consent.

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

This final assessment report for the Mount Owen Continued Operations (SSD 5850) (MOCO Project, or project) has been produced for the consideration of the Planning Assessment Commission (Commission). It should be read in conjunction with the Department's preliminary Environmental Assessment Report (preliminary report) dated November 2015.

Together, these two reports comprise the Department's environmental assessment of the project and have been prepared to satisfy the requirements of both the *Environmental Planning and Assessment Act 1979* (EP&A Act) and, in line with the Commonwealth's accreditation of the State assessment process, the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report considers the:

- recommendations made in the Commission's *Mount Owen Continued Operations Project Review Report* dated February 2016 (Commission's Review Report);
- additional information received from Mount Owen Pty Limited (a subsidiary of Glencore Pty Ltd (Glencore)) in response to the Commission's Review Report and the Department's proposed conditions of consent;
- further advice from key Government agencies received following the merit review;
- final independent air quality and economics reviews commissioned by the Department; and
- submissions made on the project during a second exhibition period, following the merit review.

1.2 Project Overview

In response to the Commission's Review Report, Glencore made a number of changes to its proposed MOCO Project. In particular, it is no longer proposing to extract coal from the small RERR Pit mining area. Glencore is now seeking consent to expand its existing mining operations at two open cut pits in the Mount Owen Complex to extend the life of the mine and enable the extraction of an additional 86 million tonnes (Mt) of run-of-mine (ROM) coal. In summary, the project would involve:

- expanding the existing open cut mine to extract an additional 86 Mt of ROM coal from two open cut pits (one of which is largely located in an area previously disturbed by mining);
- extending the life of the open cut mine by approximately 12 years (to 2030);
- duplicating the existing rail spur line and constructing a northern rail entry/exit;
- using an existing overland conveyor to transfer gravel and coal to the Liddell Coal Mine; and
- upgrading Hebden Road and ancillary site infrastructure.

A detailed description and plans of the major components of the project (as originally proposed) are provided in the preliminary report. Glencore's proposed revisions to the project are discussed in detail in Section 3.1 below.

1.3 Department's Preliminary Assessment Report

In November 2015, the Department published its preliminary report for the MOCO Project. This report contained the Department's preliminary assessment of the environmental, social and economic aspects of the proposed project.

In completing the preliminary report, the Department was satisfied that it had sufficient information to determine the likely overall impacts of the project and make a preliminary judgement of its relative merits. However, the Department identified several matters that required further consideration prior to determining the project. The principal residual matters identified in the preliminary report as requiring further consideration were:

- predicted air quality impacts at nearby residences, including finalising an independent air quality review commissioned by the Department from Todoroski Air Sciences (TAS review);
- additional biodiversity offsets to satisfy Commonwealth offsetting requirements;
- further opportunities to minimise final voids; and
- more detailed rehabilitation and final landform plans that considered the availability of water licences, optimised post-mining land uses and incorporated macro-relief and micro-relief features.

The Department's preliminary report clearly acknowledged where further information was required and identified that this residual information was unlikely to materially affect the overall merits of the project. Rather, this outstanding information was required to confirm the nature and scale of impacts in specific areas and inform any final conditions of consent.

The Department considered that there was enough information available to make a preliminary recommendation on the broad merits of the project, whilst acknowledging that these preliminary findings could change based on the extra information requested. However, it notes that the Commission's Review Report stated that it *"acknowledges community dissatisfaction with the absence of complete information and community frustration that conclusions appear to have been drawn by the Department on the basis of partial information"*.

The Department also provided draft conditions of approval in conjunction with the preliminary report for the benefit of the public and the Commission in its review process. It is usual practice for such draft conditions to be revised in the Department's final assessment report, following consideration of recommendations contained in the Commission's Review Report, additional input from agencies and the public, and further information provided by the Applicant in response to the Commission's review and recommendations.

1.4 Chronology of Events

A chronology of the key events that have occurred and correspondence received since the Department completed the preliminary report are set out in **Table 1**.

Table 1: Chronology of events and key correspondence

Date	Event
14 November 2015	Department's preliminary Environmental Assessment Report referred to Commission
20 November 2015	TAS air quality independent review revised
8 December 2015	Commission briefed by officers from the Department
14 December 2015	Glencore provided its response to the TAS air quality independent review
15 December 2016	Commission met with Singleton Shire Council
15 December 2016	Commission held a public hearing in Singleton
16 December 2016	Commission visited the Mount Owen mine site, with representatives of OEH and DPE
16 February 2016	Commission published its Review Report on the MOCO Project
17 February 2016	Department requested Glencore provide a response to the Commission's Review Report and recommendations
2 March 2016	Department requested advice from the EPA, DPI Water and OEH on the issues raised in the Commission's Review Report
3 March – 29 April 2016	During this period, the Department received two responses from Glencore regarding air quality issues. Each response was considered in an updated TAS air quality independent review, with the final report of the TAS review being received on 29 April 2016 (see Appendix C)
27 May 2016	Glencore provided a response to the Commission's Review Report
31 May 2016	Department wrote to all submitters inviting comment on Glencore's revised project and response to the Commission's Review Report
1 June 2016	Department wrote to relevant government agencies and requested their comments, along with any revised recommended conditions of consent
4 June 2016	Glencore held an information session for the public regarding the revised project and its response to the Commission's Review Report
7 June 2016	Glencore briefed the Department on its response to the Commission's Review Report. Department received final advice from the Dam Safety Committee
14 June – 7 July 2016	During this period, the Department received comments from agencies including OEH, DPI Water, EPA, NSW Health and the Commonwealth Department of the Environment & Energy (Commonwealth DoEE). The Department also sought additional information from Glencore on its updated cost-benefit analysis following an initial independent review undertaken for the Department by the Centre for International Economics (CIE). Other information requests and responses made to Glencore during this period related to clarifying the project's area of woodland/open forest rehabilitation in the final landform, the rehabilitation research commitment, number of currently approved final voids and updated land ownership. Glencore also provided information recording its consultation efforts with the community, Council and agencies on the revised project.
7 July 2016	Department received CIE's independent review of Glencore's updated cost-benefit analysis for the revised project
13 July 2016	Department wrote to Glencore concerning the number of approved final voids
15 July 2016	Glencore provided additional information clarifying its revised noise assessment
22 July 2016	Glencore provided information supporting its position concerning approved final voids
16 August 2016	DPI Water provided final advice on water licences for the final landform
2 September 2016	Department sought Glencore's feedback on the draft conditions of consent
9 & 26 September 2016	Glencore provided feedback on the Department's recommended conditions of consent
7 October 2016	Glencore provided feedback on long term rehabilitation outcomes

2.0 OVERVIEW OF COMMISSION'S REVIEW REPORT

On 18 November 2015, the Minister for Planning requested that the Commission carry out a review of the MOCO Project based on the following terms of reference:

- a) *considering the EIS for the development, the issues raised in submissions, the formal response to submissions, and any other information provided on the development during the course of the review or as part of the public hearings;*
- b) *considering the likely economic, environmental and social impacts of the development in the locality, in the region and for the State;*
- c) *assessing the merits of the development as a whole, having regard to all relevant NSW Government policies and guidelines; and*
- d) *providing recommendations on any additional reasonable and feasible measures that could be implemented to avoid, minimise and/or manage the potential impacts of the development;*

The Minister also requested that the Commission hold a public hearing during the review. The public hearing was held in Singleton on 15 December 2015, with 19 verbal submissions and 17 written submissions received from individuals, special interest groups, local businesses and mine employees. The Commission also received a total of 31 written submissions before and after the public hearing.

The Commission's review paid close consideration to several issues raised in agency and public submissions made regarding the EIS, at the public hearing and during the review process. The Commission also sought specific expert advice on a number of key aspects of the project.

The Commission generally concurred with the Department's assessment of the project's key impacts and most recommendations contained in the preliminary report. However, as indicated above, the Commission identified several important aspects of the project that remained unresolved and required further assessment before it could make a final recommendation on the project.

The Commission acknowledged that the preliminary report identified the need to obtain additional information on outstanding issues relating to management of air quality impacts, licensing of water take, biodiversity offsetting and rehabilitation requirements, and the potential for improvements to mine design (including the incorporation of micro-relief in the final landform, further consideration of potential post-mining land uses and the minimisation of final voids).

The Commission made 24 recommendations to clarify these outstanding uncertainties, strengthen the Department's draft conditions and ensure that potential impacts are avoided, minimised or mitigated.

The Commission's key recommendations relate to:

- *biodiversity* - adequacy of biodiversity offsets, need for stronger requirements for progressive regeneration and rehabilitation (including performance measures and trigger values), need for further clarity regarding potential for additional fauna corridors, suitability of short term foraging resources, potential impacts on the function of vegetation corridors over the project life;
- *air quality* - need for the Department to complete its assessment of air quality impacts, paying particular attention to any residual issues identified by agencies or the final air quality independent review;
- *final landform and rehabilitation* - provision of additional information and justification concerning the proposed final landform and rehabilitation measures, including consideration of the potential minimisation of final voids, incorporation of micro-relief and refinements to the proposed post-mining land uses;
- *other impacts* - need for further consideration and/or clarification of several other matters related to water resources, Aboriginal cultural heritage and the social and economic impacts of the project; and
- *community consultation* - opportunity for further consultation with the community prior to determination.

In addition, the Commission made a number of recommendations aimed at strengthening draft conditions of consent.

Overall, the Department supports the Commission's recommendations. The Department considers that the Commission's report balances a broad range of strategic considerations, including the protection of the natural environment and human amenity, and the economic recovery of the State's mineral resources.

3.0 RESPONSES TO THE COMMISSION'S REVIEW REPORT

3.1 Applicant's Response

On 27 May 2016, Glencore provided a response to the Commission's Review Report. This response sought to address each of the Commission's recommendations and also included several material concessions and amendments to its proposed mine plan. The key amendments can be summarised as:

- removal of the previously-proposed RERR Pit mining area, with a resulting reduction in proposed ROM coal extraction from 92 Mt to 86 Mt. Removal of the RERR Pit was proposed to address the Commission's concerns about the number of proposed final voids, and has consequential effects for water management, timing of certain rehabilitation activities and amenity impacts in the later years of the project;
- incorporation of additional macro-relief and micro-relief across the proposed final landforms, including improvements to the design of overburden emplacements and final void batters;
- further post-extraction works to improve the final landform around the Bayswater North Pit void;
- updated tailings emplacement activities that reflect a recent modification to the consent for the Ravensworth East Mine;
- revised rehabilitation plans that incorporate additional rehabilitated woodland corridors and measures to improve corridor resilience and habitat connectivity in the final landform; and
- provision of updated mine plans, management measures and associated information.

In addition to these changes to the proposed mine plan, Glencore sought to address a number of merit-based considerations raised in the Commission's Review Report by providing the following:

- a detailed response to the Commission's air quality recommendations, including a response to the final TAS review. While this response discusses the differences in the consultants' modelling approaches, it generally accepts the recommendations of the final TAS review;
- an additional 144 hectare (ha) biodiversity offset area which seeks to address the shortfall in upfront offsets identified by the Commission and the Commonwealth DoEE, by protecting additional areas of extant woodland and forest communities and key foraging resources for threatened fauna species;
- discussion of the revised rehabilitation plans, including proposed establishment of additional woodland rehabilitation corridors and an East-West Corridor Management Area to be managed in the short to medium term to retain native vegetation and improve habitat connectivity along Yorks Creek near the Bayswater North Pit, but which would not form a permanent offset area;
- revised amenity impact assessments (ie noise, air quality and water) and an updated economic analysis to reflect the changes to the mine plan and management commitments;
- further clarification about water management, water licensing and Aboriginal cultural heritage; and
- a list of additional commitments, including management and mitigation measures for the mine.

Glencore considers that the project refinements and additional information that it has provided are adequate to address and resolve the key merit-based issues raised in the Commission's review. The Department is satisfied that Glencore's response contains sufficient information to adequately inform final consultation with government agencies and to enable the Department to complete its assessment. Glencore also provided comments on the draft conditions of consent on 9 and 26 September 2016, which mainly focused on the operational practicality of these conditions. The Department has considered Glencore's responses in preparing this report.

3.2 Additional consultation

One of the Commission's recommendations was for the community to be afforded an opportunity to review and comment on the supplementary information provided and on the Department's findings regarding the outstanding issues concerning air quality impacts, the proposed biodiversity offset package, progressive regeneration and rehabilitation, the final landform, surface water impacts and the economic cost-benefit analysis (CBA).

In response, the Department wrote to all submitters to invite them to provide supplementary comments on Glencore's response to the Commission's Review Report. This provided the community with the opportunity to consider the additional material available on the Department's website, including the amendments to the project made in Glencore's response to the Commission's Review Report.

The Department only received a total of four supplementary submissions, comprising three objections and one submission in support of the revised project. The Department has taken the additional matters raised in these supplementary submissions into consideration in finalising its assessment.

3.2.1 Supplementary comments objecting to the revised project

Supplementary comments made objecting to the revised project were received from the Nature Conservation Council (NCC), Martin Fallding of Land and Environment Planning and Donna Watson.

The NCC's submission raised a number of general objections to the development of coal mines in NSW due to climate impacts associated with the generation of downstream greenhouse gas emissions from the burning of coal. The NCC considers the extraction of coal to be at odds with Australia's international commitments regarding limiting rises in global temperatures and therefore argues that the further development or expansion of coal mines is not in the public interest. The NCC was also concerned with the biodiversity impacts of the project, in particular the consideration of cumulative impacts associated with clearing of the Ravensworth State Forest, the appropriateness of the proposed offsets package and the Commission's recommendation regarding relocation of hollow-bearing trees. The NCC also raised concerns over final voids and the impacts on water resources, and considered that all open cut coal mining proposals in NSW should be refused unless they completely backfill and remove mining voids. The Department considers that each of the matters raised in the NCC's submission have been appropriately considered in the preliminary report and in Section 4.0 of this report.

Martin Fallding's submission stated that the revised project would continue to have a significant impact on regional biodiversity and that the preliminary report, the Commission's Review Report and Glencore's response to the Commission do not adequately address these issues. Mr Fallding proposed amendments to the Department's draft conditions of consent, which he considers provide appropriate compensation and monitoring measures. The Department has considered these recommendations in finalising this report.

Donna Watson did not raise any additional concerns on the revised project, but reiterated the concerns raised in her previous submissions (one to the Department and another to the Commission). Ms Watson's previous submission to the Department raised concerns with the potential impact of air quality and blast fume emissions to her property and her family's health. Ms Watson noted that initial discussions with Glencore regarding the acquisition of her property had been held. These matters have been considered in the preliminary report and in Section 4.0 of this report.

3.2.2 Supplementary comments supporting the revised project

One submission in support of the revised project was received, from Thiess. Thiess is the mining contractor which has operated the Mount Owen mine on behalf of Glencore since 2004. Thiess stated that it has worked closely with Glencore to develop and implement industry best practice rehabilitation, which has been applied to more than 450 ha of mined land. Thiess has also been involved in implementing air quality and greenhouse gas management at the mine, which it considers has contributed to positive outcomes for air quality in the Hunter Valley. Finally, Thiess stated that it currently employs a workforce of 320 at the mine and that current operations rely heavily on local businesses, including around 100 local and regional suppliers.

4.0 DETAILED CONSIDERATION OF THE COMMISSION'S REVIEW REPORT

The Department has completed its consideration and assessment of outstanding matters related to the project, with a specific focus on addressing and responding to the Commission's recommendations. The following sections should be read in conjunction with the assessment included in the preliminary report. Each of the Commission's recommendations is considered individually below.

4.1 Biodiversity

The Commission made six recommendations relating to the project's biodiversity impacts and the proposed offset package which primarily focus on the adequacy of offsets, vegetation connectivity and the timely delivery of rehabilitation and regeneration outcomes.

4.1.1 Proposed Offsets and Vegetation Corridors

Commission Recommendation 1

That, prior to determination, the Department should progress discussions with, and seek additional information from, the Applicant about establishing supplementary offsets, including an east-west vegetation corridor linking the Swamp Creek Corridor Offset and offsets at the Liddell Coal Mine.

Glencore's response to the Commission's Review Report included the offer of an additional 144 ha biodiversity offset, known as the Mitchell Hills Offset Area. This additional offset is located close to the project and borders Glencore's existing Hillcrest and Mitchell Hills South Offset Areas. OEH supported this additional proposed offset, noting that it strengthens the offset package provided for the project. OEH also identified that the Mitchell Hills Offset Area contains remnant woodland, as well as likely habitat and movement corridors for the Spotted-tailed Quoll.

The Department notes the strategic location of this additional offset, which adjoins the existing network of Glencore offsets in the Greater Ravensworth area (see **Figure 1**). It would strengthen this network of wooded vegetation corridors and promote the movement of threatened fauna in the region. This proposed offset is comprised mainly of established woodland and forest communities, including 83 ha of *Barrington Footslopes Dry Spotted Gum Forest*, dominated by *Corymbia maculate*, which is a key winter-flowering foraging species for Swift Parrots and Regent Honeyeaters. The area also contains known habitat for threatened micro-bat and mammal species, including the Large-eared Pied Bat, Eastern Bent-wing Bat, Spotted-tailed Quoll and Brush-tailed Phascogale.

Given this additional offset area, removal of the proposed RERR pit and changes to the final landform and rehabilitation plans, the Department has reviewed the offset ratios for the project. The offsets package would still only provide upfront like-for-like offsets of 0.3:1 for the *Central Hunter Ironbark – Spotted Gum – Grey Box Forest Endangered Ecological Community* (EEC). However, it is expected that this offsets ratio would increase to 2.6:1 following regeneration of Derived Native Grassland (DNG) within the offset sites. OEH has supported the fact that regeneration of cleared land with intact soil profiles and seed banks (ie DNG) can support the re-establishment of previous woody plant communities. The Department is therefore satisfied that, with the proposed management measures and supplementary planting of underrepresented species, the proposed biodiversity offset package provides an adequate offset for this EEC and meets the requirements of the applicable *Interim Policy on Assessing and Offsetting Biodiversity Impacts* (2011) (the Interim Policy).

The project also now provides an upfront ratio for established woodland EECs and Vulnerable Ecological Communities (VECs) of 0.8:1, which is expected to increase to 3.7:1 in the long term following woodland regeneration in the DNG in offset areas. For all native forest, woodland and shrub land communities, the project now provides an upfront offset ratio of 1.8:1 with an expected long term (post-regeneration and rehabilitation) offset ratio of 6.2:1. The Department notes that these offset ratios materially exceed the 2:1 requirements of the Interim Policy.

Glencore's revised mine plan would also establish an additional 604 ha of rehabilitated woodland vegetation, bringing the total area of woodland rehabilitation at the Ravensworth East and Mount Owen mines to 2037 ha. Under the revised mine plan, this rehabilitated woodland would be established as additional corridors traversing the site and would increase the extent of native woodland communities to be established around the two proposed final voids. Glencore has also confirmed that 518 ha of this 2037 ha would form part of its biodiversity offset strategy and would be established to meet the EEC listing criteria for the *Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC*.

The revised rehabilitation plans provide three additional woodland corridors and improve habitat connectivity across the Mount Owen Complex. These corridors include an east-west corridor near the northern extent of the project which would connect the rehabilitated area surrounding the Bayswater North Pit with established rehabilitation at the Mount Owen mine, and provide additional north-south and east-west connections through the centre of the Ravensworth East mine.

To supplement and strengthen the role of these rehabilitation corridors, Glencore has committed to retain and improve vegetation linkages in an area known as the East-West Corridor Management Area (EWCMA). This area is located outside the proposed disturbance area and would be managed to further improve vegetation connectivity along Yorks Creek between the Ravensworth East mine and existing rehabilitation areas at Mount Owen. While the EWCMA is not proposed as a permanent offset, the Department considers this area serves an important role as a stepping stone to connection between Ravensworth State Forest and other Glencore offsets near Liddell Coal Mine. This role is especially important in the short term, before woodland rehabilitation areas can be established post-mining.

Glencore has also committed to continue to investigate opportunities to increase habitat connectivity along Stringybark Creek and to consider providing alternative east-west corridors should the temporary EWCMA be disturbed by any future activities. While OEH noted that Glencore could temporarily fence

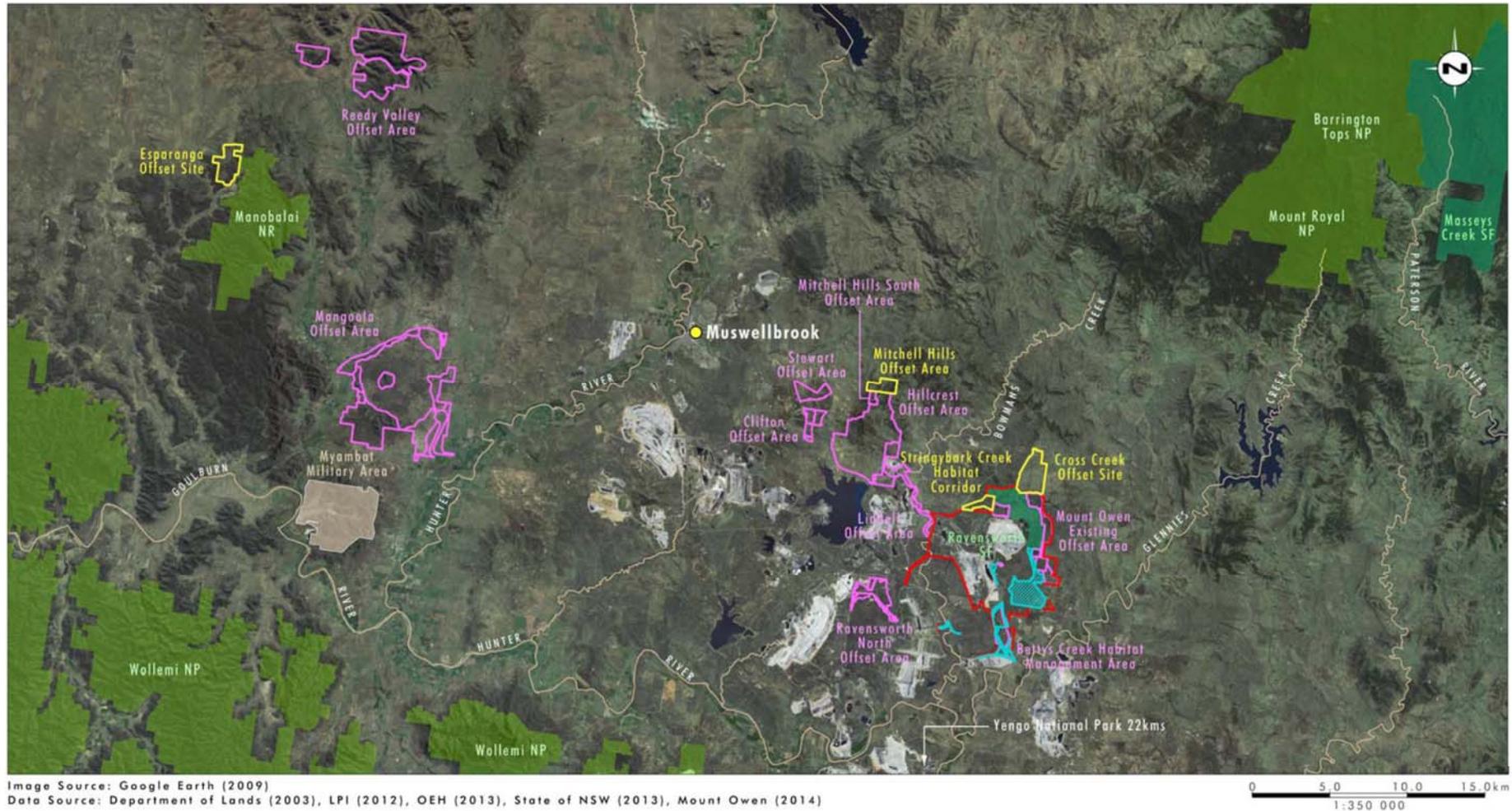


FIGURE 4.1
 Updated Mount Owen
 Biodiversity Offset Strategy

Figure 1: Location of Glencore's existing and proposed biodiversity offset areas

an additional section of Stringybark Creek while it investigates land ownership and mining constraints in this area, such actions would be in addition to a biodiversity offsets package that has already been deemed adequate for the project, and would not resolve the land ownership issues currently preventing the provision of a connected corridor to the Liddell Coal Mine. Consequently, the Department is satisfied that the proposal to manage the EWCMA is reasonable and would provide significant benefits to native fauna species, without sterilising potentially recoverable State-owned coal resources.

In summary, the Department considers that Glencore's revised offset package and rehabilitation plans represent a significant improvement to the biodiversity outcomes described in the EIS and comprehensively address the issues raised in the Commission's Recommendation 1. The Department has incorporated the revised offsets into the recommended conditions at **Appendix E**.

Commission Recommendation 2

That, prior to determination, the Department should seek further comments from:

- *DotE about whether the proposed offsets meet its requirements, particularly in relation to the suitability of foraging resources; and*
- *OEH about whether the proposed expansion of the North Pit would materially affect the proposed vegetation corridors, particularly in relation to the movement and habitat of individual fauna species.*

As stated above, Glencore's response to the Commission's review included offering an additional 144 ha biodiversity offset area, comprised primarily of established forest and woodland communities. The Commonwealth DoEE has reviewed the adequacy of this additional offset area and identified that 83.1 ha of the existing woodland within the Mitchell Hills Offset Area contains key foraging tree species used by the Swift Parrot. Accordingly, the Commonwealth DoEE has advised that the revised offsets package adequately addresses the EPBC Act Environmental Offsets Policy and the Commonwealth DoEE's previous concerns about the need for mature woodland offsets.

The Department has also conferred with OEH regarding the likely impact of the North Pit expansion on the functionality of the existing and post-mining vegetation corridors. In providing its response, OEH acknowledged and supported Glencore's proposal to increase the width of the eastern corridor through a range of active revegetation and supplementary planting on its eastern edge where the corridor is at its narrowest. Nevertheless, OEH noted that the narrowing of woodland corridors to the east of the North Pit would take place over the first five years of the project and could place additional short term pressure on some species. Having considered the range of threatened fauna that use this corridor, OEH advised that, while these impacts are unlikely to contribute to the extinction of any local population, the proposed revegetation works should be prioritised and commence in the first year of the project. The Department supports OEH's position, which it has reflected in the recommended conditions at **Appendix E**.

4.1.2 Strengthened Conditions of Consent

Commission Recommendation 3

That the Department considers requiring further research in the recommended preliminary conditions of consent, particularly in relation to regeneration activities in this project, corridor linkages within the project area, and corridor linkages between this project and other nearby mines.

Further Research

Glencore's response to the Commission's Review Report describes the company's research over the past 20 years at the Mount Owen Complex into mine rehabilitation. This research has largely focused on the effects of growth mediums, nutrient cycles, soil biota and ecology, and the creation of functional soil substitutes in post-mining rehabilitation areas. Glencore's response also identifies that, in recent years, it has broadened its research into the roles of specific flora species in the creation of target communities and the regeneration of DNG to woodland communities.

In addition to its rehabilitation focused research, Glencore has undertaken many years of research into habitat requirements for threatened fauna, including a radio tracking program that monitored quoll movements and home ranges in and around the Ravensworth State Forest. This research program has highlighted the importance of habitat connectivity for quoll movements in the region and has been a significant factor behind Glencore's strategic approach to biodiversity offsets, which has seen the establishment of connected conservation areas throughout the Greater Ravensworth area.

Glencore has since confirmed that it has spent some \$2,260,000 on the research programs undertaken at Mount Owen to date. Glencore also confirmed that it has committed \$80,000 in funding to undertake

its current research program to the end of 2017 and will then seek to undertake further research that builds on research undertaken at other Glencore mines and addresses emerging issues.

The Department both recognises the value of this long-term and ongoing research program and supports the Commission's comments regarding the need for continued research in the areas of rehabilitation, regeneration and improved biodiversity outcomes. This was reflected in the Department's preliminary draft conditions, which stated that the Rehabilitation Management Plan must "include a research program that seeks to improve the understanding and application of rehabilitation techniques and methods in the Hunter Valley for EECs, including Central Hunter Box-Ironbark Woodland".

In response to this recommendation, Glencore requested that this condition be modified to integrate with and leverage off the Hunter Ironbark Research Program being undertaken at its Ravensworth Coal Mine. The Department agrees that this would be a more efficient use of resources and has amended its draft conditions to require Glencore to implement the findings of the research undertaken to date at Mount Owen and Ravensworth, and further this understanding by conducting additional research into rehabilitation techniques and methods for threatened ecological communities in the Hunter Valley.

Given Glencore's reliance on regeneration and rehabilitation in its offsets package, the Department previously recommended conditions requiring Glencore to periodically monitor and report on the establishment of habitat for significant and/or threatened flora and fauna; creation of self-sustaining vegetation communities and wildlife corridors; and achievement of targeted land capabilities. The Department considers that, over time, these periodic monitoring and reporting requirements could provide important insights into the success of management measures in regeneration and rehabilitation (benchmarked against the baseline of the remaining Ravensworth State Forest), and inform further research into the natural succession of Hunter Valley vegetation communities and the establishment of complex multi-storey ecosystems. Accordingly, the Department has revised the recommended conditions to require Glencore to publish this material in an appropriate format in its Annual Review.

Glencore has also provided a range of additional information on the likely impacts of the project on the width, resilience and functioning of nearby vegetation corridors. The functionality of habitat corridors would not be expected to change materially in the first few years of the project, as the existing TSR Offset and Southern Offset would remain the narrowest north-south vegetation corridor east of the mine. However, by Year 5 the progression of the North Pit would narrow the width of vegetation surrounding the Southeast Corridor Offset to around 280 m. To address this, Glencore has committed to actively revegetate an area of DNG within the offset area to a denser woodland community that would provide improved habitat connectivity. As discussed above, OEH supports this management measure and the Department has recommended a condition requiring that Glencore implement specific measures to prioritise the substantial undertaking of these revegetation activities in Year 1 of the project.

With respect to east-west corridors, Glencore has also committed to liaise with relevant government authorities and investigate opportunities to strengthen connectivity between the Stringybark Creek Habitat Corridor and Liddell Coal Mine's Bowmans Creek Riparian Corridor Offset. Considering the regrowth of vegetation communities within the project area over the past 30-50 years, the Department considers that regeneration of this riparian corridor is an achievable and appropriate outcome. Glencore has also confirmed that the project would not impact on the existing upper Betty's Creek stream diversion (see Figures 2.1 - 2.3 of Glencore's response to the Commission's Review Report).

Overall, the Department considers that the incorporation of additional habitat linkages in the revised rehabilitation plans, combined with Glencore's commitment to investigate further linkages between Stringybark and Bowmans Creeks and strengthen the north-south linkages to the east of the mine, adequately address the Commission's recommendations in respect of corridor linkages.

Commission Recommendation 4

That the recommended preliminary condition of consent relating to the Independent Environmental Audit should be linked to the preliminary Biodiversity Management Plan condition to ensure that regeneration is independently monitored and audited on a regular basis (i.e. within a year of the commencement of development, and every 3 years thereafter).

Monitoring of Regeneration

The Department supports the intent of this recommendation and has reflected this in its recommended conditions, by requiring that any passive and active regeneration outcomes detailed in the Biodiversity Management Plan are specifically included within the scope of the Independent Audit.

Commission Recommendation 5

That the recommended preliminary condition of consent relating to the Biodiversity Management Plan should be strengthened to include:

- *salvaging, transplanting or propagating measures for all six threatened flora species known to occur in the region;*
- *monitoring of potential impacts on groundwater dependent ecosystems and specific trigger levels for remedial action;*
- *more specific performance measures and milestones linked to key individual fauna species (for example the relocation and re-use of hollow-bearing trees for the Squirrel Glider, Swift Parrot and Regent Honeyeater);*
- *further details about the specific methods of regeneration, as well as relevant performance measures to assist in monitoring the effectiveness of regeneration; and*
- *further detail about the particular vegetation species that should be promoted, including species from different 'functional groups', such as cycads, ferns, geophytes, rushes and sedges.*

Biodiversity Management Plan

The Department appreciates the Commission's concerns regarding the management of biodiversity impacts and is supportive of strengthening the recommended conditions relating to the Biodiversity Management Plan. The Department has sought to address the intent of each of the above matters and the management of biodiversity outcomes in the updated conditions at **Appendix E**.

OEH's response to the Commission's recommendation agrees with Glencore's position that it is unlikely that the project would directly impact on any threatened fauna species known to occur in the broader project area. Importantly, all known records of these species are located outside the proposed disturbance areas. For this reason, OEH has confirmed that it is unlikely that any plants would need to be salvaged and translocated or propagated as part of this project.

Nevertheless, the Department's preliminary suite of conditions already requires Glencore to salvage, transplant or propagate any new specimens of threatened flora species found during pre-clearance surveys. This condition relates to any threatened flora species located within the disturbance area. While orchids are specifically mentioned, this is because individual orchid specimens are generally easier to salvage and transplant. The other four threatened species known to occur in the disturbance area include larger shrub and tree species, such as River Red Gums. While Glencore is still expected to offset and manage impacts on these species, the Department considers that it may be more appropriate to attempt to propagate these species rather than to attempt transplanting.

The Department acknowledges that, while the draft conditions accompanying its preliminary report already included a requirement to monitor and develop trigger levels for investigating adverse impacts on groundwater dependent ecosystems, the inclusion of this requirement in the Biodiversity Management Plan would strengthen the governance of remedial actions in the unlikely event these are required. This amendment has been reflected in the proposed conditions.

As requested by the Commission, the Department has also sought to provide additional clarity around the performance measures for habitat management. Recommended conditions now require Glencore to maximise salvage and reuse of tree hollows from within the disturbance area and establish naturally scarce fauna habitat structures and features (such as nest boxes and den structures). To monitor the effectiveness of these measures and provide for their periodic improvement, conditions also require Glencore to demonstrate that all reasonable and feasible efforts have been made to encourage their use by specific target species.

The Department also supports the Commission's recommendation to strengthen the requirements and performance measures relating to regeneration activities within biodiversity offset areas. Recommended conditions now require that any regeneration outcomes detailed in the Biodiversity Management Plan (including triggers for active regeneration) are included within the scope of the Independent Audit.

The Department has also revised recommended conditions to promote the establishment of different functional groups within each vegetation community. Given the range of vegetation communities to be regenerated in the biodiversity offset areas or established in the rehabilitated post-mining landscape, the Department has intentionally limited this requirement to establishment of functional groups. More prescriptive and specific performance measures, tailored to each vegetation community, should then be included in the Biodiversity Management Plan and be monitored via the triennial Independent Audits.

Commission Recommendation 6

That the Department should review the current membership and operation of the CCC to ensure that it conforms with the Guidelines for Establishing and Operating Community Consultative Committees For Mining Projects (2007) (as updated), and that all relevant interests are represented, including those related to biodiversity, regeneration and rehabilitation.

Community Consultative Committee (CCC)

The Department agrees with this recommendation and supports the view that CCCs should include a cross-section of the community and a range of relevant interests, opinions and skill sets. To achieve this, the Department has recommended a condition requiring Glencore to establish a CCC for the Mount Owen Complex, which comprises an independent chair and appropriate representation from Council, recognised environmental groups and the local community, and is operated in line with the Department's *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects*.

4.2 Air Quality

The EIS contained an assessment of the project's potential air quality emissions over a range of representative years and sought to predict worst-case emissions based on the intensity of mining and proximity to sensitive receivers. Following its initial review of the EIS's air quality impact assessment (AQIA), and having regard to the concerns expressed by the EPA and members of the local community, the Department commissioned TAS to undertake an independent review of the AQIA.

The Commission made three recommendations concerning air quality, which essentially require the Department to consider the advice of relevant government agencies and the findings of the independent air quality review in completing its assessment of potential air quality impacts. These three recommendations are considered serially below.

Commission Recommendation 7

That the Department should forward a copy of the updated peer review of the AQIA to EPA and NSW Health and seek further comments in relation to the residual issues raised in their previous submissions.

The Department sought the EPA's initial advice on the Commission's Review Report on 2 March 2016. Following receipt of the final TAS review and Glencore's response to this review (see **Appendix A**), the Department again sought advice from the EPA and NSW Health on the issues raised in previous agency submissions, the TAS review and the adequacy of Glencore's response to these matters.

The EPA response of 22 June 2016 identified that Glencore's response to the Commission's Review Report resolved all outstanding issues raised by the EPA with respect to air quality impacts. The EPA recommended two conditions which would require Glencore to estimate PM_{2.5} emissions from diesel combustion and minimise PM₁₀ and PM_{2.5} emissions from the project.

On 28 June 2016, Hunter New England Population Health (NSW Health) provided further comments which reiterated the importance of assessing particulate emissions against current air quality standards, namely the 3 February 2016 amendments to the National Environmental Protection (Ambient Air Quality) Measure (the Ambient Air Quality NEPM).

The Department has considered and incorporated the advice of the EPA and NSW Health in this report (see below) and in the recommended conditions of consent.

4.2.1 TAS Air Quality Independent review

As identified in the preliminary report, the extraction rates, vehicle fleet and mining methods proposed for the project are similar to those at the approved Mount Owen operations. While the project would generate similar levels of dust as the current operations, the air quality impacts would be expected to shift to the southeast in line with the progressing mine front, resulting in a small increase in air quality impacts at nearby residences in the Middle Falbrook area.

To provide greater certainty regarding likely impacts on residential receivers in this area, the Department commissioned Todoroski Air Sciences (TAS) to undertake an independent expert review of the project's air quality impacts. TAS's initial review, dated 20 November 2015, raised several concerns with the project EIS's assessment of annual average PM₁₀ impacts and sought a range of additional information to clarify these matters. The review also concluded that the assessment of 24-hour PM₁₀ impacts had been undertaken correctly and provided a sound basis for the Department's assessment.

On 14 December 2015, Glencore's air quality consultant, Pacific Environment Limited (PEL), provided the Department with a copy of its response to the TAS review. This response was forwarded to the Commission for consideration in completing its review of the project. The Commission then made the following recommendation.

Commission Recommendation 8

That the Department ensures that the key residual issues regarding air quality and the AQIA are resolved prior to determination, particularly in relation to the meteorological data used, the methodology for calculating background levels and calibrating with other mines, and the assessment of cumulative impacts.

The Department chaired a meeting on 7 March 2016 between TAS, Glencore and Glencore's consultants (including PEL). This meeting enabled TAS to clarify the issues that remained outstanding and the information required to enable it to complete its review. Glencore provided TAS with all requested data and its modelling outputs (for TAS's sensitivity analysis) in February and March 2016.

In order to resolve the residual issues raised at this meeting and provide greater certainty to the review outcomes, TAS independently assessed the provided data inputs, including the modelling parameters and methodology used by PEL to predict the worst-case air quality impacts of the project. This examination identified issues with weather data obtained from one meteorological station used in the model (SX8), a potential underestimation of the background levels of annual average PM₁₀ and concerns over PEL's apportionment of dust sources both around the site and relative to nearby mines.

To address any uncertainty associated with these issues and provide a more conservative assessment of the likely annual average PM₁₀ impacts at receivers in the Middle Falbrook area, TAS performed independent sensitivity testing of three 'worst-case' scenarios to represent the upper bounds of the potential underestimations. These scenarios included the addition of TAS's predicted underestimation in background levels to Glencore's model outputs, increasing the project's dust generation to 150% of the levels predicted in the air quality assessment and providing for a redistribution of likely dust sources by doubling the dust generated by the project and halving the dust generated by other mines (which is counted as background). TAS concluded that it is not plausible that the project could result in impacts greater than those arising under these scenarios.

TAS then completed its assessment of the project's air quality impacts and submitted its final review to the Department on 29 April 2016. The final TAS review (see **Appendix C**) considered the additional information provided by Glencore and resolved a number of issues raised in submissions and in the initial TAS review, including issues with the modelling inputs and the methodological approach used in PEL's AQIA. The final TAS review concluded that *"the air quality assessment, additional information and data provided by the proponent and considered in this review is now sufficiently adequate to determine the potential impacts of the Project ... subject to the addition of three conditions"*. It also concluded that the Department can rely on the AQIA to inform its assessment of the project and the development of air quality conditions.

In applying the three conservative scenarios, the TAS review found that in addition to those receivers identified in the EIS as exceeding relevant air quality criteria, Receivers 114 and 116 should be afforded acquisition rights as a result of the likely worst-case annual average PM₁₀ impacts of the project. Furthermore, TAS recommended that Glencore be required to install and operate a weather station near the closest private receivers to the southeast and be required to operate an accurate predictive dust management system, in order to minimise and better manage potential dust impacts in this area.

Given the conservativeness of its three scenarios, the Department considers that the TAS review's recommendations fully address any residual uncertainty with the air quality modelling and fully support assessment of the worst-case annual average PM₁₀ impacts associated with the project. The Department is therefore satisfied that all residual issues relating to air quality impacts have now been addressed or can be appropriately conditioned. Consequently, the Department has completed its assessment of the air quality impacts of the project, and has provided further comments on the residual issues raised in submissions from the community, EPA and NSW Health.

The Department supports the three recommendations made in TAS's final independent review and has incorporated these in its recommended conditions at **Appendix E**.

4.2.2 Final Assessment of Air Quality Impacts

The Department's final assessment of the air quality impacts is provided below and should be read in conjunction with the related assessment in the preliminary report.

Particulate Matter Emissions

As discussed in the preliminary report, dust generating activities associated with the project are comparable to those being undertaken at the existing Mount Owen Complex. Consequently, the likely shift in dust emissions to the southeast is more a function of the advance of the mining face, rather than any change in the operational fleet, management measures or intensity of mining.

Glencore's response to the Commission's Review Report identified that the company no longer proposes to mine the RERR Pit. Accordingly, Glencore has provided an updated AQIA that reflects recent air quality monitoring data, removal of the RERR Pit, Glencore's recent acquisition of nearby private properties and the Integra underground mine and changes to the predicted scheduling of mining at neighbouring mines. Given this new data, it would be expected that the revised predictions provide a more accurate indication of likely air quality impacts at surrounding residences. The updated AQIA indicates a minor reduction in the predicted air quality impacts (particularly 24-hour impacts) in the later years of the project, when mining operations are only occurring in the North Pit.

The Department considers that, given the uncertainties to date with the modelling of air quality impacts, it should adopt a conservative approach in its assessment, and has therefore considered the worst-case impacts predicted under both the updated modelling and the final TAS review. Taken together, this information provides both conservatism and certainty in assessing the project's dust impacts and the consequent application of the NSW *Voluntary Land Acquisition and Mitigation Policy* (VLAMP).

- *24-hour PM₁₀*

Glencore's original AQIA indicated that the project would exceed the 24-hour PM₁₀ criterion of 50 µg/m³ at one privately-owned residence (Receiver 23), with a maximum predicted impact of 51 µg/m³ in Year 10. The updated AQIA indicates that project-alone air quality impacts in this area would reduce and that consequently the project would comply with the 50 µg/m³ criterion at all nearby residences. Receiver 23 would still be eligible for acquisition due to the predicted exceedances of the project specific noise levels (see the preliminary report).

In addition to impacts at residences, both AQIAs recognise that the project would exceed the 24-hour PM₁₀ criterion over at least 25% of seven private landholdings at some stage over the project's life. Three of these landholdings contain residences (Receivers 105, 114 and 116), although the residences themselves are not affected by the predicted exceedances. The remaining four landholdings are vacant lots (Receivers 18, 115, 133 and 345). The project is also predicted to exceed this criterion at Receiver 181. However, this lot is owned by a quarry operator and is not eligible for mitigation or acquisition under the VLAMP.

These predictions represent the worst-case impacts modelled over all representative years and therefore represent the total number of properties predicted to exceed the 24-hour PM₁₀ impact assessment criterion at any time over the project life. Notwithstanding that these exceedances are unlikely to occur repetitively or for any length of time, Glencore has adopted a conservative approach and assumed that any property predicted to exceed the criterion for one day in a single modelling year could exceed the criterion on at least five days over the life of the project. Consequently, Glencore has assessed all seven properties as being eligible for voluntary acquisition rights under the VLAMP.

Glencore has recently purchased the vacant lots 18 and 345. Consequently, only receivers 105, 114, 115, 116 and 133 would be eligible for voluntary acquisition and mitigation of existing residences due to 24-hour dust impacts. Receiver 105 already has acquisition rights due to noise impacts from the Integra open cut mine. The Department considers this receiver should also be granted acquisition rights for air quality impacts under the project. This would ensure that Receiver 105 is afforded appropriate mitigation to address both noise and air quality impacts. In making this recommendation, the Department has identified that Glencore should only be required to acquire this property if acquisition is not reasonably achievable under the Integra open cut approval. These outcomes are reflected in the recommended conditions at **Appendix E**.

The Department also notes that the project would result in both systemic and non-systemic exceedances of the 50 µg/m³ 24-hour criterion at a number of mine-owned properties. While there are no air quality criteria applicable for mine-owned residents, the Department has recommended conditions relating to the management of air quality impacts and due notification of current and potential tenants.

As discussed in the preliminary report, Glencore already implements a range of proactive and reactive air quality controls at the Mount Owen Complex and has committed to continue to implement best practice dust mitigation measures throughout the life of the project. With these controls in place, the Department considers that Glencore could minimise the frequency and severity of potential 24-hour PM₁₀ impacts and is therefore satisfied that the project can be appropriately managed to meet the recommended conditions of consent.

- *Annual Average PM₁₀*

In undertaking its assessment of annual average PM₁₀ impacts, the Department acknowledges NSW Health's comments concerning the February 2016 variation to national environmental assessment standards prescribed in the Ambient Air Quality NEPM and PM₁₀ air quality assessment standards that might apply over the project life.

However, while the NEPM provides guidance on establishing air quality standards, each participating jurisdiction is responsible for the application of these standards under its own laws and policies. The NEPM's revised standards are yet to be implemented in NSW. Consequently, the Department is required to assess the project against the EPA's current 30 µg/m³ annual average PM₁₀ assessment criterion, and afford any voluntary mitigation and acquisition rights in accordance with the criteria currently included in the VLAMP.

Glencore's AQIA indicates that, over the life of the project, three privately-owned residences (Receivers 111, 145 and 354) would be expected to exceed the 30 µg/m³ annual average PM₁₀ criterion due to the cumulative effects of mining in the region. However, Glencore has argued that it should not be required to acquire these properties, as these receivers are located considerable distances from the project and are primarily impacted by other, closer mining operations, ie the Integra Open Cut (Receiver 111), Ashton South East Open Cut (Receiver 145) and Rix's Creek mine (Receiver 354).

Having considered the locations of these properties and the proportionate impacts of the project, the Department considers there is merit to Glencore's argument. Receiver 111 is located within the approved Integra Open Cut pit footprint. Receiver 145 is located around 8 km south of the project and within the project boundary of the Ashton South East Open Cut, just west of the approved mining area. Receiver 354 is located around 11 km south of the project and only 1 km away from open cut operations at Rix's Creek. All three properties already have acquisition rights in respect of their nearby projects. The Department is therefore satisfied that existing arrangements are sufficient to address the project's likely impacts at these locations and has not recommended further acquisition rights under this project.

However, the TAS review identified two additional residences that are likely to exceed the annual average PM₁₀ criterion, and have a direct nexus with the project. TAS recommended that these two residences (Receivers 114 and 116) be afforded acquisition rights for potential annual average impacts. Having considered the location of the residences on these properties, the Department considers that a third intervening vacant lot (Receiver 115) may also be expected to exceed the annual average criterion.

Accordingly, the Department has recommended that Receivers 114, 115 and 116 be afforded acquisition rights for annual average PM₁₀ impacts. While this recommendation does not change the recommended acquisitions list (as all three receivers have already been recommended for acquisition due to 24-hour PM₁₀ impacts), the Department considers that it provides additional clarity and justification to those acquisition rights.

The Department also supports TAS's recommendations that relate to the proactive management of air quality impacts associated with the proposed mining operations. This has been reflected in the recommended conditions, with stronger air quality management plan requirements including the installation and operation of a weather station between or at dust monitoring stations SX9 and SX10 (ie near the closest private receivers to the southeast) and the operation of an accurate predictive dust management system aimed at minimising and better managing potential dust generating activities.

The EPA also advised that Glencore should be required to implement best practice air quality management measures, including proactive and reactive measures to minimise emissions from all crustal and combustion sources to the maximum extent achievable. The Department supports this recommendation. Draft conditions require the ongoing review and implementation of reasonable and feasible best practice management measures.

- *Annual Average and 24-hour PM_{2.5}*

The February 2016 variation to the Ambient Air Quality NEPM also contains a new national annual average PM_{2.5} criterion. The amended NEPM adopts the former advisory reporting standards as national environmental assessment standards against which PM_{2.5} emissions can be assessed. It also established further goals for the reduction of PM_{2.5} by 2025. The new standards are 25 µg/m³ (24-hour) and 8 µg/m³ (annual average).

However, as noted above, each participating jurisdiction is responsible for the application of these standards under its own laws and policies. As recognised in the Commission's Review Report, the EPA does not currently have an impact assessment criterion for PM_{2.5} and the VLAMP does not currently provide for mitigation or acquisition on the basis of PM_{2.5} impacts. Therefore, the Department must assess the project against current NSW policies and standards. Notwithstanding, the Department has reviewed the project against the new PM_{2.5} standards set out in the NEPM.

In response to comments made by the EPA, Glencore's RTS provided a revised assessment of PM_{2.5} impacts that sought to correct an error in the original modelling approach that resulted in the double counting of mining emissions. These revised figures indicate that the project would generate less than 1 µg/m³ of PM_{2.5} emissions at the closest privately-owned residence and that the project would contribute to a cumulative exceedance of the annual average 8 µg/m³ NEPM standard over part of a vacant lot (Receiver 18) during Year 10 of the project. Glencore has recently purchased this property.

Three further private residences (Receivers 111, 145 and 354) are predicted to exceed the cumulative annual average NEPM PM_{2.5} standard early in the project life. As discussed above, all three private properties are already subject to acquisition rights due to air quality impacts from other closer mining operations. Given that the project's incremental contribution to these PM_{2.5} impacts would be marginal (0.5 µg/m³ at Receiver 111 and 0.1 µg/m³ at Receivers 145 and 354), the Department does not consider that any further action is necessary.

The project is not expected to cause exceedances of the daily maximum NEPM PM_{2.5} standard at any nearby private residence over the life of the project. However, the Department notes that these levels are expected to be exceeded at several mine-owned properties.

Overall, the Department is satisfied with the acceptability of the PM_{2.5} impacts associated with the project. The Department considers that the air quality (and specifically PM₁₀) mitigation and management requirements outlined in recommended conditions of consent are sufficient to mitigate the potential PM_{2.5} impacts of the project. However, the Department considers that Glencore should be required to monitor and report on the project's PM_{2.5} emissions, and abide by the requirements of any future pollution reduction program or Environment Protection Licence (EPL) conditions that the EPA implements to manage PM_{2.5} emissions from the site.

- *Total Suspended Particulates (TSP) and Dust Deposition*

In regard to TSP and Dust Deposition, the AQIA indicates that the project would comply with relevant criteria at all privately-owned residences near the mine. The AQIA predicts one distant exception to this result, being predicted exceedances at Residence 145 in Year 1 of the project for both the cumulative TSP criterion of 90 µg/m³ and dust deposition criterion of 4.0 g/m²/month. Glencore has argued that this exceedance is principally associated with other mines and would occur regardless of the project, with the project contributing only 2% of the TSP and none of the deposited dust impacts.

As identified above, Residence 145 is located within the project boundary of the Ashton South East Open Cut, around 8 km south of the project, and has already been afforded acquisition rights under that project. Consequently, the Department does not consider that this receiver should be afforded acquisition rights under this project.

While the project is not considered to cause any exceedances at private residences, two mine-owned residences (Residences 38 and 158) are predicted to experience TSP levels greater than 90 µg/m³ and/or dust deposition in excess of 4.0 g/m²/month. While there are no set limits applicable for mine-owned properties, NSW Health has raised concerns regarding the potential health impacts on tenants of these properties. As identified in the preliminary report, the Department has already recommended conditions requiring Glencore to advise current and future tenants of the potential health and amenity impacts of the project, and allow its tenants to terminate their tenancy agreements without penalty at any time. These conditions are the current standard for mine-owned properties.

Blasting and NO_x Emissions

As reflected in the preliminary report, the Department considers that blast fume emissions can be managed through implementing appropriate mitigation measures, operational procedures and conditions of consent. However, the preliminary report also acknowledged that further assessment was required to address several issues raised in the initial TAS review, including the consideration of early morning blasting, the risk or likelihood of blast exceedances when appropriate mitigation measures are in place and a request that Glencore consider mine-owned residences in its blast management strategy.

Glencore's response to the TAS review clarifies that it modelled each hour of the baseline year to determine meteorological conditions and events that would be likely to pose a risk of NO_x exceedances for blast events carried out between 7 am and 5 pm. Glencore has provided an explicit commitment to implement relevant controls under an updated Blast Fume Management Plan and ensure that it does not undertake any blasts during conditions that are likely to cause exceedances.

TAS has stated that it is satisfied that Glencore's response sufficiently addresses the concerns raised in its initial independent review and noted that "*blast management is a well-established practice in the Hunter Valley and this is not seen as a significant issue for this Project provided that the normal best practice measures for blast management are adopted.*"

The existing Mount Owen Complex has been able to operate for many years with relatively few blasting-related issues and the Department is confident that blast fume emissions associated with the project could continue to be managed to comply with relevant limits.

Diesel Emissions

As discussed in the preliminary report, the EPA's earlier submissions asked that Glencore provide a discrete assessment of the project's diesel emissions (ie separate to other particulates). Glencore's two air quality consultants and TAS responded to these requests by noting that the AQIA assessed diesel emissions as part of overall emissions, which was consistent with established practice and sufficient to assess the merits of the project.

The Department acknowledges that the management off-road diesel emissions has been a longstanding EPA priority. On 28 June 2016, the EPA held a meeting with Hunter Valley coal mining companies to present an overview of a proposed pollution reduction program aimed at best management practices to minimise site specific diesel emissions from off-road mobile equipment. The EPA reported that it was seeking to confirm current diesel emission levels and identify practicable (ie technically and operationally feasible) mitigation measures to reduce PM_{2.5} emissions from diesel combustion equipment that could be tailored to site-specific considerations and mining fleets and implemented via management plans. Glencore attended this meeting and presented information on diesel emission reduction measures it is already implementing for its NSW projects and the challenges in achieving further reductions.

On 22 June 2016, the EPA provided advice to the Department identifying that it was satisfied that Glencore's response to the Commission's Review Report adequately addressed its air quality concerns, subject to the imposition of two conditions. These conditions included a requirement for Glencore to estimate the PM_{2.5} emissions arising from the operation of diesel engines on-site and a requirement for Glencore to implement all reasonable and feasible measures to minimise PM₁₀ and PM_{2.5} emissions from the project, including proactive and reactive measures to minimise all emission sources (ie both crustal and combustion) to the maximum extent achievable.

The Department supports the EPA's objective to regulate and manage off-road diesel emissions and has included its proposals in the recommended conditions. This includes a requirement for Glencore to include a baseline estimate of the project's off-road diesel emissions in the Air Quality Management Plan. If the EPA determines that any further or specific management measures should be implemented, then these measures could be implemented through the project's Air Quality Management Plan or through the EPA's EPL. The Department also notes that Glencore already implements a number of measures to minimise diesel use at Mount Owen and has a significant economic incentive to continue to focus on improving its vehicle efficiency and reduce diesel consumption.

The Department is satisfied that appropriate measures are in place to manage diesel emissions from the project and that the EPA's recommendations have been adequately addressed.

Greenhouse Gases

As stated in the preliminary report, the Department is satisfied that the average annual greenhouse gas emissions from the project would not materially change relative to the existing operations, and that these

represent a very small proportion of Australia's annual average emissions under relevant international agreements. Aside from Glencore's financial interest in reducing its on-site diesel use and energy costs, the Department is satisfied that the project's Scope 1 and Scope 2 emissions would be adequately managed and minimised through application of the recommended conditions of consent and best practice management measures.

Conclusion

Overall, the Department is satisfied that, with the implementation of appropriate management and mitigation measures, including those discussed in the preliminary report and recommended in the TAS review, the project could be managed to achieve acceptable air quality impacts. To address the residual predicted impacts at residents in the Middle Falbrook area, the Department has recommended that several properties be afforded acquisition rights under the recommended conditions of consent.

Commission Recommendation 9

That the Department make the Applicant's response to the peer review of the AQIA, as well as any updated peer review, and any other additional information, available online as soon as practicable.

The Department has made the final TAS review and Glencore's response to the initial TAS review available on its website. Glencore's response to the final TAS review is contained within its Response to the Commission Review Report, which is also available on the Department's website. In addition, the Department has provided a copy of the final TAS review at **Appendix C**.

4.3 Final Landform and Rehabilitation

The Commission made six recommendations regarding Glencore's proposed final landform and rehabilitation plan, which sought further clarification of approved final landform features, consideration of post-mining land uses, reviews of the proposed mine plan and comments on the recommended conditions of consent. These recommendations are considered in order below.

4.3.1 Approved Final Voids

Commission Recommendation 10

That, prior to determination, the Department clarifies the number of currently approved final voids and seeks further justification from the Applicant for any additional proposed final voids.

The Department's preliminary report expressed concerns with the level of justification provided by Glencore in relation to the number and design of final voids to be retained in the post-mining landform. To address these matters and strengthen final landform outcomes, the Department asked Glencore to provide additional information on options to reduce the size, depth and number of final voids. The Commission's recommendation reflects this same concern.

Glencore initially responded to the Department in June, indicating *inter alia* that the Ravensworth East consent allowed the retention of a final void associated with its Stage 3 tailings emplacement area. On 13 July 2016, the Department wrote to Glencore disputing this position and noting that the Stage 3 tailings emplacement area is a temporary structure that must be backfilled and capped prior to closure. The Department asked Glencore to provide evidence of any existing approval to retain a void at the Ravensworth East mine.

On 22 July 2016, Glencore wrote to the Department acknowledging its mistake regarding the Stage 3 tailings emplacement area and clarifying that the March 2000 Ravensworth East consent allows for the retention of a final void along the eastern boundary of the site, adjacent to the Mount Owen rail loop. Glencore noted that this final void is shown in its approved 2015-2019 Mining Operations Plan for the Mount Owen Complex, but that its current Landscape Management Plan (which incorporates its Final Void Management Plan and Mine Closure Plan) has not been updated to reflect the approved sequencing of mining in this area. Glencore has committed to review and update these documents.

The Department agrees that the original March 2000 Ravensworth East consent allowed for the retention of a final void approximately 3 km long by 250 m wide along the eastern boundary of the mine. Subsequent modifications resulted in the southern two-thirds of this approved void being backfilled with tailings and overburden, but did not affect the original approval to undertake mining activities to the north of the TP1 tailings emplacement area nor the retention of a final void in this area. The Department therefore confirms that Glencore has approval to retain a final void at the Ravensworth East mine.

Glencore therefore has existing approval for three final voids at the Mount Owen Complex, being the:

- North Pit final void at the Mount Owen Coal Mine, located near the southern limit of the North Pit;
- final void at the Ravensworth East Coal Mine, located north of the TP1 tailing storage and along the eastern limit of the approved mining area (referred to as the Bayswater North Pit Void); and
- Barrett Pit final void at the Glendell Coal Mine, located near the western extent of the Glendell mining area. It should be noted that this void is governed under a separate consent for the Glendell mine and is not part of this project.

4.3.2 Strengthened Final Landform Outcomes

Commission Recommendation 11

That, prior to determination, the Department seeks further information about alternative post-mining land use options, including the possibility of increasing woodland rehabilitation on steeper slopes and focusing on agricultural species on the flatter areas of land to support grazing activities.

Post Mining Land Use Options

The Department supports the Commission's recommendation regarding post mining land use options. This recommendation builds upon and supports the Department's previously established position, that Glencore's original mine plan and associated rehabilitation strategy left a number of opportunities for improvements to rehabilitation, biodiversity and future land use options for the site.

Glencore has since provided additional information and revised future land use plans for the site in its response to the Commission's Review Report. This response identifies that soil properties on the site are a constraint on potential future land uses and that the establishment of woodland for biodiversity outcomes would provide more beneficial outcomes than the establishment of low-intensity grazing land.

Notwithstanding, Glencore's revised final landform and rehabilitation plans do include a mix of potential future land uses and a more intuitive distribution of woodland and grassland areas. Woodland areas have been expanded to provide additional biodiversity corridors and focus on the more steeply sloped areas of the site. Grassland would be established on the generally flatter areas of the site that have greater potential for future grazing, industrial or agricultural uses.

The Department considers that the revised final landform and rehabilitation plans would achieve an appropriate balance of future land uses, including agricultural, biodiversity and industrial outcomes.

Commission Recommendation 12

That, prior to determination, the Applicant provides a revised mine plan that:

- *includes more detailed consideration of the potential minimisation of final voids, with particular reference to the large volumes of overburden material that would be moved over the life of the project;*
- *provides more detail about the final void shapes and how these are to be achieved;*
- *incorporates micro-relief, with a focus on ensuring that the final landform will be more sympathetic to the surrounding landscape; and*
- *includes a more refined composition of proposed vegetation within the rehabilitated areas in order to ensure a diversity of species and appropriate fauna habitat.*

Mine Design and Final Landforms

In response to the Commission's Review Report, Glencore has made a number of material amendments to the proposed mine plan and offered a range of improved final landform outcomes for the project.

These amendments include the removal of extractive activities in the RERR Pit mining area, which reduces the project's ROM coal extraction from 92 Mt to 86 Mt. This change reduces the number of final voids proposed under the project to two and means that the project would not increase the number of approved final voids at the Mount Owen Complex. It would also reduce the total post-mining surface water catchment draining to final voids and improve the staging of rehabilitation. As Glencore is no longer seeking to operate the North Pit and RERR Pit concurrently, it would also reduce amenity impacts in the later years of mining.

Glencore has also proposed several improvements to the shape and integration of the proposed final voids with the surrounding landscape. The revised mine plans and final landforms shown in Figures 2.1 to 2.4 and Figure 4.6 of Glencore's response to Commission's Review Report highlight the significant changes made to the Bayswater North Pit void, including incorporation of gentler slopes, micro-relief features and additional woodland rehabilitation corridors that connect with Ravensworth State Forest.

The North Pit void has also been amended to improve the slope and curvature of final highwalls and integrate the post-mining rehabilitation domains with the surrounding natural landscape. In addition to improving the geotechnical stability and safety of the final highwalls, these changes reduce potential long term views of the North Pit highwall from the intersection of Glennies Creek Road and Middle Falbrook Road.

With respect to the overburden material to be moved by the project, the revised mine plan now proposes to leave a large volume of overburden material in the currently backfilled RERR Pit, meaning that this material is no longer available to partially backfill the Bayswater North Pit. This change in emplacement location means that, while the total surface area of all pit lakes and void catchments has been reduced, the catchment area and pit lake associated with the Bayswater North Pit void would increase. The Department supports the use of available overburden material in the revised mine plan and considers that the backfilling and removal of the RERR Pit final void from the post-mining landscape would provide greater environmental benefits than the partial backfilling of the Bayswater North Pit.

Glencore has clarified that it would use the Bayswater North Pit as an operational water storage and/or future tailings emplacement area in the short to medium term. Following the completion of mining operations at Mount Owen, Glencore would then decommission the residual final void area by flattening the in-put overburden and battering back the highwalls, to create a more stable final landform and smoother slopes leading to the final void lake. These slopes would be rehabilitated with woodland vegetation, reducing the potential for offsite views and providing additional biodiversity corridors.

Glencore's revised rehabilitation plan incorporates additional habitat linkages for threatened fauna and the establishment of wider woodland corridors that would be more resilient to potential edge effects. Glencore has acknowledge the benefits of establishing a diversity of vegetation across the mine site and tailoring the targeted communities to match local soil and landscape characteristics. Glencore has committed to refine the mix of woodland communities in its Rehabilitation Management Plan.

The Department considers the revised mine plan, final landforms, micro-relief features and rehabilitation plans to be material improvements on Glencore's original proposal. The Department is now satisfied that Glencore has undertaken all reasonable and feasible efforts to minimise the number and extent of final voids, and blend the residual final voids into the surrounding landscape. The Department now considers that the project meets contemporary standards for final landform design and has reflected the revised mine plans and rehabilitation completion criteria in its recommended conditions of consent.

Commission Recommendation 13

That the recommended preliminary conditions relating to the Rehabilitation Management Plan and/or Revision of Strategies, Plans and Programs are strengthened to take into account the outcomes of any review of the NSW Government's current policy on final voids.

The Department is currently working to develop a comprehensive set of principles for determining the acceptability of final landform and rehabilitation outcomes for major mining projects. These principles will set out the NSW Government's expectations regarding final landform and closure outcomes for major mining projects and provide decision makers with guidance on the measures necessary to achieve safe, stable and non-polluting landforms that maximise beneficial community, economic and environmental outcomes and achieve improved integration with surrounding land uses. As part of this policy document, the Department and DRE intend to outline specific considerations that relate to the design and overall acceptability of any final voids that are intended to be retained in the post-mining landscape. However, this policy is still in the early stages of development. Consequently, the Department is not able to make specific reference to the policy in recommended conditions of consent.

The Department acknowledges that the Commission's recommendation seeks to strengthen the final landform design and rehabilitation outcomes for the project. The Department is satisfied that Glencore's revised final landform and the recommended conditions of consent represent best practice for final landform development and management in NSW. However, it is possible that any additional requirements or outcomes set out in the policy could be applied to the project by way of future reviews of operational management plans for the Mount Owen Complex.

This includes the Rehabilitation Management Plan required under the recommended conditions of consent and also DRE's Mining Operations Plan. DRE is the relevant NSW Government agency responsible for the regulation of mining operations, final landforms and closure processes. DRE's Mining Operations Plans contain appropriate flexibility to enable their regular review and consequent incorporation of contemporary standards for mine rehabilitation and closure.

4.3.3 Strengthened Rehabilitation Outcomes

Commission Recommendation 14

That the recommended preliminary condition of consent relating to the Independent Environmental Audit should be linked to the preliminary Rehabilitation Management Plan condition to ensure that rehabilitation is independently monitored and audited on a regular basis.

Independent Reviews of Rehabilitation

The Department supports the Commission's recommendation that regeneration, revegetation and rehabilitation activities should be independently monitored on a regular basis, to ensure that Glencore is achieving its stated goals and trending towards the establishment of target vegetation communities.

The Department has amended its recommended conditions to include requirements for Glencore to undertake seasonally-based monitoring of its biodiversity management, rehabilitation and regeneration measures, identify any progressive improvements that could be implemented to improve biodiversity outcomes and report on these measures in the annual environmental reviews. Glencore's performance against these outcomes would then be independently assessed as part of the required triennial independent environmental audits. In addition to these requirements, the Department notes that DRE would also be closely involved in monitoring and enforcement of rehabilitation outcomes through its Mining Operations Plan for the Mount Owen Complex.

Commission Recommendation 15

That the Department reviews intentions to mine existing rehabilitated land and considers options to ensure that the proposed rehabilitated areas are not disturbed in the future, through conditions of consent or any other means.

Security of Rehabilitation Areas

The potential for future disturbance of previously rehabilitated areas at the Mount Owen Complex is largely influenced by the history of mining on the site. Over time, different lease holders have held stratified mining titles over this land and have extracted coal to various depths. Given technological advances in the development of deeper pits and with all mining tenements now held under common ownership, Glencore has identified opportunities to maximise the recovery of deeper coal resources.

Given that the majority of the Mount Owen Complex has already been mined to significant depths, the Department understands that very limited areas have potential to be re-mined in future. The most economically viable areas include the Bayswater North, TP1 and RERR Pits, as they have previously been mined to very shallow depths, would require minimal overburden rehandling and contain sufficient deeper coal resources. Of these areas, Glencore now only proposes to re-mine the Bayswater North Pit. Most of this area is already disturbed and has not been rehabilitated, meaning that the project would recover a significant amount of coal with minimal additional clearing.

Glencore's decision to not re-mine the RERR Pit and complete its backfilling of this area avoids both the disturbance of existing grassland rehabilitation and allows for the accelerated establishment of woodland communities. The revised rehabilitation and final landform plans show the retention of wide corridors of rehabilitated woodland over the RERR Pit and TP1 tailings emplacement area. As these rehabilitated woodland areas form part of Glencore's biodiversity offset package, the Department has provided for their long-term protection in the recommended conditions.

The Department does however acknowledge that further technological improvements, improved market conditions or additional exploration drilling may make re-mining of other areas of the site more viable in the future. Should Glencore choose to pursue any such opportunities, it would be subject to a separate development application and rigorous merit assessment of the likely impacts on rehabilitated land, vegetation corridors, habitat connectivity and threatened species.

The Department also notes that the recovery of deeper coal seams from previously disturbed areas can often result in fewer environmental impacts than the extraction of an equivalent amount of coal from a greenfield site. Given the economic recovery of the State's mineral resources is an important consideration under the EP&A Act, the Department is reticent to preclude potential future mining opportunities within previously disturbed and rehabilitated areas, prior to the cessation of mining.

Consequently, to provide for the protection of rehabilitated woodland areas without sterilising the recovery of the State's mineral resources, the Department's preliminary report recommended a condition

that requires Glencore to make suitable arrangements for the long term protection of rehabilitated woodland areas within 12 months of the cessation of mining. The Department considers this to be a reasonable or feasible timeframe for the protection of these areas, especially given that rehabilitated woodland areas would be landscaped or established progressively over the mine life.

Notwithstanding, the Department has sought to strengthen its recommended conditions relating to both the establishment of regenerated and rehabilitated woodland areas, and Glencore's accountability for monitoring, reporting and evidencing the success of these activities. The Department is satisfied that together, the progressive rehabilitation and long term conservation requirements in its recommended conditions provide sufficient protection for the biodiversity values of rehabilitated areas.

4.4 Water Management

The Commission made three recommendations relating to water management, which required the Department to consult with relevant government agencies and to consider further refinements to recommended conditions for surface and groundwater management over the life of the mine.

4.4.1 Further Agency Consultation

Commission Recommendation 16

That, prior to determination, the Department seeks further comments from:

- *EPA about the discharge of surplus water from this project; and*
- *DPI Water about water licensing and associated issues, particularly in relation to the proposed surface water management system, the significant volume of water proposed to be held in dams that would require licensing under Jerry's Water Source, and the reconstruction and rehabilitation of watercourses in the final landform.*

The EPA's initial submission on the project identified that the existing EPLs for the Mt Owen and Ravensworth East mines did not allow for the direct discharge of surplus water to the environment. The EPA noted that any surplus water balance generated by the project could be transferred to other nearby Glencore mines under Glencore's Greater Ravensworth Water Sharing Scheme (GRWSS), and that this water could then be used or discharged under the relevant EPL conditions for those sites.

DPI Water's initial submission also raised issues with aspects of the project's predicted groundwater and surface water impacts, water balance, proposed surface water management system and licensing arrangements for the final landform. DPI Water noted that these issues could generally be addressed through the provision of additional information or under a Water Management Plan for the project.

The Department considered these matters in detail in its preliminary report and confirmed that with appropriate conditions in place, the project's water impacts were likely to be acceptable. The Department recommended that further consultation be undertaken with the EPA and DPI Water to confirm the acceptability of water impacts following any changes or refinement to the final landform. This requirement for further consultation is reflected in the Commission's recommendation.

No Additional Discharge of Surplus Water

The Department obtained further advice from the EPA on 22 June 2016, which stated that *"the matter of potential surface water discharges has been adequately addressed by the proponent's response to the PAC review"* (see **Appendix B**). The EPA noted that the project *does not* involve the discharge of surplus water to the environment and that any surplus water would be managed through the GRWSS.

The GRWSS is an approved water management scheme that allows Glencore to transfer water between its mining operations in the Greater Ravensworth area (see the Department's preliminary report). The Department supports this strategic approach to water management and acknowledges that it provides for more efficient water management across several coal mines with the aim of reducing or avoiding water deficits and surpluses. This system helps to optimise re-use of surplus water, reduce the volume of surplus water discharged to the environment and minimise the need to obtain clean water from the environment for use in mining operations. The storage capacity of the GRWSS has been increased by 2 Gigalitres recently through construction of the Reservoir North water storage at Glencore's Liddell Coal Mine. The GRWSS has also allowed Glencore to remove a number of licensed discharge points, including from the Mount Owen Complex in November 2014.

The EPA explained that, as a consequence, any future proposal by Glencore to discharge surplus water from the complex would be subject to a new application to vary the complex's EPL and would be assessed by the EPA. This process had been previously referred to in the EPA's submission on

Glencore's RTS, which stated that *"any proposed discharges from the premises will be pursued by the Proponent, if required, separately to this project"*.

The Department acknowledges that Glencore currently holds licences that permit discharge of surplus water to the environment from its Ravensworth and Liddell Coal Mines. Both of these mines participate in the GRWSS and have maximum limits on the quantity of surplus water that may be discharged under each mine's EPL. Glencore has confirmed in its response to the Commission's Review Report that the project *would not* increase the existing amount of surplus water that Glencore is currently allowed to discharge to the environment from Ravensworth and Liddell mines under existing EPL conditions. Any future request to increase these limits would be assessed by the EPA.

Surface Water Licensing

DPI Water provided the Department with advice on the project in March 2016, which identified that DPI Water "accepts there may be reasons for some dams remaining in the final landform, including final land use and environmental purposes" but that further information was required to ensure that associated surface water take was appropriately accounted for and licensed (see **Appendix B**). This advice was provided to Glencore to address in its response to the Commission's Review Report.

The Department wrote to DPI Water again in June 2016, to confirm whether Glencore had adequately addressed DPI Water's concerns in its response to the Commission's Review Report. DPI Water advised that its review of the response indicated that the estimated total volume of dams in the final landform may exceed the harvestable rights and water access licences currently held by Glencore. DPI Water requested a meeting with Glencore to confirm how land ownership had been considered in calculating harvestable rights and the availability of additional water access licences for the project.

Following this meeting, Glencore provided DPI Water with a conceptual framework for licensing of water storages in the final landform and calculations of its expected water licensing requirements, which included identification of existing harvestable right and water access licence entitlements. Glencore also proposed to transfer surplus water access licences to the Forestry Corporation to account for anticipated surface take above harvestable rights for the final landform within the Ravensworth State Forest.

In response to the conceptual framework and additional information, DPI Water identified that:

- it was unclear whether Glencore had included stock and domestic dams or dams with a volume of less than 1 ML built prior to 1 January 1999, in its calculations of maximum harvestable rights;
- a 450 ML water access licence identified by Glencore as applying to the Glennies Creek Water Source of the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Source* had been incorrectly converted from a previous aquifer category water access licence and as such, could not be used to account for surface water take in the final landform; and
- that further information was required for DPI Water to confirm whether it is possible for Glencore to obtain the necessary volume of water access licences from the Glennies Creek Water Source to account for the predicted surface water take associated with the final landform.

Glencore then provided DPI Water with additional information on 12 July 2016 and attended a further meeting with DPI Water on 3 August 2016. On 16 August 2016, DPI Water advised the Department that it was satisfied with the methodology used to calculate catchment loss and to estimate the volume of water take for the proposed final landform. DPI Water also advised that it was satisfied that Glencore would be able to obtain sufficient water entitlements to account for the estimated water take of the final landform from the existing market share of the Glennies Creek Water Source.

In providing this advice, DPI Water made four recommendations relating to conditions of consent. These supported the Department's recommendation that Glencore be required to ensure that it has sufficient water for all stages of the development or else adjust the scale of its operations to match available water supply. They would also require Glencore to consult with DPI Water regarding its Water Management Plan and the final design and licensing requirements of the proposed final landform for the project. The Department has reflected DPI Water's recommended conditions of consent in **Appendix E**.

4.4.2 Surface and Groundwater Conditions

Commission Recommendation 17

That the recommended preliminary condition of consent for the Groundwater Management Plan includes consideration of operations at Integra Underground Mine and any associated impacts.

Glencore's response to the Commission's Review Report noted that the regional groundwater model that formed the basis for its original and revised groundwater impact assessments already accounts for the ongoing operation of the Integra Underground Mine. Further, Glencore noted that it has recently acquired the Integra Underground Mine from Vale and has agreed to incorporate consideration of the Integra Underground Mine in its Groundwater Management Plan for the Mount Owen Complex.

The Department supports the Commission's intention to manage the potential groundwater impacts and interactions of these two adjacent and overlying mining operations in an integrated fashion. The Department has modified its recommended conditions of consent to give effect to the Commission's recommendation and expects that this condition will be readily achievable now that both operations are under common ownership.

Commission Recommendation 18

That the recommended preliminary condition of consent for the Surface Water Management Plan should include consideration of the discharge of surplus water from this project.

As discussed in relation to the Commission's sixteenth recommendation, the project does not involve any proposed discharge of surplus water to the environment. The Department and EPA are both satisfied that any surplus water balance at the Complex would be effectively managed via the GRWSS.

The Department considers that its recommended conditions of consent include appropriate monitoring, reporting and performance measures for the management of surplus water at the project. These conditions require that all mine water storages are designed to ensure no unlicensed discharge or transfer of water off-site; include detailed requirements relating to the management, monitoring and reporting of water transfers under the GRWSS; and reporting on these matters in the Annual Review.

The recommended conditions also require Glencore to periodically validate its water balance, salt balance, surface water take and groundwater model in light of ongoing monitoring, and use all reasonable and feasible endeavours to develop a protocol to minimise cumulative water quantity and quality impacts and encourage efficient water use between nearby mining operations.

The Department also considers that existing statutory obligations, including section 120 of the *Protection of the Environment (Operations) Act 1997*, sufficiently protect and prohibit the pollution of water, unless expressly permitted under an EPL. As noted by the EPA, any licence variation would be subject to its assessment if and when it was made. While this statutory protection of the environment applies despite any conditions of consent, the Department's practice has been to include a reference to section 120 in recommended conditions of consent (see condition 23 of Schedule 3).

Overall, the Department considers that the recommended conditions adequately address the intent of the Commission's recommendation, especially given that the project would operate as a 'nil discharge' site except for overflow from sediment dams under high rainfall conditions. The issue of overflow from sediment dams was comprehensively assessed in the preliminary report and performance measures were recommended as part of the proposed conditions to ensure sediment dams are constructed in accordance with industry-accepted standards that seek to minimise spills to the environment.

4.5 Aboriginal Cultural Heritage

The Commission made one recommendation regarding Aboriginal cultural heritage, as follows.

Commission Recommendation 19

That, prior to determination, the Department consider the findings and any potential implications of the recent court case, LALC v Minister for Planning Infrastructure and Anor (re Calga Sand Mine) in relation to the adequacy of the cultural heritage assessment for this project.

The Department first notes that the Commission's Review Report recorded that it was "generally satisfied that any Aboriginal cultural heritage impacts would be appropriately managed and mitigated" under the recommended conditions of consent, which reflected the recommendations made by OEH.

However, in response to a submission on behalf of a Native Title claimant group, the Plains Clans of the Wonnarua People (PCWP), the Review Report also stated that "While the Commission is generally satisfied that the Aboriginal cultural heritage consultation and investigation processes were comprehensive for this project, the Commission recommends that [the] Department also consider the findings and any potential implications of this court case". The Department has therefore considered the findings and any potential implications of this court case.

Calga Sand Quarry, which was at the time of the case operated by Rocla Materials Pty Ltd (Rocla), was granted project approval by the Commission on 23 December 2013. Two objectors, the Darkinjung Local Aboriginal Land Council (Darkinjung LALC) and the Australian Walkabout Wildlife Park Pty Ltd (AWWP), subsequently appealed this decision to the Land and Environment Court (LEC) on the separate grounds of impacts to Aboriginal cultural heritage and to non-Aboriginal cultural heritage, respectively. The non-Aboriginal cultural heritage grounds were withdrawn during the appeal following an agreement between the Rocla and the AWWP.

Darkinjung LALC contended that the proposed expansion of the quarry's extraction area would impact on the cultural landscape associated with a site of high significance (a 'women's site'). The LEC found that there was not enough evidence to rule out the danger of the development significantly compromising the Aboriginal values of the cultural landscape. The LEC also determined that there was insignificant knowledge about the cultural significance of the women's site in its cultural landscape and that this should be obtained prior to granting approval. The LEC considered that further archaeological, historic and ethnographic research was required, including consultation with Aboriginal stakeholders.

The LEC also found that there was a possibility of new Aboriginal sites of high significance being discovered within the quarry disturbance area. The surveys of the disturbance area had not been adequate to exclude the possibility of new sites being discovered because thick vegetation restricted the coverage of the survey and there had been no predictive model developed prior to carrying out the surveys.

The Department considers that the case did not affect the legal framework for Aboriginal cultural heritage assessment but rather made findings of fact largely in regard to the comprehensiveness of survey effort and significance assessment, based on the specific circumstances of the case.

In relation to the MOCO project, the Department and OEHL are both satisfied that Glencore has undertaken suitably detailed and comprehensive archaeological and survey work, which has included ongoing consultation with Registered Aboriginal Parties (RAPs) and knowledge holders (including PCWP) in accordance with relevant OEHL guidelines and statutory requirements.

Glencore's Aboriginal cultural heritage assessment included:

- identification of Registered Aboriginal Parties (RAPs) and knowledge holders (including those groups with current or former registered Native Title claims in the region);
- assessment of cultural values and significance of Aboriginal sites including detailed archaeological investigations, based on the involvement of RAPs and knowledge holders;
- engagement of three knowledge holder groups to prepare their own cultural values assessments;
- development of a predictive model to inform surveying of the site, with good coverage of the site achieved during the survey; and
- RAPs and knowledge holders were provided with opportunities to participate in archaeological surveys of the area and received copies of the draft Aboriginal Survey report and the Cultural Heritage Assessment report for comment prior to these documents being finalised.

Glencore also provided opportunities for other RAPs and knowledge holders which were not directly engaged to participate in workshops and site visits and provide input on cultural values and the significance of sites located in areas to be disturbed.

Glencore's assessment identified nearly all Aboriginal sites as having low significance. The three exceptions were identified as having low to moderate significance. This contrasts with the Calga Sand Quarry, in which the matter of dispute related to whether the area around an identified site of high Aboriginal cultural significance (ie the 'cultural landscape') had been adequately assessed. The LEC found that it had not.

The Department has considered the findings of the Calga Sand Quarry case and considers that its potential implications are in ensuring that adequate and sufficient Aboriginal cultural heritage assessments are undertaken, in particular in relation to sites of high Aboriginal cultural significance and any related cultural landscape. As the MOCO project has been subject to a detailed Aboriginal cultural heritage assessment and would impact upon sites of low or low to moderate significance, the Department considers that this case has no relevant implication for the determination of the project.

4.6 Socio-Economic

The Commission noted that the Department's independent reviewer, the Centre for International Economics (CIE) identified several aspects of Glencore's cost-benefit analysis which required revision

and/or greater transparency. While the Department considered Glencore's response to the CIE's review, CIE had not reviewed this response before the Commission completed its merit review. The Commission came to the view that it was unable to determine its final position with respect to the economic benefits of the project and agreed with the Department that further advice from CIE was necessary.

Since publication of the Commission's Review Report, Glencore has made a number of material changes to the project. Glencore therefore provided a revised CBA, which had been updated to reflect those changes as well as to reflect more recent market conditions.

Commission Recommendation 20

That, prior to determination, the Department ensures that the cost-benefit analysis for the project has been prepared in accordance with the relevant guidelines, including the NSW Government Guidelines for Economic Appraisal (NSW Treasury, 2007) and the Guidelines for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals (NSW Government, 2012).

In its first independent review (September 2015), CIE concluded that the project's CBA had been undertaken in a manner that was consistent with NSW Government guidelines, despite there being a number of issues where further clarification was required.

The Department requested that CIE also review Glencore's additional information (dated 26 October 2015) and also confirm that the revised project's CBA had been undertaken in accordance with the Commission's Review Report. CIE advised that it was satisfied that Glencore had addressed all issues raised in its original review, with the exception of attributing the full cost of externalities to NSW.

CIE identified the revised project CBA had only attributed a portion (32% or \$11.14 M) of the total estimated cost of carbon emissions (\$34.8 M) from the project to NSW, despite the new *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* stating that the full amount should be attributed to NSW. This was then rectified in the sensitivity testing undertaken by CIE.

The Department therefore considers the revised project CBA (as amended by CIE) has been undertaken in accordance with relevant guidelines, including the *NSW Government Guidelines for Economic Appraisal* (NSW Treasury 2007) and the *Guidelines for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals* (NSW Government 2012). The Department also notes that CIE has undertaken its own analysis to test the net benefit to NSW as it would be determined under the new *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*. Overall, the Department is of the view the Commission's recommendation has been satisfied.

Commission Recommendation 21

That, prior to determination, final advice on the EIS, including on air quality, biodiversity and final landforms should be reflected in the CBA.

Glencore's revised CBA takes into account all updates made to relevant impact assessments, including air quality, biodiversity and final landforms. These assessments are separately considered below.

4.6.1 Valuation of Air Quality Impacts

When the Department's independent air quality reviewer (TAS) had completed its review of the AQIA, it reported that it was satisfied that there was sufficient information to fully assess air quality impacts and whether properties should receive acquisition or mitigation benefits under the VLAMP. The TAS review focussed on the technical aspects associated with undertaking a predictive air quality modelling exercise to inform impact assessment conclusions.

Separately, the Department and CIE queried the EIA's use of a 2005 study by the then NSW Department of Environment and Conservation which led to an estimate of the value of the project's residual air quality impacts (based on receivers located in Singleton Heights) at \$13.2 M. CIE noted that the use of unit damage costs published in a much more recent study by PAE Holmes¹ would lead to a much higher value of \$27.4 M for the project's air quality impacts. CIE therefore considered that a range of estimates of air quality impacts should be provided to reflect this uncertainty.

¹ PAE Holmes (2013), *Methodology for valuing the health impacts of changes in particle emissions – final report*, NSW EPA, available from <http://www.epa.nsw.gov.au/air/costcurves.htm>.

Glencore initially opposed this position, with PEL arguing that there were sufficient technical grounds to not use unit damage costs in estimating the cost of residual air quality impacts. Nonetheless, a revised assessment was provided as part of Glencore's response to the Commission's Review Report.

This revised assessment used two methods, including unit damage costs from the PAE Holmes study (as requested by CIE and the Department) and an 'approximated impact pathway approach'. The Department notes that the PAE Holmes study considers an 'impact pathway approach' to be the most thorough and detailed method for valuing changes in air quality. However, PEL's approximated approach provides a useful alternate scenario (which in this case, is a lower bound estimate).

The unit damage cost method produced an estimate of the residual value of air quality impacts of up to \$39.9 M. PEL argued that the PAE Holmes method provides less consideration of localised factors (including meteorology), assumes that the emission source is located an equal distance from all receivers and calculates a representative cost for the nearest populated area (ie Singleton). In particular, this method applies a uniform cost to all receivers in the nearby area, despite the fact that the project is located 10 km from the boundary of Singleton urban area and 20 km from the town itself.

In contrast, the approximated impact pathway method estimated a much lower cost of \$4.9 M. The main difference in this approach is that it is focussed on the smaller number of receivers located closer to the mine, as compared to the much larger number of receivers located in the Singleton urban area. This approach recognises that residents located in close proximity to emission sources incur the highest per capita costs of the project and that the relative costs progressively decrease as emission levels disperse over distance (noting that, in this case the peri-urban and urban areas are indeed rather distant).

CIE noted that the CBA for the revised project included the much lower approximated impact pathway cost for air quality of \$4.9 M but considered that, even if the much higher upper estimate of \$39.9 M was used, the revised project would still be expected to deliver a net benefit to NSW.

The Department is satisfied that Glencore has provided an alternate methodology to value air quality impacts to test the sensitivity of the original method, as requested by CIE. However, it must note the wide range of estimates of the cost to the community of the project's air quality impacts. Estimates of \$4.9 M, \$13.2 M, \$27.4 M and \$39.9 M have been put forward. These estimates vary by a factor of over eight. They would seem to demonstrate that while each assessment approach has strengths and weaknesses, the science and methodology of this form of impact assessment is far from settled. While the Department does not consider it possible to select one figure as being more reliable than the others, it does have sympathy for Glencore's position that the project is located a substantial distance from urban and peri-urban populations, and that relatively higher air quality costs would be incurred by those receivers located in closer proximity to the project boundary. The Department accepts CIE's view that, regardless of which of these figures is applied for the purpose of assessing the project's costs and benefits, the project would lead to a net benefit for the people of NSW.

In relation to the changes made to the project in respect of biodiversity, the Department notes that Glencore would be fully offsetting all residual impacts. The cost of implementing the revised offset is a private cost to Glencore, which is deducted from its private benefit (ie revenue from coal sales). Similarly, changes made to the final landform represent an increase (or decrease) in costs to Glencore (against its revenue stream). None of the revised project's changes to biodiversity or final landform outcomes result in material changes to predicted residual impacts. Therefore, there are no further external costs that need to be valued and included in the CBA.

In conclusion, the Department, based on the advice of CIE, is of the view that the CBA has accurately reflected the revised project and that it supplies the full reasonable range of the cost to the community of residual air quality impacts. Overall, the Department is of the view that Glencore has satisfied the Commission's recommendation.

Commission Recommendation 22

That, prior to determination, the peer reviewer be given an opportunity to indicate whether the Applicant's response adequately addresses the issues raised in the peer review.

CIE has advised the Department that Glencore's response has adequately addressed all issues raised in its original review. Accordingly, the Department considers the Commission's recommendation has been satisfied.

4.6.2 CBA Sensitivity Analysis

Commission Recommendation 23

That, prior to determination, the Applicant provide additional information on the methodology employed to produce estimates of the value of the project under alternative scenarios, including the sensitivity of individual variations against the base-line assumptions, how the various scenarios for coal prices, carbon prices and extraction volumes relate to one another and under what conditions the project would generate a zero net present value.

The Commission noted that CIE's independent review identified that the transparency of sensitivity analysis undertaken in Glencore's original economic impact assessment (EIA) could be improved. The Commission considered this to be important because Glencore's EIA was suggesting that, if coal prices decreased by 30%, then the project would have a present value of negative \$165 M, before deducting externalities. In other words, the project may become unviable for Glencore if coal prices are significantly lower than expected. The Commission considered that *"It would be useful therefore to understand how the various scenarios for coal prices, carbon prices and extraction volumes relate to one another and under what conditions the project would generate a zero net present value"*.

Glencore's response

Glencore provided an updated CBA for the revised project, which estimated a net benefit to NSW of \$312 M including \$197 M in royalties. This updated CBA reflected the revised project but was also based on market assumptions from the original project's CBA, to allow direct comparison. As with the original project's CBA, the sensitivity of the revised project was tested against changes in coal prices, capital investment value, operating costs and carbon emissions (the latter of which was not included in the original EIA sensitivity testing). This analysis indicated the revised project may still be unviable under a low coal price scenario with an estimated present value of *negative* \$283 M using a 7% discount rate.

Glencore considered that the key parameter affecting the net economic benefit of the project was coal prices. However, it also noted the complex interactions of other important parameters, in particular, carbon prices and the project's production profile. Glencore stated that it was unduly speculative to identify those alternate scenarios under which the project may deliver a zero NPV and did not provide this information. Glencore also stated that a zero NPV (of private and public costs and benefits) did not indicate whether a project was financially viable to an operator, nor whether it would deliver net benefits to NSW or local communities because a flow of economic activity would continue while ever the project was operating.

In line with the NSW Government's *Guidelines for the economic assessment of mining and coal seam gas proposals* (2015), Glencore also provided a focussed analysis of the costs and benefits that would be expected to accrue to NSW (ie excluding all private costs and benefits to Glencore such as capital investment, operating costs and revenue from coal sales). This focussed analysis, which was updated to reflect current market conditions (ie 2016 consensus coal price forecasts) valued the net benefit of the revised project to NSW as \$185 M in present value terms. In conclusion, Glencore considers that the revised project would deliver significant benefits to NSW despite a low coal price scenario and that it would continue to have a positive NPV over the life of the project. The Department also notes a recent substantial uptick in both international steaming and coking coal prices.

CIE's review of Glencore's response

Having confirmed that the issues raised in its initial review had been adequately resolved, CIE turned its attention to testing the sensitivity of the net benefit to NSW as estimated by Glencore. This focussed on testing the key parameter (coal prices, based on current market conditions) as well as incorporating upper bound (or worst-case) estimates of those externalities where there was some uncertainty around the value of the costs of residual impacts (particularly air quality and carbon emissions).

CIE considered these externalities under an 'extreme scenario', which was based on a coal price 20% lower than current market conditions (ie 2016 consensus coal price forecasts). Alone, this reduction in coal price would lower the estimated net benefit to NSW from \$185 M to \$136 M.

CIE then deducted what it considered to be an upper bound estimate of the costs of residual air quality impacts (\$39.9 M, which in the Department's opinion should have been \$35 M because \$4.9 M had already been deducted) and the remaining 68% (\$23.7 M) of Australia's costs of carbon emissions not already deducted from the benefits to NSW. CIE found that even under this 'extreme scenario', the revised project would still be expected to generate a net benefit to NSW of around \$70 M in present value terms. The likelihood is that returns to NSW would be higher than this 'extreme scenario'.

4.6.3 Conclusions

The Department is satisfied that Glencore has provided an updated CBA, which reflects the material changes made to the project in response to the Commission's recommendations and, importantly, current market conditions. The Department has considered CIE's independent review of the updated CBA and notes that issues raised in CIE's original review have been resolved. Furthermore, CIE has indicated that, even under an extreme scenario, the revised project is expected to deliver a minimum net benefit to NSW of \$70 M. As CIE noted, this benefit is actually expected to be higher.

Although not included in its recommendations, the Department also notes that the Commission requested that the voluntary planning agreement (VPA) proposed by Glencore be finalised prior to determination. Glencore has provided a copy of the VPA in Appendix 1 of its response to the Commission's Review Report (see **Appendix A**). Under this agreement, Singleton Shire Council (Council) would receive a total of \$1.024 M in funding (while coal mining operations are occurring), which would be used for economic development initiatives (riverfront beautification), playground upgrades at Rose Point Park, sponsorship of an annual cycle event (for 5 years) and an Aboriginal Art Award (for 3 years). The Department notes that Council has endorsed the VPA at its meeting on 18 April 2016. These benefits are in addition to the estimated net benefit to NSW.

In relation to the Commission's request for the circumstances under which the revised project may generate a zero NPV, this was not provided by Glencore. CIE considered that, even if the coal price halved (based on current market conditions) the revised project would still deliver a net benefit to the people of NSW. However, this assumes that Glencore decides to continue production under this circumstance and that royalties would continue to be paid. If Glencore decided to cease production under this scenario, then the project would from that point generate zero net benefits to the community.

The Department considers that this scenario applies equally to all coal mines (as well as other mining operations) in NSW. While some projects may be able to operate at a loss for a short period of time, others may have higher production costs and enter care and maintenance periods during times of low market prices.

In the case of the revised project, the Department considers that this scenario has been closely scrutinised in Glencore's updated CBA, which is based on current market conditions, additional information and CIE's independent review. The Department is satisfied that, based on current market conditions (which appear to be moving up from a cyclical low point), the revised project would deliver a net benefit to the NSW community.

Accordingly, the Department considers that the Commission's recommendations relating to the socio-economic assessment of the project have been satisfied.

4.7 Further Public Input

As noted in Section 1.4, the Commission recommended that the community be afforded an opportunity to review and comment on supplementary information and the Department's findings on those issues which had not been resolved in the preliminary report. The Commission identified these issues as including air quality impacts, the proposed biodiversity offset package, woodland regeneration measures, the mine plan, surface water impacts and the CBA.

Commission Recommendation 24

That the Department should consider options to ensure that the community has a further opportunity to provide submissions on the Department's final findings prior to determination.

Glencore's response to the Commission's Review Report included a summary of the consultation it had undertaken with the community from project inception in 2012 to date. This consultation included:

- 257 one-on-one meetings with various stakeholders, including ongoing communication with 57 of the nearest neighbours to the project;
- 59 phone discussions with community members;
- 48 email or other correspondence exchanges with community members;
- 13 public forums consisting of nine community consultative meetings, one mine open day, two community information sessions and one presentation to Council; and
- seven separate newsletters, information sheets or updates distributed in the community.

In relation to the revised project, Glencore distributed a project update newsletter to 183 stakeholders in early June, held a community information session on 4 June and provided an update briefing to Council on 17 June. Glencore also advised the Department that it briefed the Mount Owen Community Consultative Committee on the revised project at its scheduled meeting on 22 July.

The Department encourages public consultation and supported the Commission's request for further public involvement and consultation in the assessment process. To address the Commission's recommendation, the Department progressively uploaded a range of relevant documentation to its website, including TAS's final air quality independent review and Glencore's response to the Commission's Review Report. Having uploaded these documents, the Department wrote to all individuals and special interest groups that made submissions on the project, to notify them that these documents were available and to seek any supplementary comments for the Department's consideration in finalising its assessment.

As a result, the Department received a total of four submissions providing supplementary comments including three objecting to the revised project and one in support. The Department has taken these comments into consideration in finalising its assessment of the project.

The Department also notes that the revised project is not substantially different to the original application and that its overall environmental impact has been reduced. Specifically, the original project's air quality and noise impacts have been reduced as a result of Glencore's decision to not undertake mining in the RERR area while other impacts are similar to or marginally less than the original project.

5.0 FINAL REVISED IMPACT ASSESSMENT

As part of its response, Glencore reviewed the EIS and updated those impact assessments which it identified to be materially affected as a result of the changes in the revised project (refer Table 10.1 in **Appendix A**). This involved updates to noise, air quality, surface and groundwater, greenhouse gas and energy, rehabilitation and closure and economic impact assessments. In general, Glencore considered the impacts of the revised project would be equivalent to, or less than those outlined in the EIS for the original project.

The Department has assessed Glencore's updated air quality, rehabilitation (final landform) and economic impact assessments in responding to the Commission's recommendations above. The Department's assessment of the other updated impact assessments is provided below.

5.1 Revised Noise Impact Assessment

The Department's preliminary report established Project Specific Noise Levels (PSNLs) that allowed for a more refined assessment of the 13 representative noise catchments associated with the project and account for the unique topographic features and industrial noise sources that have led to the presence of atypically elevated background noise levels in the evening and night periods.

The revised project has removed proposed mining operations (extraction and overburden emplacement) from the RERR area, which were previously planned to be undertaken in Year 10 of the project. By this stage, extraction in the North Pit extension area would have reached its southern-most extent. To account for the removal of the RERR area as a noise source, Glencore revised its noise impact assessment and concluded that there would be a slight improvement in predicted noise levels during Year 10 for receivers in the Falbrook and Middle Falbrook areas (ie southeast of the mine). Glencore noted that when the impacts of the revised project are considered against the PSNLs there would be a reduction in the number of residences in the noise affectation and management zones.

The Department has applied these PSNLs in considering the revised Year 10 noise impacts for the project. Having reviewed the worst-case predicted operational noise impacts across all representative modelled years, the Department concludes that the project would result in significant noise exceedances of over 5 dB(A) above the relevant PSNL at three private residences (Receivers 21, 22 and 23) and marginal exceedances of 3-5 dB(A) above the relevant PSNL at an additional three private residences (Receivers 13, 19 and 93). While a further 13 private properties are predicted to experience lesser exceedances of 1-2 dB(A) above the relevant PSNL, most individuals are not able to perceive an increase of this low magnitude, and consequently such exceedances are usually considered to be negligible.

The project is also predicted to result in noise impacts significantly above the PSNL on more than 25% of privately-owned vacant lots 15c and 174. However, as described in the preliminary report, the noise impacts at these properties would not be expected to exceed the relevant rural amenity criterion of 45 dB(A) for vacant land identified in Table 2.1 of the INP. Consequently, these properties do not qualify for voluntary acquisition rights.

Having reviewed the revised Year 10 noise impacts, the Department is satisfied that the revised project would provide a slight improvement in predicted noise levels in the later years of mining. To ensure that nearby residences are afforded appropriate protection from the impacts of mining in accordance with the VLAMP, the Department has recommended that Receivers 21, 22 and 23 be afforded voluntary acquisition rights and Receivers 13, 19 and 93 be afforded voluntary mitigation rights. The Department has reflected this updated assessment in the recommended conditions at **Appendix E**.

5.2 Revised Surface Water Impact Assessment

Glencore updated its surface water impact assessment to reflect changes made in the revised project and concluded that the predicted impacts would not materially change from those described in the EIS. The revised project would lead to the following changes to water management at the mine:

- minor changes to the conceptual layout of the water management system (WMS) to accommodate changes to the final landform, in particular, removal of the RERR final void;
- changes to the number and capacity of dams in the WMS, with a net increase in total capacity of 27 ML; and
- an update to the water balance to reflect removal of the RERR final void and incorporate the recent separately approved emplacement of tailings at the West Pit void at Ravensworth East.

The updated water balance predicts that the revised project would not materially change in Year 1 when it is expected to be in deficit, or in Year 10, by which it is expected to be in surplus. However, in Year 5, the predicted water deficit is expected to be reduced by up to 440 ML, as a result of the receipt of additional water-laden tailings for emplacement at the West Pit void. The revised project is not expected to materially change the quantity of water that may be exported from the site under the GRWSS. The Department considers that Glencore would be able to manage all predicted water deficits and surpluses at Mount Owen via its GRWSS, or else to utilise its existing water access licences for extraction of water from Glennies Creek.

The revised project would lead to the following changes in respect of surface watercourses:

- reduction in the number of final voids from three to two as a result of not mining the RERR Pit;
- further reduction (70 ha or 4%) in the final catchment area of Swamp Creek, when compared to the original project;
- minor increases in the final catchment area of Bettys Creek (8%) and Main Creek (3%); and
- negligible decrease (10 ha or 1%) in the final catchment area of Yorks Creek.

Glencore's revised impact assessment predicts no material change to the equilibrium level of the final void in the North Pit, which is expected to be 20 m AHD (previously 19 m AHD) while the Bayswater North Pit final void would reach an equilibrium at the lower level of 10 m AHD (as compared to 37 m AHD for the original project). The Department considers these changes to be minor as both predicted equilibrium levels would remain below the potential spill level thereby minimising potential impacts to the broader environment.

In terms of the reduction in the final catchment area of Swamp Creek, Glencore considers the predicted changes in annual flow volumes associated with the changed catchment are small within the overall context of flows in ephemeral streams. The change in flows would remain less than seasonal and annual variations in flows, which was also the case for the original project.

The Department considers it likely that the implications of these minor catchment changes downstream in Bowmans Creek and Glennies Creek remain negligible when compared to the original project. The Department also accepts Glencore's assessment that the revised project and changes to catchment areas would not result in material changes to potential flooding impacts when compared to the current approved final landform.

Finally, since Glencore has now resolved with DPI Water all outstanding issues regarding water licensing, the Department is satisfied the revised project has been comprehensively assessed. The Department remains satisfied that Glencore has proposed a range of suitable mitigation, management and monitoring measures, which have been incorporated into the recommended conditions of consent.

5.3 Revised Groundwater Impact Assessment

Glencore considers the revised project would only have beneficial changes with respect to groundwater as mining in the RERR area is no longer proposed to be undertaken. The Department's assessment in the preliminary report considered predicted drawdown of up to 2 m to Bettys Creek, which is located adjacent to the previously proposed RERR mining area would be acceptable in accordance with the *NSW Aquifer Interference Policy* (AIP). Although revised drawdown (if any) to Bettys Creek has not been quantified by Glencore, the Department accepts that it is likely to further reduce already acceptable levels of drawdown.

5.4 Revised Greenhouse Gas and Energy Assessment

The revised project is expected to result in lower Greenhouse Gas (GHG) emissions as a result of not mining in the RERR area. Glencore has updated its estimates of Scope 1, 2 and 3 emissions, as well as its forecast energy consumption. These revised estimates have been valued as part of Glencore's updated CBA. The Department considers that Glencore's proposed mitigation and management actions remain suitable to minimise potential fugitive emissions, diesel combustion and energy use.

5.5 Voluntary Planning Agreement

Glencore's response to the Commission's Review Report also provided an update on its Voluntary Planning Agreement (VPA) negotiations with Council. Glencore advised that on 18 April 2016, Council endorsed Glencore's draft VPA offer. This endorsed offer comprises total funding contributions of \$1,024,000 and includes initiatives to target economic development, support for Aboriginal cultural events and the provision of community infrastructure and sponsorships.

The Department considers the agreed VPA to be reasonable given the likely impacts of the project and resultant demand on local services and infrastructure. Accordingly, the Department has reflected the terms of the agreed VPA in the conditions at **Appendix E**.

5.6 Disclosure of political donations

Following publication of the preliminary report, Glencore provided the Department with an updated political donations disclosure statement that discloses recent political donations made by Glencore or related entities. However, this disclosure does not change the fact that the project falls within the Minister's delegation of 14 September 2011 (and outside of the Minister's delegation to senior Departmental officers of 16 February 2015). As such, it must be determined by the Commission.

6.0 ACCREDITED COMMONWEALTH ASSESSMENT

In accordance with the delegate for the Commonwealth Minister for the Environment's accreditation of the NSW Government's environmental assessment processes under the EP&A Act, the Department has provided additional information required by the Commonwealth Minister in deciding whether or not to approve the proposal under the EPBC Act in **Appendix D**.

7.0 RECOMMENDED CONDITIONS

Revisions have been made to the Department's conditions of consent to reflect the Commission's recommendations, Glencore's response to the Commission's Review Report, the Department's further assessment, public comments received, final input from agencies and final comments received from Glencore (see **Appendix E**).

8.0 CONCLUSION

The Department has carefully considered all recommendations in the Commission's Review Report, Glencore's response to the Commission's recommendations, advice from key agencies including DRE, EPA and DPI Water, and the outcomes of independent reviews of the air quality and economic aspects of the project. In addition, the Department has consulted with Glencore and key agencies regarding the recommended conditions of consent in **Appendix E**.

The Department notes that, following the Commission's review, Glencore made a number of material amendments to the mine plan, including the removal of the RERR Pit and revisions to the proposed final landform and rehabilitation outcomes. Glencore considers that these material changes provide a sufficient and adequate means of addressing any residual concerns held by the Commission or government agencies, and would ensure that the project meets relevant performance measures. The Department considers these amendments to be appropriate. Where necessary, the Department has sought further clarification or recommended conditions to resolve outstanding issues to its satisfaction.

The Department considers that its assessment process has been extensive, detailed and informed by community views, relevant agency input and technical experts (particularly in the fields of air quality and economics). The Department is therefore confident that its preliminary report and this report together provide a robust assessment of the merits of the project.

In summary, the Department considers that Glencore has satisfactorily addressed the Commission's recommendations on biodiversity through the provision of additional information on its proposed biodiversity management actions, an additional upfront biodiversity offset and further commitments toward the establishment, active revegetation and management of strategic woodland corridor areas.

The Department has completed a final comprehensive review of the air quality impacts of the project, informed by an extensive independent review undertaken by TAS. In light of the findings of this review, the Department is confident in its assessment of the likely air quality impacts of the project and has recommended that voluntary acquisition rights be offered to a number of nearby residences. The Department has also adopted TAS's recommendations that Glencore be required to install and operate a weather station near the closest private receivers to the southeast and operate an accurate predictive dust management system in order to minimise and better manage the potential for dust impacts in this area. With these conditions in place, the Department is satisfied that the project can be operated to meet acceptable air quality standards.

The Department has also carefully considered the Commission's recommendations in relation to rehabilitation and final landforms and is now satisfied that Glencore has undertaken all reasonable and feasible efforts to minimise the number and extent of final voids and blend the residual final voids into the surrounding landscape. The Department considers the amendments made in Glencore's response to the Commission's Review Report to be material improvements on Glencore's original proposal and that the revised final landform includes appropriate macro-relief and micro-relief features, promotes optimal post-mining land uses and meets contemporary standards for final landform design.

The Department considers that the revised project provides an appropriate balance between the minimisation of potential amenity and environmental impacts and the efficient recovery of State-significant mineral resources. However, the Department has revised the recommended conditions to provide a greater focus on regular monitoring and reporting of rehabilitation and regeneration success, and the independent evaluation of these matters in the triennial independent environmental audits.

With respect to the Commission's recommendations regarding water management, Aboriginal cultural heritage and socio-economics, the Department has carefully reviewed its assessment of these matters, paying careful consideration to additional advice from the EPA and DPI Water, legal advice on the application of the Calga Sand Quarry court case and the CIE's final independent review of the project's economics. The Department is satisfied that the project's predicted impacts on water resources can be appropriately managed and licensed, that detailed Aboriginal cultural heritage assessments have been undertaken to inform the consideration and determination of likely cultural heritage impacts, and that the project would result in a net benefit to NSW under all of the reasonably foreseeable economic scenarios.

The Department has considered the air quality and noise impacts for the revised project, having regard to the NSW Government's VLAMP, and updated the recommended conditions at **Appendix E** to reflect voluntary mitigation and acquisition rights available for nearby private receivers impacted by the project. The Department has recommended that Receivers 105, 114, 115, 116 and 133 be afforded acquisition rights for air quality impacts; Receivers 21, 22 and 23 be afforded acquisition rights for noise impacts; and Receivers 13, 19 and 93 be afforded mitigation rights for noise impacts.

In finalising its assessment of the project, the Department has also sought to update and strengthen the recommended conditions of consent at **Appendix E** to reflect the:

- proposed amendments by Glencore to the mine plan and final landforms;
- recommendations of the TAS review of the project's air quality impacts;
- advice of the EPA regarding post-approval reporting requirements for diesel emissions;

- advice of DPI Water regarding the appropriate management and licensing of water take; and
- Department's further consideration of the matters raised in the Commission's Review Report.

Overall, the Department is satisfied that its recommended conditions provide a comprehensive, contemporary and precautionary approach to the regulation and management of the project and require appropriate and strict compliance with relevant performance measures and standards to ensure that any residual impacts are effectively minimised and mitigated. The Department is of the view that these conditions represent current best practice for the regulation of open cut coal mining projects in NSW, provide a high level of protection for the local environment and amenity of the local community and promote the orderly development of the region's significant coal resources.

9.0 RECOMMENDATION

It is RECOMMENDED that the Planning Assessment Commission exercise the powers and functions delegated to it in the Minister for Planning's Instrument of Delegation, dated 14 September 2011, and:

- **considers** the findings and recommendations of this report;
- **approves** the development application, subject to conditions; and
- **signs** the attached instrument of approval (**Appendix E**).



07/10/16

Matthew Sprott
A/Director
Resource Assessments



7.10.16

Howard Reed
A/Executive Director
Resource Assessments & Compliance

APPENDIX A: GLENCORE'S RESPONSES TO THE COMMISSION'S REVIEW REPORT

APPENDIX B: AGENCY RESPONSES TO THE COMMISSION'S REVIEW REPORT

APPENDIX C: TODOROSKI AIR SCIENCES'S INDEPENDENT REVIEW OF THE PROJECT'S AIR QUALITY IMPACTS

APPENDIX D: MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE UNDER THE EPBC ACT

The Mount Owen Continued Operations Project (the project) was declared to be a 'controlled action' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), given its likely significant impacts on listed threatened species and communities, listed migratory species and water resources. In making this determination, the delegate for the Commonwealth Minister for the Environment accredited the State's environmental assessment processes under the *Environmental Planning and Assessment Act 1979* (EP&A) Act. Consequently, the potential impacts on EPBC Act controlling provisions have been assessed under Part 4 of the EP&A Act.

In accordance with the agreement between the Commonwealth and NSW Governments to accredit the State's assessment process, the Department provides the following additional information for the Commonwealth Minister to decide whether or not to approve the proposal under the EPBC Act.

The Department's assessment has been prepared following careful consideration of the information contained in Section 3.1, Sections 5.5 - 5.7 and Appendix 4 of Glencore's Environmental Impact Statement (EIS) for the project; Glencore's Response to Submissions (RTS); substantial supplementary information provided by Glencore during the assessment process; and submissions and advice provided by the NSW Office of Environment and Heritage (OEH), NSW Department of Primary Industries – Water (DPI Water), the Commonwealth Department of the Environment & Energy (Commonwealth DoEE), and the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC).

This assessment is supplementary to, and should be read in conjunction with, the assessments included in Sections 6.4 and 6.6 of the Department's Preliminary Assessment Report (the preliminary report) and the assessment contained within Sections 4 and 5 of this report. Accordingly, the Commonwealth Minister should also have close regard to those sections of these two reports.

D.1 Impacts to listed threatened species and communities

As described in detail in Section 6.4 of the preliminary report, the project would not involve the disturbance of any ecological communities listed under the EPBC Act. However, the project would clear some 223.7 ha of established woodland, forest and riparian vegetation and 223.1 ha of Derived Native Grassland (DNG), which provides (or has the potential to provide) habitat and foraging resources for several listed threatened fauna species, migratory species protected under international agreements and potential habitat for one threatened flora species (*Ozothamnus tessellatus*).

The EIS identifies that the project would clear potential and/or known habitat for nine threatened fauna species and one threatened flora species (see **Table D1**) which could, in the absence of appropriate management measures, result in significant impacts for the Regent Honeyeater, Swift Parrot and Spotted-tailed Quoll. However, Glencore has asserted that its proposed mitigation and management measures would ensure that the project does not cause significant impacts to any threatened species.

Table D1: Summary of likely direct impacts on threatened species listed under the EPBC Act

EPBC listed species	EPBC Act Status	Potential Area (ha)	Nature of Impact
Regent Honeyeater (<i>Anthochaera Phrygia</i>)	Endangered *	163.7	Clearing of potential habitat and foraging resources
Swift Parrot (<i>Lathamus discolor</i>)	Endangered	163.7	Clearing of known habitat and foraging resources
Spotted-tailed Quoll (<i>Dasyurus maculatus</i> subsp. <i>Maculatus</i>) southeastern mainland population	Endangered	446.8	Clearing of known habitat
Australian Painted Snipe (<i>Rostratula benghalensis australis</i>)	Endangered	0.6	Clearing of potential habitat
Green and Golden Bell Frog (<i>Litoria aurea</i>)	Vulnerable	-	Clearing of potential habitat (farm dams and associated terrestrial habitat)
Koala (<i>Phascolarctos cinereus</i>): combined populations of Qld, NSW and the ACT	Vulnerable	163.7	Clearing of potential habitat
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable	163.7	Clearing of potential foraging habitat

Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	Vulnerable	223.7	Clearing of potential foraging habitat
New Holland Mouse (<i>Pseudomys novaehollandiae</i>)	Vulnerable	0	Not present
<i>Ozothamnus tessellatus</i>	Vulnerable	163.7	Clearing of potential habitat

* While the EPBC Act status of this species was changed to critically endangered on 25 June 2015, the assessment of impacts on this species must be considered against the status at the time the controlled action decision was made (24 October 2013).

The Commonwealth DoEE's submission on the project (dated 25 March 2015) acknowledged the project's potential impacts on listed threatened species and identified that, in the absence of appropriate mitigation measures and/or biodiversity offsets, the project could result in significant impacts for the Spotted-tailed Quoll, Regent Honeyeater, Swift Parrot and Koala. Based on the information provided in the EIS, the Commonwealth DoEE did not consider the project likely to result in significant impacts to the Green and Golden Bell Frog or the New Holland Mouse.

The Department also notes that the project would clear some woodland that conforms to the definition of the *Central Hunter Valley Eucalypt Forest and Woodland* critically endangered ecological community (CEEC). However, this CEEC was only listed as critically endangered under the EPBC Act on 7 May 2016 and postdates the Commonwealth's 24 October 2013 determination of the project as a controlled action. Therefore, consistent with section 158a of the EPBC Act, impacts on this ecological community are not a relevant consideration for the project and do not require any further assessment.

D.2 Impacts to Migratory Species

The EIS included a detailed consideration of the potential impacts of the project on migratory species listed under the EPBC Act. Based on an assessment of the Commonwealth's Protected Matters Search Tool and consideration of monitoring reports in the region, the EIS identified 12 species listed under international treaties that have been recorded or have the potential to occur within the project area. These species comprise the:

- White-bellied Sea Eagle (*Haliaeetus leucogaster*);
- White-throated Needletail (*Hirundapus caudacutus*);
- Rainbow Bee-eater (*Merops ornatus*);
- Black-faced Monarch (*Monarcha melanopsis*);
- Spectacled Monarch (*Monarcha trivirgatus*);
- Satin Flycatcher (*Myiagra cyanoleuca*);
- Rufous Fantail (*Rhipidura rufifrons*);
- Fork-tailed Swift (*Apus pacificus*);
- Eastern Great Egret (*Ardea modesta*);
- Cattle Egret (*Ardea ibis*);
- Latham's Snipe (*Gallinago hardwickii*); and
- Australian Painted Snipe (*Rostratula benghalensis australis*).

The EIS acknowledges that several of these species have been historically recorded in the proposed disturbance area. However, in considering the significance of potential impacts on migratory species, the EIS identified that the project area was unlikely to comprise important habitat for any of these species and that it was unlikely that any of these species would be present within the project area in ecologically significant numbers. Consequently, the EIS concluded that the project is unlikely to substantially modify or remove important habitat for migratory species, disrupt the lifecycle of an ecologically significant proportion of a migratory species or cause harm to migratory species through the establishment of invasive species in the project area.

The Department is satisfied that the project is unlikely to result in any significant direct impacts on migratory species and that the biodiversity offset package and rehabilitation of post-mining vegetation communities would be sufficient to mitigate and account for any residual (or 'non-significant') impacts on migratory species that could arise through the short term loss of habitat and foraging resources.

D.3 Impacts to water resources

The Commonwealth DoEE has identified impacts on water resources in relation to coal seam gas and large coal mining development as a controlling provision under the EPBC Act. A detailed assessment of the potential impacts of the project on water resources is contained in Sections 6.5 and 6.6 of the Department's preliminary report. This assessment considered the IESC's and DPI Water's advice on surface and ground water impacts, potential impacts on downstream watercourses, water users, groundwater dependent ecosystems and receiving environments.

The Department notes that with the exception of drawdown within a small 4.5 ha area of the Main Creek alluvium, the project would meet the Level 1 impact assessment criterion under the *NSW Aquifer Interference Policy*. Overall, the Department is satisfied that the predicted groundwater drawdown is unlikely to cause any significant impacts to nearby GDEs or riparian communities, beyond that of the existing approved operations. Accordingly, the Department is of the view that the predicted drawdown impacts to alluvial aquifers are acceptable.

A detailed assessment of the potential impacts on water resources is contained in Section 6.6 of the Department's preliminary report and supplemented by further assessments in Sections 4.4, 5.2 and 5.3 of this report. Based on these assessments, the Department is satisfied that the project could be appropriately managed to avoid significant impacts on water resources and has recommended conditions requiring Glencore to ensure that it has sufficient water for all stages of the development (or adjust the scale of operations to match available water supply) and implement suitable mitigation, management, monitoring and response measures to manage impacts on water resources.

D.4 Demonstration of 'avoid, mitigate, offset' for Matters of National Environmental Significance (MNES)

The EIS describes a number of measures and refinements that have been made to the conceptual mine plans to reduce disturbance of threatened flora species, ecological communities and fauna habitat, avoid direct impacts on fauna species and increase the buffer distances between mining areas and nearby creek lines, thereby reducing potential direct and indirect impacts on water resources.

For impacts within or close to the project disturbance boundary, where avoidance is not practicable, Glencore has provided a range of targeted mitigation measures, including habitat augmentation and the active regeneration of narrow sections of woodland corridors. Where the project is considered likely to have indirect impacts on MNES (ie from noise, light, dust, erosion, weeds and feral animals) Glencore has also proposed to undertake a number of mitigation or management actions that would reduce the extent of these impacts.

To account for any residual impacts that cannot be addressed through the proposed avoidance and mitigation measures, Glencore has provided a comprehensive and targeted biodiversity offset package. Having considered the potential residual impacts on MNES, the Commonwealth DoEE has advised that it is satisfied that the final proposed biodiversity offsets package contains suitable key foraging tree species and habitat for threatened fauna and adequately addresses the *EPBC Act Environmental Offsets Policy* (2013). Further detailed consideration and assessment of the likely impacts for individual fauna species and the adequacy of the offsets package is provided in Section 6.4.2 of the preliminary report and Section 4.1 of this report.

D.5 Requirements for decisions about threatened species and endangered ecological communities

In accordance with section 139 of the EPBC Act, in deciding whether or not to approve, for the purposes of a subsection of section 18 or section 18A of the EPBC Act, the taking of an action and what conditions to attach to such an approval, the Commonwealth Minister must not act inconsistently with certain international environmental obligations, Recovery Plans, or Threat Abatement Plans. The Commonwealth Minister must also have regard to relevant approved conservation advices.

D.5.1 Australia's international obligations

Australia's obligations under the *Convention on Biological Diversity* (Biodiversity Convention) include the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

The recommendations of this report are not inconsistent with the Biodiversity Convention, which promotes environmental impact assessment (such as this process) to avoid and minimise adverse impacts on biological diversity. Accordingly, the recommended approval requires avoidance, mitigation and management measures for listed threatened species and communities and all information related to the proposed action is required to be publicly available to ensure equitable sharing of information and improved knowledge relating to biodiversity.

Australia's obligations under the *Convention on Conservation of Nature in the South Pacific* (Apia Convention) include encouraging the creation of protected areas which together with existing protected areas will safeguard representative samples of the natural ecosystems occurring therein (particular

attention being given to endangered species), as well as superlative scenery, striking geological formations and regions. Additional obligations include using best endeavours to protect fauna and flora (special attention being given to migratory species) so as to safeguard them from unwise exploitation and other threats that may lead to their extinction. The Apia Convention was suspended on 13 September 2006. Nonetheless, Australia's obligations under the Convention have been taken into consideration. The recommended approval is not inconsistent with the Convention which generally aims to promote the conservation of biodiversity.

The *Convention on International Trade in Endangered Species of Wild Flora and Fauna* (CITES) is an international agreement between governments which seeks to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The recommended approval is not inconsistent with CITES as the proposed action does not involve international trade in specimens of wild animals and plants.

D.5.2 Recovery plans and approved conservation advices

The Department's preliminary report and this report together provide a detailed and comprehensive assessment of the potential impacts of the project on listed threatened species and communities under the NSW *Threatened Species Conservation Act 1995* and the EPBC Act. In accordance with the accredited assessment process, the Department has taken into consideration approved conservation advices and recovery plans of the species and communities which have been identified as having potential to be impacted by the project.

The primary risk of impact to species and communities from the project is land clearing leading to the removal of habitat and foraging resources. The Department notes that, in addition to the avoidance and mitigation measures proposed by Glencore, any residual impacts would be offset under Glencore's biodiversity offset strategy, which both OEH and the Commonwealth DoEE have assessed and consider to be acceptable. The Department has also included requirements in its conditions of consent aimed at improving the presence of foraging and habitat resources within offset and rehabilitation areas.

Accordingly, the project would not result in residual impacts to biodiversity, subject to the timely and successful implementation of Glencore's proposed offset strategy, which would ensure habitat and foraging resources are established and/or conserved for listed threatened species. In relation to specific approved conservation advices and recovery plans that are applicable under the EPBC Act, the following assessment has been made.

Regent Honeyeater (*Anthochaera Phrygia*) and Swift Parrot (*Lathamus discolor*)

The Department's preliminary report identified that the clearing of vegetation within the proposed disturbance area has the potential to impact the Regent Honeyeater through the loss of habitat, nesting sites and foraging resources; and the Swift Parrot through the loss of winter foraging resources (namely flowering eucalypts and psyllid lerps) and nest hollows. The loss of habitat and key foraging resources through land clearing are identified as key threats in the approved conservation advice and recovery plans for the Regent Honeyeater and Swift Parrot.

The Department's preliminary report identified that while the proposed biodiversity offset strategy would sufficiently mitigate and offset the project impacts from a State perspective, the Commonwealth DoEE had indicated that further offsets may be required to meet the offset requirements of the EPBC Act. To address this residual shortfall in offsets, Glencore provided an additional 144 ha biodiversity offset area, known as the Mitchell Hills Offset Area. This additional offset area primarily comprises extant woodland and forest communities and key foraging resources for threatened fauna species.

The Commonwealth DoEE has since confirmed that the final biodiversity offset package would adequately address the requirements of the *EPBC Act Environmental Offsets Policy*, by securing an appropriate area of land with key foraging resources and suitable habitat for the Regent Honeyeater and Swift Parrot. The Department considers that the offsets package is consistent with the primary conservation objectives of reversing the long term trend of population decline and maintaining key habitat to maximise survival and reproductive success. The Department therefore considers that the proposal would not be inconsistent with the approved conservation advice or recovery plan for either species, subject to the timely and successful implementation of Glencore's biodiversity offset package.

Spotted-tailed Quoll (*Dasyurus maculatus maculatus*)

Breeding populations of Spotted-tailed Quolls are known to occur in the area surrounding the Mount Owen Mine, with a number of confirmed den sites and latrines in the Ravensworth State Forest and adjacent biodiversity offset areas. While no den sites have been identified in the proposed disturbance

area, the preliminary report identified that the proposal could still lead to impacts on the local Spotted-tailed Quoll population, through the removal of suitable habitat types and foraging resources.

To mitigate and compensate for these impacts on habitat and foraging resources, Glencore has proposed a robust biodiversity offsetting package, including conservation of an additional 912 ha of strategically located offsets, the establishment, regeneration and protection of woodland corridors and establishment of naturally scarce habitat features (such as denning structures). These actions would improve the connectivity of Spotted-tailed Quoll habitat in the region, which is likely to assist in the improved health and genetic diversity of the local population.

Having given careful consideration to the project's potential impacts on the Spotted-tailed Quoll, the Commonwealth DoEE has advised that Glencore's biodiversity offset strategy is adequate to address the likely impacts to this species. The Department is therefore satisfied the project would not be inconsistent with the recovery plan for the Spotted-tailed Quoll.

Koala (*Phascolarctos cinerus*)

The EIS identifies that individual Koalas have been recorded in and around the project disturbance area in the past, but that this area is unlikely to support a resident Koala population. While the project would clear some areas of potential Koala habitat, including around 163.7 ha of box-gum ironbark woodland that could provide potential foraging resources and dispersal corridors, the EIS and RTS identify that this vegetation does not meet the definition of core or key foraging habitat (as defined under the State's SEPP 44). These documents conclude that the clearing of this vegetation would be unlikely to result in significant direct impacts on Koalas or substantially interfere with the recovery of Koala populations.

The Department has included a requirement in its conditions of consent to incorporate a diverse range of species in the woodland communities to be established in the final landform, including preferred feed trees for Koalas. The Department considers that this outcome would increase the potential foraging and dispersal value of the post-mining landform for Koalas and that the project would not be inconsistent with the approved conservation advice or the National Koala Conservation and Management Strategy.

Green and Golden Bell Frog (*Litoria aurea*)

The EIS identifies that the Green and Golden Bell Frog has been recorded at the Mount Owen site in 1994, 1996, 1997 and 1999, and within the surrounding region between 1998 and 2009. Ongoing surveys of potential Green and Golden Bell Frog habitat have been undertaken at the Mount Owen Complex since 1996, with frog surveys currently undertaken at 21 locations across the complex and a further 15 targeted locations surveyed within the proposed disturbance area. Despite these survey efforts, no sightings of this species have been recorded at the Mount Owen site since 1999.

While the project area contains potential habitat for this species, the EIS notes that this habitat is limited to a few farm dams and terrestrial environments and concludes that the project is unlikely to cause significant impacts on this species, especially given the absence of recorded sightings for over 16 years. The EIS infers that the potential absence of this species at the Mount Owen site may be associated with the diffuse distribution of the Upper Hunter population and/or the potential impacts of chytrid virus on the persistence of the species within the referral area.

The Department is satisfied that the project would be unlikely to result in any significant impacts on this species and would not be inconsistent with the approved conservation advice.

Large-eared Pied Bat (*Chalinolobus dwyeri*) and Grey-headed Flying-fox (*Pteropus poliocephalus*)

Grey-headed Flying-foxes have been recorded in woodland areas within and surrounding the Mount Owen Complex as recently as 2010. Likewise, although no individuals have been trapped or sighted during ecological surveys, the presence of Large-eared Pied Bats in the area has been detected in echolocation recordings undertaken between 1999 and 2014.

Although the project would result in the clearing of some potential woodland foraging habitat for the Large-eared Pied Bat and Grey-headed Flying-fox, no known roosting or camp sites (or woodland vegetation near such sites) would be impacted. The Department is satisfied that the project is unlikely to result in any significant impacts on these species and considers that the proposed avoidance, mitigation and offsetting measures adequately account for any potential impacts on these species. The Department also notes that in the longer term, the proposed biodiversity offset strategy would provide for an increase in potential foraging habitat. Consequently, the Department considers that the project would not be inconsistent with the objectives of the recovery plan for the Large-eared Pied Bat.

New Holland Mouse (*Pseudomys novaehollandiae*)

Although identified in past monitoring of the Mount Owen Complex and Ravensworth State Forest, the New Holland Mouse has not been recorded since 2007. The locations of the previous monitoring records indicate that the New Holland Mouse prefers disturbed habitat and rehabilitated land. No sightings have been recorded within the project referral area. The EIS considers that the clearing of established woodland and grassland habitat in the disturbance area would be unlikely to impact the New Holland Mouse as this vegetation is not characteristic of its preferred habitat. The project is not expected to result in significant impacts on this species and consequently, the Department considers that the project would not be inconsistent with the recovery plan for this species.

Australian Painted Snipe (*Rostratula benghalensis australis*)

The EIS identifies that the project would result in the removal of approximately 0.6 ha of potential habitat for the Australian Painted Snipe, associated with highly modified and degraded waterways and farm dams in the proposed disturbance area. The Department notes that the Australian Painted Snipe has not been recorded in the disturbance area or during annual fauna monitoring surveys at the Mount Owen Complex and is satisfied that the project is unlikely to result in significant impacts on this species.

Ozothamnus tessellatus

This dense shrub species exists in a few locations in NSW, including the Ravensworth State Forest to the northeast of the project. The EIS notes that, despite the project disturbance area containing some 163.7 ha of potential habitat (associated with eucalyptus dominated woodland), this species was not identified in extensive ecological surveys and is considered unlikely to be present in the proposed disturbance area, due in part to the historic disturbance activities and current grazing practices. The Department is satisfied that the project is unlikely to result in significant impacts on this species.

D.5.3 Threat abatement plans (TAPs)

The Department has considered the approved threat abatement plans under the EPBC act, available at <http://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved>, along with any current draft revisions to these plans. The relevant threat abatement plans are set out below.

Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* (relevant to White Box-Yellow box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland)

Phytophthora cinnamomi (*P. cinnamomi*) is a microscopic soil-borne organism that has the ability to cause plant disease and plant death by interfering with the movement of water and nutrients to plants. This organism can be spread in water, soil or plant material that contains the pathogen and dispersal is favoured by moist or wet conditions. It can be carried in both overland and subsurface water flow and by water moving infected soil or organic material. Native and feral animals have also been implicated in spreading *P. cinnamomi*, particularly those species that exhibit digging behaviours. Nevertheless, humans still have the greatest capacity to disturb and transport large volumes of soil and plant material.

The *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* is identified as an ecological community that may be affected by *P. cinnamomi*. While no *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland* is present in the proposed disturbance area, this community has been identified in some of Glencore's biodiversity offset areas. While some people may access these offset areas to carry out conservation activities, the Department does not consider that the project would be likely to exacerbate the spread of *P. Cinnamomi*, especially considering that these areas will be fenced off from people and afforded long term protection as biodiversity offsets.

The Department is satisfied that approval of the proposed action would not be inconsistent with this threat abatement plan.

Threat abatement plans for competition and land degradation by rabbits (relevant to Regent Honeyeater), predation by the European Red Fox (relevant to Spotted-tailed Quoll, Green and Golden Bell Frog and New Holland Mouse) and predation by feral cats (relevant to Spotted-tailed Quoll, Swift Parrot, Green and Golden Bell Frog and New Holland Mouse)

Rabbits have direct impacts on native flora and fauna, including by grazing on native vegetation, preventing regeneration and competing with native fauna for habitat and food. Rabbits can also have indirect and secondary effects on the predation of native fauna, for instance by supporting populations of introduced predators or by denuding vegetation and thereby exposing fauna species to increased predation. The ecology of rabbits, including digging and browsing habits, leads to a loss of vegetation cover and consequent slope instability and soil erosion, which further degrades fauna habitat.

The European red fox and feral cats are significant predators in Australia that interact with native fauna in various ways, including predation, competition for resources and transmission of disease.

In relation to the threat abatement plans for competition and land degradation by rabbits and predation by the European Red Fox and feral cats, it is possible that the proposed action may:

- facilitate the spread, or lead to a higher abundance of foxes and feral cats (and other unmanaged or feral fauna) through the clearance and modification of habitat; and
- increase the amount of disturbed and modified habitats, which rabbits tend to colonise, and lead to an increase in rabbit populations.

However, as the majority of works associated with the action are located adjacent to existing disturbed areas or within previously disturbed mining areas, the risk of these impacts is considered low.

The Department has included measures for the control of feral animals under condition 31(e) of Schedule 3, including specific requirements for Glencore to implement avoidance, mitigation and controlling measures identified in relevant threat abatement plans under the project's Biodiversity Management Plan. With these measures in place, the Department is satisfied that approval of the action would not be inconsistent with the threat abatement plans for competition and land degradation by rabbits and for predation by the European Red Fox and feral cats.

Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (relevant to Green and Golden Bell Frog)

Chytridiomycosis is an infectious disease affecting amphibians which is considered to have led to the extinction of one population of amphibians in upland eastern Australia as well as impacting other populations across Australia. The TAP aims to prevent the transmission of the fungus to unaffected populations while also minimising impacts of infection in those areas or populations where it already exists. As the Green and Golden Bell Frog has been identified in past monitoring (but not recently) near the disturbance area, the Department has recommended that measures to avoid and mitigate the spread of chytrid fungus are developed as part of the project's Biodiversity Management Plan. Subject to these measures, the Department considers that the project would not be inconsistent with this Threat Abatement Plan.

D.6 Requirements for decisions about listed migratory species

In accordance with section 140 of the EPBC Act, in determining the project the Commonwealth Minister must not act inconsistently with Australia's obligations under the following international conventions and agreements:

- Bonn Convention;
- China–Australia Migratory Bird Agreement (CAMBA);
- Japan–Australia Migratory Bird Agreement (JAMBA);
- Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA); or
- any international agreement approved under subsection 209(4) of the EPBC Act.

D.6.1 Bonn Convention

The Bonn Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range. The Bonn Convention is available at: www.cms.int/about/index.htm

On the date that the controlled action decision was made, the project was considered likely to have a significant impact on the Regent Honeyeater, a species listed under the Bonn Convention. However, on 26 November 2013, the Regent Honeyeater was delisted as a migratory species under the EPBC Act. Notwithstanding this delisting, the Regent Honeyeater remains a threatened species under the EPBC Act and the potential impacts on this species have been considered above.

The Department has given particular consideration to the avoidance, mitigation and management measures for listed threatened and migratory species that have the potential to be impacted by the project. The Department considers that the recommendations of the preliminary report and this report are not inconsistent with the Bonn Convention.

D.6.2 CAMBA, JAMBA and ROKAMBA Agreements

The CAMBA, JAMBA and ROKAMBA Agreements list terrestrial, water and shorebird species which migrate between Australia and the respective northeast Asian countries. The majority of species listed under these three agreements are shorebirds. The agreements require the parties to protect migratory birds by:

- a) limiting the circumstances under which migratory birds are taken or traded;

- b) protecting and conserving important habitats;
- c) exchanging information; and
- d) building cooperative relationships.

These agreements can be found at:

- a) CAMBA agreement: www.austlii.edu.au/au/other/dfat/treaties/1988/22.html;
- b) JAMBA agreement: www.austlii.edu.au/au/other/dfat/treaties/1981/6.html; and
- c) ROKAMBA agreement: www.austlii.edu.au/au/other/dfat/treaties/2007/24.html.

The project disturbance area is considered unlikely to comprise important habitat for or ecologically significant populations of any migratory species listed under these agreements. Nevertheless, these agreements have been considered and are not inconsistent with the recommended approval of the project, which includes requirements to avoid, mitigate and manage impacts to biodiversity, including any listed migratory species which may be present.

D.7 Additional EPBC Act considerations

In addition to the key matters discussed above, **Table D2** contains a range of further mandatory considerations, factors to be taken into account and factors to have regard under the EPBC Act.

Table D2 – Additional considerations for the Commonwealth Minister under the EPBC Act

EPBC Act section	Considerations	Conclusion
Mandatory considerations		
136(1)(b)	Social and economic matters are discussed in the Executive Summary and Sections 6.9 and 8 of the preliminary report and Section 4.6 of this report.	The Department considers that the proposed development would result in a range of benefits for the local and regional economy and would allow for the continued and valuable production of coal from the region.
Factors to be taken into account		
3A, 391(2)	Principles of ecologically sustainable development (ESD), including the precautionary principle, have been taken into account, in particular in: <ul style="list-style-type: none"> • long and short term economic, environmental, social and equity considerations relevant to this decision; • conditions that restrict environmental impacts, impose monitoring and adaptive management requirements and reduce uncertainty concerning the potential impacts of the project; • conditions requiring the project to be operated in a sustainable way that protects the environment for future generations and conserves MNES; • advice provided within this report which reflects the importance of conserving biological diversity and ecological integrity in relation to the controlling provisions for this project; and • mitigation measures to be implemented which reflect improved valuation, pricing and incentive mechanisms that promote a financial cost to the applicant to mitigate the environmental impacts of the project. 	The Department considers that, subject to the recommended conditions of consent, the project could be undertaken in a manner that is consistent with the principles of ESD.
136(2)(e)	Other information on the relevant impacts of the action.	The Department is not aware of any relevant information not addressed in the preliminary report or this report. The Department considers that all information relevant to the impacts of the project has been taken into account.
136(2)(fa)	Advice was sought from the IESC and its comments have been considered and addressed in Sections 5 and 6 of the preliminary report.	The Department considers that its assessment and recommendations have taken the IESC's advice on the project into account.
Factors to have regard to		
176(5)	Bioregional plans	There is no relevant bioregional plan.
Considerations on deciding on conditions		
134(4)	Must consider:	Documentation provided by Glencore is provided at Appendix A and

- information provided by the person proposing to undertake the action or by the designated applicant of the action; and
- desirability of ensuring as far as practicable that the condition is a cost effective means for the Commonwealth and the person taking the action to achieve the object of the condition.

Appendix C of the preliminary report and **Appendix A** of this report. These documents are available on the Department's website at http://major.projects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850.

The Department considers that the recommended conditions of consent (see **Appendix E**) are practicable and cost effective means to achieve their purpose.

The conditions have been prepared following careful consideration of material provided by Glencore and following consultation with the Commonwealth DoEE.

D.8 Conclusions on controlling provisions

D.8.1 Threatened species and communities (sections 18 and 18A of the EPBC Act)

The EIS identifies that, in the absence of appropriate management measures, the project could have the potential to result in significant impacts for threatened species listed under the EPBC Act (namely the Regent Honeyeater, Swift Parrot and Spotted-tailed Quoll). To address and manage these potential impacts, Glencore has proposed a range of avoidance, mitigation and offsetting measures in its EIS, RTS and its response to the Commission's Review Report.

For the reasons set out above and in Section 6 of the preliminary report, the Department considers that the impacts of the action on threatened species and communities would be acceptable, subject to the avoidance, mitigation, offsetting and management measures described in Glencore's environmental assessment documents, and the requirements of the Department's recommended conditions of consent (see **Appendix E**).

The Department has recommended conditions relating to Glencore's obligation to minimise harm to the environment (condition 1 of Schedule 2) and to address potential impacts on biodiversity and threatened species (conditions 27-32 and 42-45 of Schedule 3). These requirements include the implementation of measures to implement its proposed Biodiversity Offset Strategy (including the long term security of these areas) and to ensure that the required biodiversity offset and rehabilitation strategies focus on the regeneration, enhancement and/or re-establishment of threatened ecological communities, threatened flora communities and habitat for threatened flora and fauna species.

The Department has also included an explicit requirement to address relevant threat abatement plans under condition 31(d) of Schedule 3. This condition requires Glencore to implement measures to control feral pests (including rabbits, red fox and feral cats) in accordance with the requirements of relevant threat abatement plans.

The Department recommends that the Commonwealth Minister require Glencore to implement condition 1 of Schedule 2 and conditions 27, 28, 29, 31, 43 and 45 of Schedule 3, where they relate to the management of impacts on listed threatened species and communities under the EPBC Act.

D.8.2 Migratory Species (sections 20 and 20A of the EPBC Act)

For the reasons set out above and in Section 6 of the preliminary report, the Department concludes that the impacts of the action on listed migratory species would be acceptable, subject to the avoidance, mitigation and management measures described in Glencore's EIS, RTS and its response to the Commission's Review Report, and the requirements of the Department's recommended conditions (see **Appendix E**).

D.8.3 Water resources, in relation to coal seam gas development and large coal mining development (sections 24D and 24E of the EPBC Act)

The proposed project was jointly referred by the Department and the Commonwealth DoEE to the IESC for advice on surface water and groundwater impacts, as well as potential impacts on downstream watercourses, water users, groundwater dependent ecosystems and receiving environments. The advice provided by the IESC is summarised in Section 5 of the preliminary report.

The IESC's advice was considered in Section 6 of the preliminary report and helped inform the Department's recommendation that the impacts of the action on water resources would be acceptable, subject to the avoidance, mitigation and management measures described in Glencore's EIS, RTS and response to the Commission's Review Report, the main text of this report and the requirements of the Department's recommended conditions of consent (see **Appendix E**).

Accordingly, the Department recommends that the Commonwealth Minister require Glencore to implement conditions 21 - 26 of Schedule 3, where they relate to the management of potential impacts on water resources under the EPBC Act.

D.9 Other protected matters

The Commonwealth DoEE has determined that other matters under the EPBC Act are not controlling provisions with respect to the proposed action. These include listed World Heritage places, National Heritage places, Ramsar wetlands, the Commonwealth marine environment, Commonwealth land, Commonwealth actions, nuclear actions, the Great Barrier Reef Marine Park and Commonwealth Heritage places located overseas.

APPENDIX E: RECOMMENDED CONDITIONS OF CONSENT
