



Glendell Continued Operations Project

State Significant Development Assessment

SSD 9349

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Glossary

Abbreviation	Definition
AHD	Australian Height Datum
BAM	<i>Biodiversity Assessment Method</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCD	Biodiversity & Conservation Division within the Department
CHPP	Coal handling and preparation plant
CIV	Capital Investment Value
Council	Singleton Council
DAWE	Department of Agriculture, Water and the Environment
Department	Department of Planning and Environment
DPI	Department of Primary Industries, DPI
DPE Crown Lands	Crown Lands Group within the Department
DPE Water	Water Group within the Department
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
Heritage NSW	Heritage NSW within the Department of Premier and Cabinet
LEP	Local Environmental Plan
MEG	Regional NSW – Mining, Exploration and Geoscience

Abbreviation	Definition
Minister	Minister for Planning and Homes
NPfI	<i>NSW Noise Policy for Industry 2017</i>
NRAR	Natural Resources Access Regulator
Planning Secretary	Planning Secretary under the EP&A Act
Ravensworth Homestead	The Ravensworth Homestead complex, comprising the group of agricultural buildings with homestead and attached kitchen on the site. The complex also contains a barn, stables, privy, men's quarters building, yard areas, paddocks and associated site and landscape features, and is further described in the EIS
Resources Regulator	NSW Resources Regulator
RFS	NSW Rural Fire Service
ROM	Run-of-mine
SEARs	Planning Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SRD SEPP	<i>State Environmental Planning Policy (State and Regional Development) 2011</i>
SSD	State Significant Development
TfNSW	Transport for NSW
VPA	Voluntary Planning Agreement

Executive Summary

Background

The Glendell Mine forms part of the Mount Owen Complex (the Complex) located in the Hunter Coalfields, approximately 20 kilometres (km) north-west of Singleton and 24 km south-east of Muswellbrook, in the Singleton local government area (LGA). Mt Owen Pty Limited (Mt Owen), a subsidiary of Glencore Coal Pty Limited (Glencore), owns and operates the Complex.

In addition to the Glendell Mine, the Complex comprises the Mount Owen Mine, Ravensworth East Mine, a Coal Handling and Preparation Plant (CHPP) and rail loop that services the Complex. A maximum of 4.5 Mtpa of run of mine (ROM) coal is mined at Glendell (comprising both semi soft coking coal and thermal coal), before being transported to Mount Owen Mine for processing.

The Project

On 3 December 2019, Glencore lodged a State significant development application for the Glendell Continuation Operations Project (the Project), which would extend the life of the existing operations by establishing a new mining area (the Glendell Pit Extension) to the north of the current Glendell Pit.

Development of the Glendell Pit Extension would enable the extraction of an additional 135 Mt of ROM coal over 21 years, at an increased production rate of up to 10 Mtpa. Coal extracted over the life of the Project would continue to be processed at the existing Mount Owen CHPP facilities before being transported via rail in accordance with the Mount Owen consent (SSD 5850). The Project involves an associated modification to the Mount Owen consent to integrate with the proposed extension.

While the Project would continue to rely on existing infrastructure including the Mount Owen CHPP, rail loop and existing Glendell mining fleet, it would require the development of a new mine infrastructure area (including associated infrastructure and services), along with construction of new heavy and light vehicle access roads. In addition, the Project would involve the realignment of a section of Hebden Road, diversion of Yorks Creek, and relocation of the historic Ravensworth Homestead.

Strategic Context

Local Context

The Ravensworth Estate, which the Project would mine through, was one of the first land grants in the Hunter Valley and contains a homestead complex (i.e. the Ravensworth Homestead) listed under the *Singleton Local Environmental Plan 2013* as being of local significance. While some Aboriginal groups identify an attachment to the Ravensworth Estate, most Aboriginal groups consider the whole region to have high cultural significance and a connection to the land.

The current landscape surrounding the Glendell Mine is dominated by mining and industrial operations with a total of 13 coal mines located within approximately 15 km of the Project area. The land surrounding the Project also supports a range of primary industries, including the Ravensworth State Forest, regenerated vegetation in the New Forest Area and biodiversity offsets associated with the current Mount Owen Mine. Rural residential holdings also exist within the locality, with the Camberwell Village located approximately 1 km from the southern boundary of the existing Glendell Mine.

Energy Policy Context

The development of policies, guidelines and plans aimed at reducing carbon emissions has progressed rapidly in recent times. Within this space, the key plans include the *United Nations Framework Convention on Climate Change Paris Agreement 2015*, *Australia's Long-Term Emissions Reduction Plan*, the *Net Zero Plan Stage 1: 2020-2030 Implementation Update* and the NSW Government's *Strategic Statement on Coal Exploration and Mining in NSW*. These plans all describe the global phasing out of coal for electricity generation and outline an approach to transition to a low carbon future.

However, within these plans, there is also a strong focus on ensuring that regional communities which currently rely on the export coal industry are able to capitalise on the opportunities of the new energy economy in order to experience new sources of growth. The *Strategic Statement on Coal Exploration and Mining in NSW* also identifies that coal mining for export from NSW is expected to continue to have an important role to play in the short to medium term, as coal currently remains an important energy source all over the world, and NSW produces some of the world's highest quality coal.

Statutory Context

The Project involves coal mining and is declared to be SSD under clause 8(1)(b) of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Under section 4.5(a) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and clause 8A of the SRD SEPP, the Independent Planning Commission (the Commission) is the consent authority for the application, as more than 50 unique submissions in the form of objections were made in respect of the Project.

The Project has also been declared a controlled action under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is being assessed by the NSW Government, in accordance with the Bilateral Agreement between the NSW and Commonwealth Governments.

On 9 September 2021, the then Minister for Planning and Public Spaces directed the Commission to hold a public hearing prior to its determination of the Project. In making this direction, the Minister requested that the Commission pay particular attention to the Department's Assessment Report and recommended conditions of consent, key issues raised in public submissions during the public hearing and any other relevant information.

The associated modification to the Mount Owen consent (SSD 5850) is being processed under section 4.55(2) of the EP&A Act, and the Commission is the delegated consent authority for the modification. The Department's Assessment Report includes consideration of both the SSD application and the associated modification.

Engagement

The Department placed the Project on public exhibition for an extended period, from 11 December 2019 until 14 February 2020. The Department received 340 public submissions on the Project during the exhibition period, comprising 60 percent (%) in support, 37% opposed and 3% in the form of a comment.

Submissions in support commented on the economic benefits of the Project, as well as the positive social impacts of the Project, noting Glencore's support for local businesses and community organisations. Those opposed to the Project were primarily concerned with the potential impacts on air quality, water resources and amenity impacts along with broader commentary about the mining industry's impact on climate change.

The Department received detailed technical advice on the Project from 15 Government agencies, Singleton Council and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC).

Assessment

The Department considers that the key assessment issues relate to heritage (particularly the relocation of the Ravensworth Homestead), air quality and greenhouse gas emissions, traffic and transport, economics and mine rehabilitation.

Heritage

The Ravensworth area has a complex history and the potential impacts of relocating the historic Ravensworth Homestead, which is currently located in the centre of the proposed pit extension, is one of the key and most contentious issues associated with the Project. The Ravensworth Estate is part of the traditional lands of the Wonnarua people, and holds cultural significance as a result of recorded reports of interactions and conflicts with colonists in the locality.

While some stakeholders believe that the Ravensworth Estate may have been the site of a reported 'massacre' of Aboriginal people, detailed evidence indicates that the estate was not the location of the reported massacre. The Heritage Council also maintains that the Aboriginal pre- and post-contact history of the Ravensworth Homestead is contested, however Heritage NSW advised that there is no material evidence to show that the current Ravensworth Homestead itself, built in 1832 (i.e. after the main period of conflict), is specifically the site of such conflicts.

In order to fully assess whether there are alternatives to relocating the homestead, the Department commissioned an independent review of the mine plan options presented by Glencore and an independent review of the economic viability of the key project alternatives. Based on this advice, the Department accepts that the options to retain the Ravensworth Homestead in-situ would essentially render the Project commercially unviable, and would mean that it would not proceed in any form.

In light of this conclusion, the Department commissioned an independent heritage architect to review the relocation options and confirm what heritage values (if any) would be retained through the relocation, and whether there were additional mitigation measures Glencore could implement to further reduce the associated potential impacts.

Two relocation options have been shortlisted following a comprehensive options investigation. These include an 'intact' move to a location outside the proposed Glendell Pit Extension but still within the original landholdings (i.e. the Ravensworth Farm option) and dismantling and rebuilding the complex in Broke (i.e. the Broke Village option).

The heritage expert agreed with Glencore's assessment that while both relocation options would impact the heritage values of the homestead complex, the Ravensworth Farm option would result in lesser heritage impacts than the Broke Village option. The Department agrees, and also notes that the Broke Village option would require a number of secondary planning approvals.

Amenity

With the implementation of proposed mitigation measures, the worst-case dust emissions from the Project are predicted to meet applicable criteria for total suspended particulates (TSP) and dust deposition at all privately-owned receivers. Emissions related to blast fumes and diesel emissions are also predicted to comply with applicable criteria.

However, fine particulate matter emissions (PM₁₀ and PM_{2.5}) are predicted to exceed applicable criteria at some privately-owned receivers during some operational scenarios. All of these receivers are already affected by existing mines in the locality, and already have acquisition rights under existing development consents where relevant criteria are exceeded.

The detailed assessment indicates that the air emissions associated with the proposed mine extension would be similar to those for the existing mine for most receivers, with dust levels reducing over time as mining moves away from Camberwell and Middle Falbrook.

Noise impacts of the Project would be comparable to those of the existing mine, and assessment indicates that emissions would comply with applicable noise criteria at all privately-owned receivers, including under noise-enhancing meteorological conditions.

On balance, the Department and the EPA are satisfied that the air quality and noise impacts of the Project are acceptable, and that Glencore has proposed all reasonable and feasible measures to reduce these impacts as far as practicable, including comprehensive proactive and reactive dust and noise monitoring and management systems.

Greenhouse Gases

The Department recognises that the greenhouse gas (GHG) impacts are a matter of interest to many members of the broader community and was raised in the majority of public objections on the Project.

The EIS indicates that the vast majority (>97%) of emissions generated by the Project comprise Scope 3 emissions that arise from the consumption of coal by end users. Under the Paris Agreement accounting rules and Australian legislation, Scope 3 emissions are not included in Project emission reporting, to avoid double counting.

Further to this, the majority (approximately 56%) of Scope 1 and 2 GHGs would be associated with fugitive gas emissions due to exposure of the seams during open cut mining operations. Glencore has reviewed the feasibility of pre-draining coal seam gas to reduce these emissions, however this option is not considered not practical or feasible given the structurally complex (faulted) domain, the overall nature of the geology, and low gas content over the majority of the proposed mining area.

The Department accepts that Glencore has applied reasonable and feasible measures to reduce its Scope 1 and 2 emissions through the design and operation of the Project. The Department also accepts the Project is consistent with the objectives of *Australia's Long-Term Emissions Reduction Plan*, the NSW Government's Net Zero Plan and its *Strategic Statement on Coal Exploration and Mining in NSW* (2020), which all recognise that in the short-medium term there will still be a strong global demand for thermal coal for power generation for at least the duration of the Project.

To minimise emissions and encourage continual improvement in GHG performance, the Department has recommended conditions requiring Glencore to monitor Scope 1 and Scope 2 GHG emissions, and to regularly review and implement further reasonable and feasible GHG abatement measures.

Traffic and Transport

The Project would not result in an increase in overall workforce numbers at the Mount Owen Complex. As such, the Project would not result in any significant change to total traffic volumes on Hebden Road, apart from a short term spike during construction, and an increase in the duration of mine-related traffic volumes associated with the extended life of the mine.

Glencore is proposing to realign Hebden Road around the western boundary of the Project area, and to then close and remove the 5.3 km redundant section of the road within the proposed mining area. The realigned road would marginally increase travel distance by 1.2 km, or an additional travel duration of less than 1 minute. Although Council raised concerns regarding these potential delays, the Department considers that the realignment would significantly improve the current condition of the road, and notes that no concerns were raised in public submissions about the proposed realignment.

TfNSW did not raise any significant issues regarding the traffic or road safety impacts of the Project, and the Department is satisfied that the Project is unlikely to result in any significant traffic impacts, subject to the proposed road and intersection upgrades.

Social and Economic

Social impact assessment indicates that the Project is unlikely to result in significant adverse social impacts, with impacts (both positive and negative) essentially a continuation of the existing social impacts associated with the mine complex. Negative social impacts would be focused on those people who reside close to the mine (through amenity impacts such as noise and dust), while positive impacts are experienced by a wider geographic spread of residents (particularly by way of increased employment and economic opportunities).

Glencore's economic assessment included a cost-benefit analysis to evaluate the net benefit/cost of the Project to NSW, and a local effects analysis to assess the net effects in the region. The cost-benefit analysis, which included consideration of all environmental externalities, calculates that the Project would have a net benefit of \$1.1 billion to the NSW economy in net present value (NPV) terms.

The Department's independent economic expert disagreed with aspects of Glencore's assessment, including the values attributed to coal price, company and payroll tax, worker and supplier benefits, and greenhouse gas emissions. While still representing a net benefit, the independent expert's analysis indicates that the Project is more likely to deliver a net benefit of around \$151 million.

The Department recognises that the assessment prepared by Glencore and the independent review undertaken by CIE are likely to represent the two extremes when it comes to the realised benefit to NSW (i.e. they are the best and worst case scenarios).

In any case, the Department accepts that the Project is likely to result in a net benefit to NSW, and would result in significant socio-economic benefits for the Singleton LGA and the wider Hunter Valley. In this regard, the Project would generate:

- continued direct employment for around 690 people at the Mount Owen Complex;
- over 400 direct and indirect jobs/year in the Lower Hunter region; and
- \$2.5 billion NPV in Gross Regional Product in the Lower Hunter.

The Department has recommended conditions requiring Glencore to enter into a Voluntary Planning Agreement (VPA) with Council to provide contributions towards community infrastructure and services, and to maintain ongoing engagement with the community.

Rehabilitation

The Rehabilitation and Mine Closure Strategy for the Project seeks to integrate rehabilitation across the Complex. The Strategy seeks to create an undulating landform with micro-relief and adequate surface water drainage to mimic the surrounding landscape. The final landform replaces the former approved final landform for the Glendell mine, which was based on the traditional 'bread-basket' type landform typical of older mines in the valley, which were designed without particular emphasis on creating natural looking landforms.

The final land use would comprise a combination of native vegetation and open grassland areas, which would be able to be used for agriculture and/or a range of other future land uses. The native vegetation would provide corridors to link with broader habitat corridors in the valley.

The Department's independent mine plan review concluded that Glencore has identified the feasible alternatives for the Project, and that its reasons for deciding on the final preferred mine plan and final landform are sufficiently justified.

The Department accepts that the proposed final landform has been designed following detailed consideration of available alternatives, and that it presents an appropriate final landform and final land use. The Department also acknowledges that the Project would significantly improve the final landform for the approved Glendell mine, which was approved before contemporary rehabilitation techniques incorporating micro-relief were introduced.

Other Issues

In addition to the above, the Department has carefully considered the Project's impacts to water resources, biodiversity, Aboriginal heritage sites, visual amenity, agricultural lands and land use compatibility, along with management of hazardous materials and potential blasting and vibration impacts.

The Department considers that these impacts have been minimised to the greatest extent practicable and that residual impacts can be appropriately managed and regulated through the development of management plans and strategies required under the recommended conditions, which have been developed by the Department in consultation with relevant government agencies.

Evaluation

The Department has undertaken a comprehensive assessment of the Project in accordance with the relevant requirements of the EP&A Act, with a particular focus on issues raised in public submissions and Government agency advice.

Overall, the Department considers the site to be well-suited for the Project as it is located in an area that is dominated by mining and industrial operations, and would be a logical 'brownfield' extension of open cut mining at the Glendell Mine.

However, the Department recognises and acknowledges that Aboriginal groups identify a connection to the land in the greater Ravensworth Area and consider the whole region to have high cultural significance. The Department also notes the concerns that some Aboriginal groups and the Heritage Council have raised about the Project's impacts on these cultural values and the request to take a precautionary approach. However, the detailed archaeological investigations demonstrate that the reported massacre did not occur at, nor was it staged from, the Ravensworth Homestead.

Nonetheless, the Ravensworth Estate and Homestead does have significant heritage significance associated with its early colonial links and a range of stakeholders, including the Heritage Council, do not support the removal of the homestead.

Consequently, a key focus of the Department's assessment was to ensure that all Project alternatives had been thoroughly investigated to confirm that the relocation of the Ravensworth Homestead, and associated impacts on heritage values, is justified and could not be avoided.

Ultimately, the Department considers that there are no reasonable alternative mine plan designs available, and the only option that would leave the Ravensworth Homestead in-situ would be to refuse the Project in its entirety.

The Department has carefully considered the option of recommending refusing the Project and the associated implications of such a decision. The benefits of refusing the project would include preserving the heritage values that would otherwise be reduced through the relocation process, and avoiding any impacts associated with the realignment of Yorks Creek and relocation of Hebden Road. However, importantly, all socio-economic benefits associated with the Project would be lost.

As is common with coal mining projects, this Project would have major economic and social benefits to the region and to NSW, including:

- continuation of an existing 690 jobs at the Mount Owen Complex, together with 350 new construction jobs during Project development phases;
- direct capital investment of approximately \$515 million (NPV) in the Project;
- over 400 direct and indirect jobs/year and \$2.5 billion in Gross Regional Product for the Lower Hunter region; and
- contributions to Singleton Council, to provide approximately \$5.15 million towards community enhancement projects.

The Department has carefully weighed the heritage and environmental impacts of the Project against the significance of the Project's identified coal resources and the socio-economic benefits associated with continued operation of the Glendell Mine until 2044, and associated coal processing at Mount Owen CHPP until 2045.

Notwithstanding the Project's unavoidable impacts to the Ravensworth Homestead, the Department considers that the benefits of the Project outweigh its costs, and that the project is approvable, subject to stringent conditions.

The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the Project (if approved) would comply with acceptable criteria and standards, that the impacts would be consistent with those predicted by Glencore in its documentation, and that residual impacts would be effectively minimised, managed and compensated.

Contents

1	Introduction	1
1.1	Background.....	1
1.2	Existing Operations	1
2	Project	4
2.1	Description of the Project	4
2.2	Associated Modifications	8
2.3	Project Alternatives.....	8
3	Strategic context	9
3.1	Environment and Surrounding Land Use	9
3.2	Policies, Guidelines and Plans	13
4	Statutory context	17
4.1	State Significant Development	17
4.2	Permissibility.....	17
4.3	Associated Modifications	17
4.4	Surrender of Development Consent.....	18
4.5	Mandatory Matters for Consideration	18
4.6	Integrated & Other Approvals.....	19
4.7	Site Verification Certificate	19
4.8	Biodiversity Development Assessment Report	20
4.9	Commonwealth Approval	20
4.10	Independent Planning Commission.....	21
5	Engagement	22
5.1	Background.....	22
5.2	Summary of submissions	22
5.3	Advice from government agencies	24
5.4	Public submissions	27
5.5	Response to submissions.....	29
6	Assessment	30
6.1	Introduction	30
6.2	Historic Heritage	30
6.3	Aboriginal Heritage	52
6.4	Air Quality	55
6.5	Greenhouse Gas Emissions.....	61
6.6	Noise.....	65
6.7	Water Resources	70
6.8	Biodiversity	79
6.9	Traffic and Transport	90

6.10	Rehabilitation and Final Landform	94
6.11	Economic and Social Impacts	97
6.12	Other issues.....	101
7	Evaluation.....	105
	Appendices	A1
	Appendix A – Environmental Impact Statement	A1
	Appendix B – Submissions	A1
	Appendix C – Response to Submissions.....	A1
	Appendix D – IESC Advice and Glencore’s Response	A1
	Appendix E – Agency Advice on Assessment.....	A2
	Appendix F – Additional Information.....	A4
	Appendix G – Statutory Considerations.....	A6
	Appendix H – Matters of National Environmental Significance	A13
	Appendix I – Recommended Instrument of Consent for SSD 9349	A29
	Appendix J – Recommended Instrument of Modification for SSD 5850	A29

1 Introduction

1.1 Background

1. The Glendell Mine forms part of the Mount Owen Complex (the Complex) located in the Hunter Coalfields in the Hunter Valley, approximately 20 kilometres (km) north-west of Singleton and 24 km south-east of Muswellbrook, in the Singleton local government area (LGA).
2. Mt Owen Pty Limited (Mt Owen), a subsidiary of Glencore Coal Pty Limited (Glencore), owns and operates the Complex. In addition to the Glendell Mine, the Complex comprises the Mount Owen Mine (North Pit) and Ravensworth East Mine (Bayswater North Pit), a Coal Handling and Preparation Plant (CHPP) and rail loop that services the Complex (see **Figures 1 and 2**).

1.2 Existing Operations

3. The Glendell Mine was originally approved by the then Minister for Planning and Environment under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 2 May 1983 (DA 80/952 – the Glendell Consent), with an original production rate of 3.6 million tonnes per annum (Mtpa) of ROM coal. Following early preparation works, mining commenced at the site in 2009.
4. The Glendell Consent regulates the mining of coal from the Glendell Pit and rehabilitation of the mining area. Coal mined at Glendell is processed at the Mount Owen Mine, which is regulated by development consent SSD-5850 (Mount Owen Consent).
5. The Glendell Consent has been modified four times and currently allows for open cut mining operations until 30 June 2024 and permits:
 - mining of up to 4.5 Mtpa of run of mine (ROM) coal using a truck and excavator fleet;
 - operations 24 hours per day, 7 days per week;
 - emplacement of overburden within the Glendell Pit and in adjacent out-of-pit emplacements, up to a height of approximately 160 mAHD;
 - one final void in the north of the Glendell Pit; and
 - transport of ROM coal to the Mount Owen CHPP for processing and transport.
6. Of relevance to the Glendell Mine, the Mount Owen Consent permits:
 - processing of up to 17 Mtpa of ROM coal at the Mount Owen CHPP;
 - tailings disposal in approved voids, including at the Ravensworth East Mine;
 - transport of coal from the site by rail to the Port of Newcastle or by conveyor to the Bayswater and/or Liddell Power Stations;
 - a private conveyor to carry of up to 2 Mtpa of ROM coal and/or crushed gravel to the Liddell Coal Mine and/or Ravensworth Coal Terminal; and
 - processing operations 24 hours per day, 7 days per week.

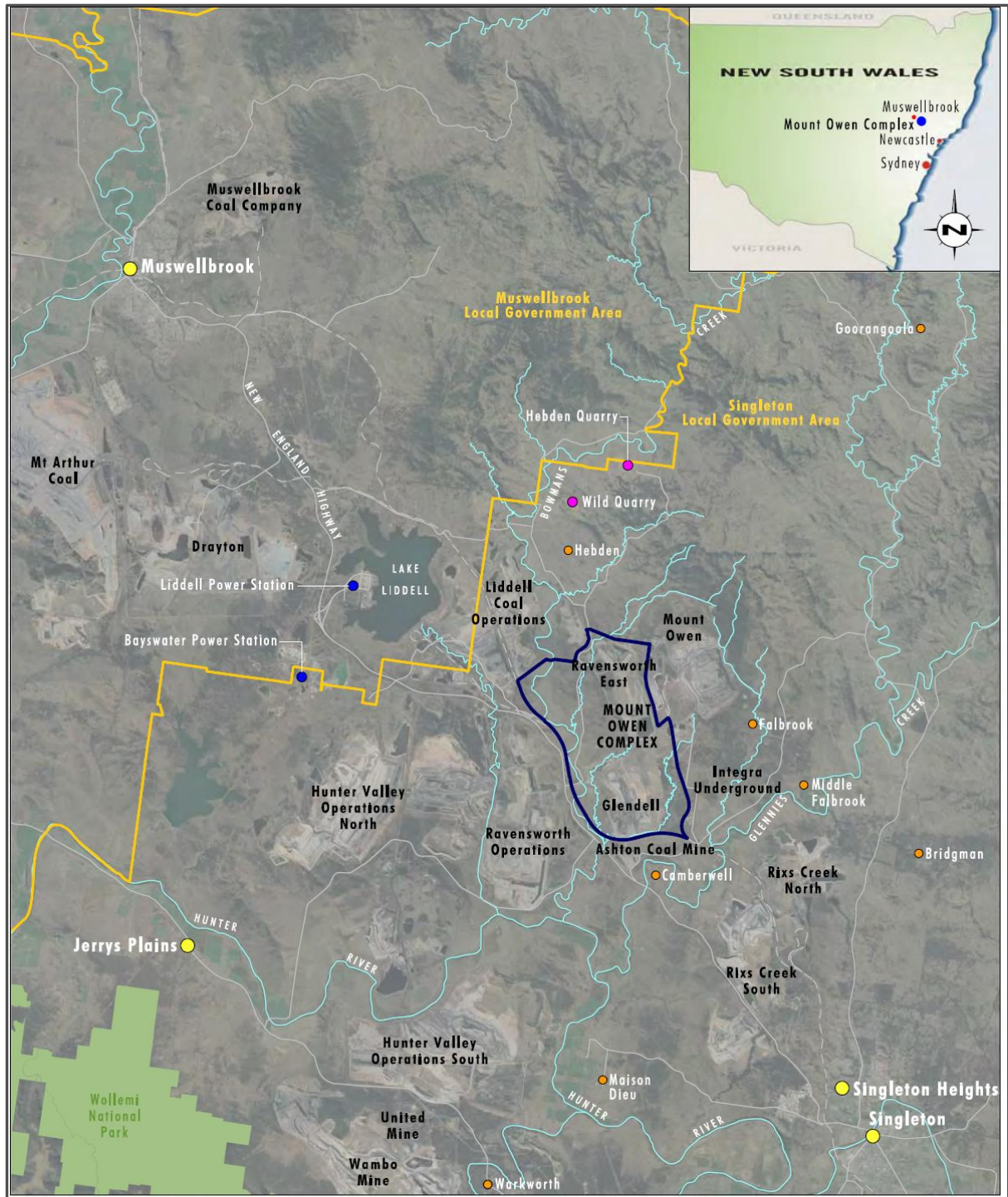


Image Source: Google Earth (2018)
 Data Source: Glencore (2019), OEH (2018)

0 2.5 5.0 10km

- Legend**
- Project Area
 - Local Government Area Boundary
 - National Park
 - Road
 - Railway
 - Drainage Line
 - Towns
 - Village/Localities
 - Power Stations
 - Quarry

FIGURE 1.1
Project Locality

Figure 1 | Project Location

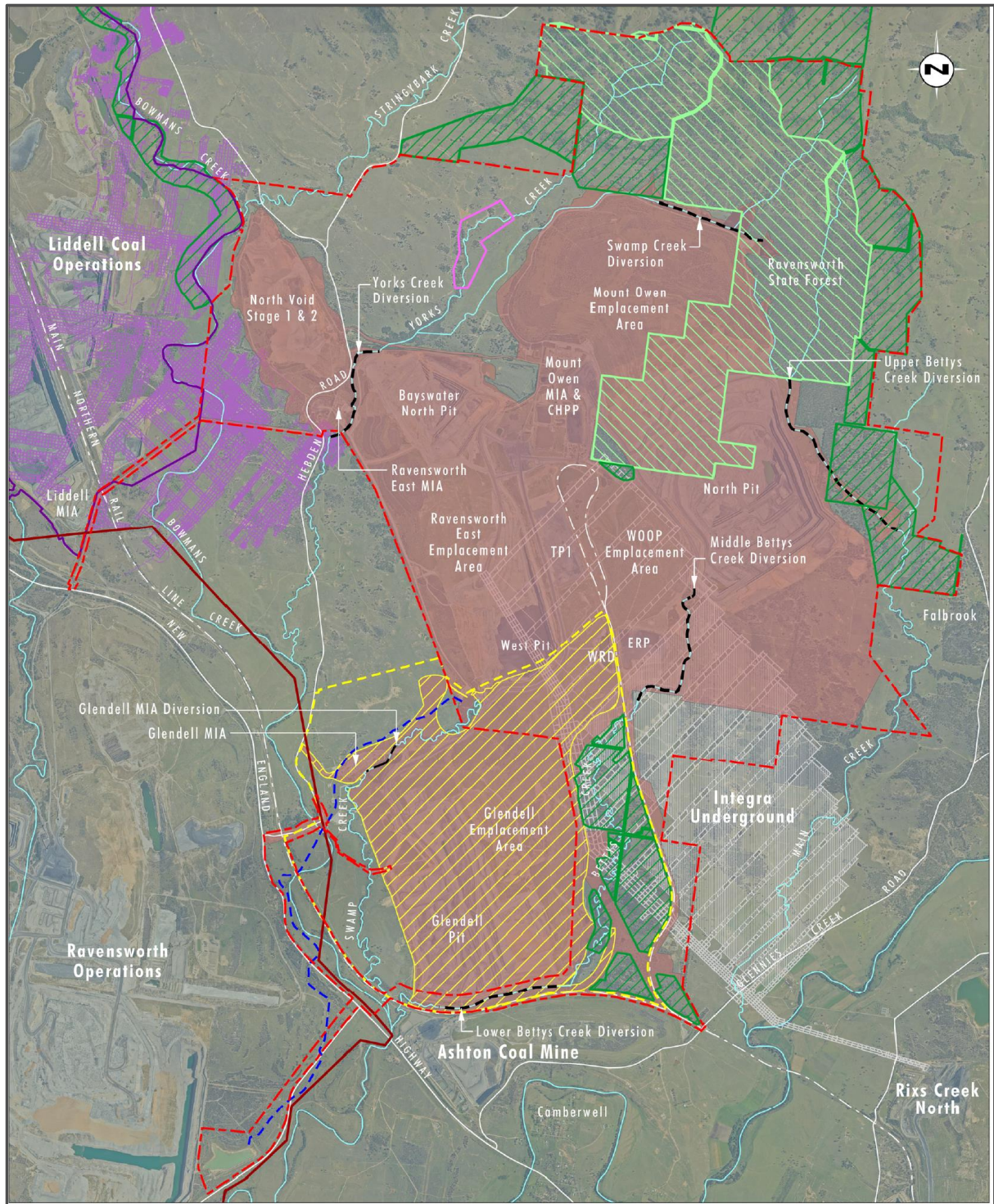


Image Source: Glencore (Dec 2018), Data Source: Glencore (2019)
 Note: Mount Owen Consent Boundary assumes Narama Pipeline Modification is approved.
 * Mining Related Disturbance assumes Glendell MOD 4 is approved

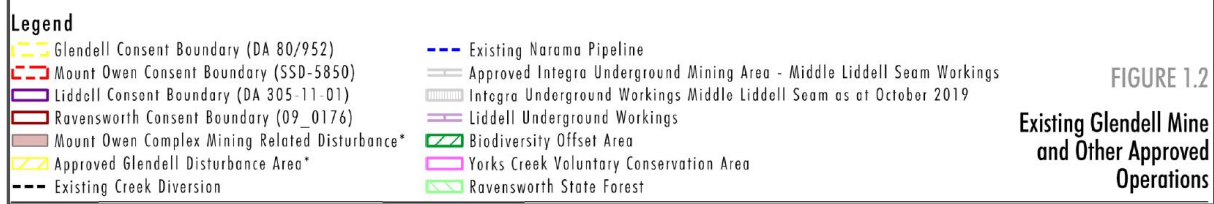


FIGURE 1.2
Existing Glendell Mine and Other Approved Operations

Figure 2 | Existing mining operations

2 Project

2.1 Description of the Project

7. On 3 December 2019, Glencore lodged a State significant development application for the Glendell Continuation Operations Project (SSD 9349) under divisions 4.1 and 4.7 of the EP&A Act.
8. The Project involves the extraction of an additional 135 Mt of ROM coal using open cut mining methods, by extending the existing open cut operations to the north of the current Glendell Pit.
9. The Project is summarised in **Table 1** below and described in detail in the Environmental Impact Statement (EIS) (see **Appendix A**). **Figure 3** show the key components of the Project and **Figure 4** shows the associated additional areas of disturbance.

Table 1 | Key Components of the Project

Aspect	Approved under DA 80/952	Proposed Glendell Continued Operations Project (SSD 9349)
<i>Life of mine</i>	Approved until 30 June 2024.	Additional 21 years of mining operations under SSD 9349 until 31 December 2044, followed by an additional year of coal processing at the Mount Owen CHPP (i.e. extension of SSD 5850 until 2045).
<i>Mining areas</i>	Open cut mining operations in the Glendell Pit.	Extension of the Glendell Pit, continuing northward beyond the current pit boundary (see Figures 3 and 4). Additional 750 ha of disturbance.
<i>Extraction rates</i>	Maximum extraction rate of up to 4.5 Mtpa.	Maximum extraction rate of up to 10 Mtpa (coinciding with decrease in extraction at Mount Owen and Ravensworth).
<i>Mining methods</i>	Open cut mining using a truck and excavator fleet.	Open cut mining using a truck and excavator fleet.
<i>Overburden emplacement and waste management</i>	<ul style="list-style-type: none"> • In-pit emplacement in Glendell emplacement area to approximately 160 mAHD. • Emplacement at Ravensworth East emplacement area to approximately 160 mAHD. • Emplacement of coarse rejects in the Bayswater North Pit and North Pit. 	<ul style="list-style-type: none"> • In-pit emplacement within Glendell emplacement area to approximately 200 mAHD. • Emplacement at existing Ravensworth East emplacement area to approximately 185 mAHD. • Ongoing use of Bayswater North Pit and North Pit for emplacement of coarse rejects.
<i>Coal processing</i>	<ul style="list-style-type: none"> • No coal processing at Glendell. ROM coal transported to Mount Owen CHPP for processing. • Use of CHPP and associated coal handling facilities to end of 2037. 	<ul style="list-style-type: none"> • All coal would continue to be processed using the existing Mount Owen CHPP facilities. • Extended duration of use of CHPP and associated coal handling facilities to end of 2045.
<i>Transport</i>	<ul style="list-style-type: none"> • Transport of coal via the Mount Owen CHPP in accordance with the Mount Owen consent (SSD 5850) to end of 2037. 	<ul style="list-style-type: none"> • Continued transport of coal via the Mount Owen CHPP in accordance with the Mount Owen consent (SSD 5850) to the end of 2045.

Aspect	Approved under DA 80/952	Proposed Glendell Continued Operations Project (SSD 9349)
<i>Operating hours</i>	24 hours a day, 7 days a week.	24 hours a day, 7 days a week.
<i>Water Management</i>	<ul style="list-style-type: none"> • Mine water management system involving dams and pipelines. • Raw water obtained under licenses from Glennies Creek. • Managed as an integrated component of the Mount Owen Complex water management system (WMS) and Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) under the Mount Owen consent. 	<ul style="list-style-type: none"> • Mine water management system involving dams and pipelines. • Raw water obtained under licenses from Glennies Creek. • Managed as an integrated component of the Mount Owen Complex water management system (WMS) and Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) under the Mount Owen consent. • Realignment of Yorks Creek.
<i>Infrastructure</i>	<ul style="list-style-type: none"> • Mine infrastructure includes: <ul style="list-style-type: none"> – stockpiles; – administration and amenities buildings; – heavy and light vehicle access roads; – workshops; and – conveyor, pipelines and power systems. 	<ul style="list-style-type: none"> • Use of existing Glendell mine infrastructure area (MIA) until decommissioned. • Construction of the new Glendell MIA including heavy and light vehicle access roads. • Realignment of Hebden Road. • Telecommunications and electricity infrastructure to be re-routed. • Removal of Ravensworth East conveyor and associated infrastructure.
<i>Workforce</i>	Approximately 300 full time equivalent employees.	Approximately 690 full time equivalent employees. The increase in employee numbers at Glendell would coincide with the decrease in production and workforce numbers at the Mount Owen North Pit (i.e. no increase in overall workforce numbers at the Mount Owen Complex).
<i>Site Access</i>	<ul style="list-style-type: none"> • Mine access via Hebden Road. • Access to the Mount Owen MIA and CHPP via the Mount Owen access road. 	<ul style="list-style-type: none"> • Access to the Glendell Pit Extension via a new mine access road linking the new MIA and the proposed realigned Hebden Road. • Continued access to the Mount Owen MIA and CHPP via the existing Mount Owen access road.
<i>Rehabilitation and final landform</i>	<ul style="list-style-type: none"> • Progressive rehabilitation of the disturbance area including establishment of native woodland and grassland. • Final land uses would involve a mix of agriculture and biodiversity conservation. • Glendell Pit final void. 	<ul style="list-style-type: none"> • Progressive rehabilitation of the disturbance area including establishment of native woodland and grassland. • Final land uses would involve a mix of agriculture and biodiversity conservation. • No additional mining voids are proposed.
<i>Additional Project Elements</i>	-	<ul style="list-style-type: none"> • Relocation of the Ravensworth Homestead

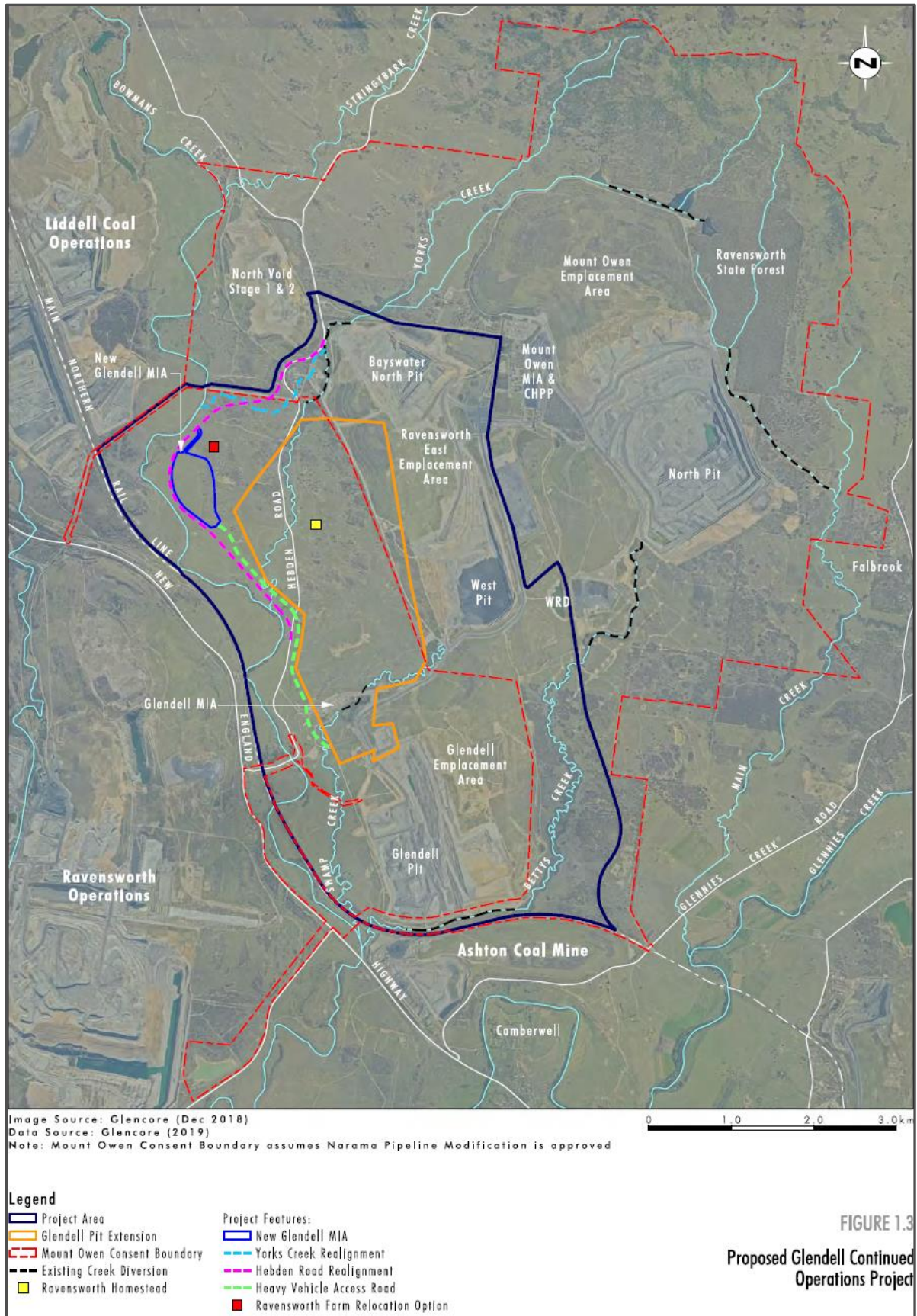


FIGURE 1.3
 Proposed Glendell Continued Operations Project

Figure 3 | Proposed Project Layout

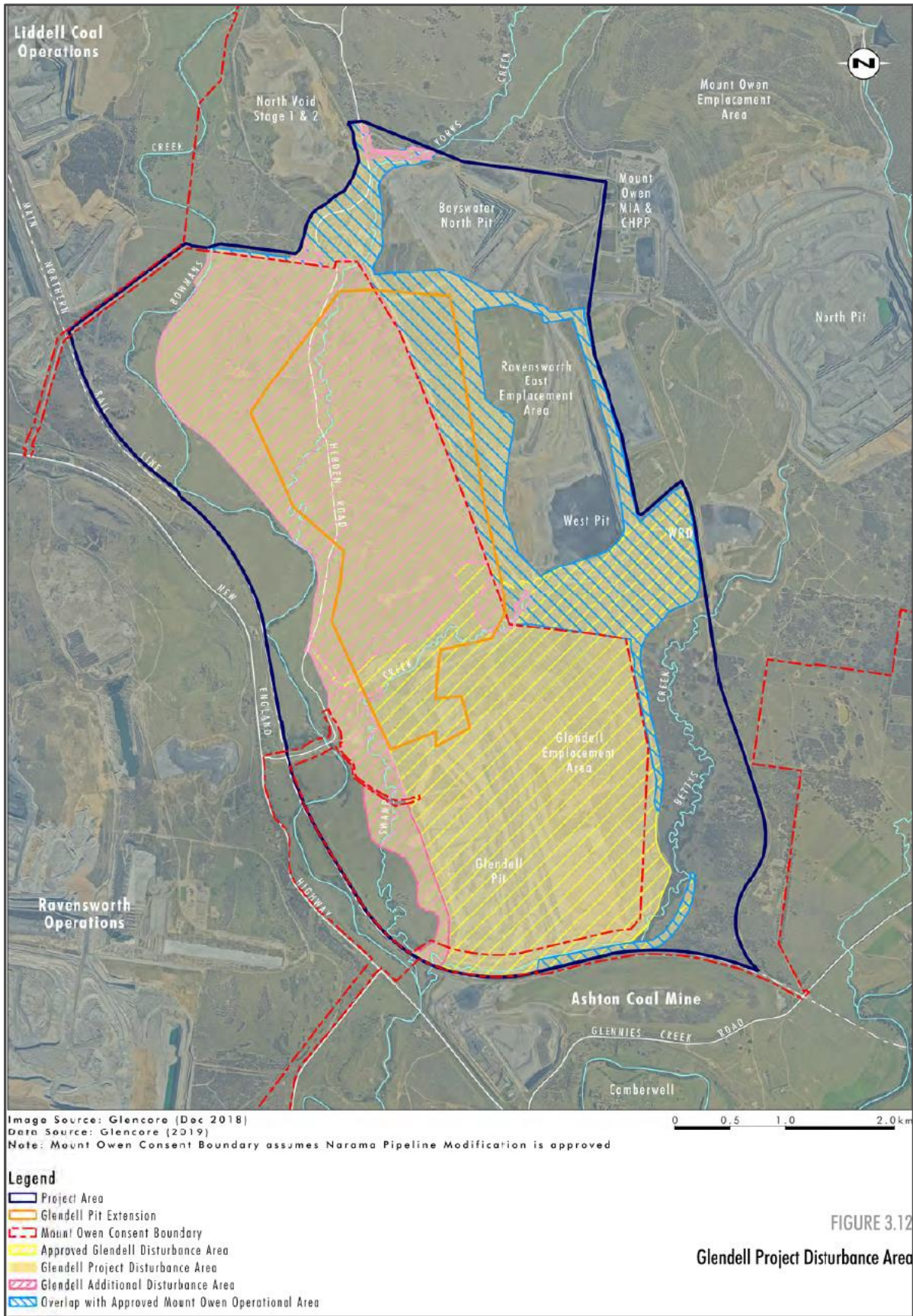


Figure 4 | Additional disturbance areas

2.2 Associated Modifications

10. Should SSD 9349 be granted approval, a modification would also be required to the existing Mount Owen Continued Operations development consent (SSD-5850) to allow operation of the Project.
11. The modifications would include:
 - extended duration of use of CHPP, MIA, load out facility and rail loop to end of 2045;
 - extended duration of approved emplacement to end of 2045 and changes to the approved final landform;
 - use of North Pit and Bayswater North Pit for water and/or tailings storage as part of the water management system for the Complex, and extension of time for completion of final landform reshaping in North Pit and Bayswater North Pit voids; and
 - extended duration of use of Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) linkages.

2.3 Project Alternatives

12. As required by Clause 7, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, the EIS included an analysis of feasible alternatives to the carrying out of the Project.
13. This assessment report considers the implications of various alternative mine designs, while having regard to the Project Objectives identified by Glencore. In addition to the Project, as defined by Glencore in its EIS, this assessment report also considers the following key alternatives:
 1. various options for reducing the Project footprint which would remove the need to relocate the Ravensworth Homestead, divert York's Creek, and realign Hebden Road, while also reducing the area of land required to be cleared; and
 2. the option of not proceeding with the Project.

3 Strategic context

3.1 Environment and Surrounding Land Use

Historical Context

14. The Ravensworth area has a complex history dating back to European settlement in 1820. European settlement of the Ravensworth area inevitably resulted in interactions between local Aboriginal people and the early settlers.
15. The Ravensworth Estate was one of the first land grants in the Hunter Valley, and contains a homestead complex and other archaeological resources that date back to the early days of European settlement in the valley.
16. The current homestead complex dates back to 1832, and comprises four stone buildings, and one timber building dating from 1900, arranged around a farmyard square.
17. The Ravensworth Homestead complex is listed under the *Singleton Local Environmental Plan 2013* (Singleton LEP) as being of local significance. However, all relevant parties agree that elements of the complex are of State heritage significance, and the Heritage Council of NSW has recommended it for nomination on the State Heritage Register¹.
18. Some stakeholders, including the Heritage Council and the Plains Clan of the Wonnarua People (PCWP) Aboriginal group, suggest that the Ravensworth Estate is highly significant for its reported association with frontier conflict between European and Aboriginal people.
19. One incident in particular, the Upper Hunter Valley Massacre (formerly the Ravensworth Massacre) is believed to have occurred in early September 1826, and resulted in the death of two Europeans and 18 Aboriginals.
20. The Department notes the significance of the Ravensworth Homestead is contested by other Registered Aboriginal Parties (RAPs). In addition, Heritage NSW acknowledges that the Upper Hunter Valley Massacre is located outside the Project area, adding that numerous surveys, salvage and excavations in the area have not identified any burials or human remains on the site.
21. Despite this, most Aboriginal groups consider the whole region to have high cultural significance and a connection to the land. With some groups identifying an attachment to the Ravensworth Estate in particular, mainly associated with Wonnarua people who may have lived and worked on the property.
22. In support of its views, the PCWP has made applications under Sections 9 and 10 of the *Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984* to seek to protect the area as a significant Aboriginal area. The Department understands that the area subject to the application covers a large portion of the Hunter Valley coalfield, and is not specific to the Project area.
23. The Department's assessment of impacts on aboriginal and historical heritage is provided in **Sections 6.2 and 6.3**.

¹ In February 2020, the Heritage Council of NSW decided to delay progressing the nomination of the Ravensworth Homestead for the State Heritage Register until the Glendell Continued Operations Project is determined. Despite this, Glencore's assessment has been undertaking in consideration of the relevant State Heritage values.

Local Context

24. The Glendell Mine is located in the centre of a mining and industrial precinct within the Hunter Valley, NSW (see **Figure 1**). In addition to the three mines making up the Complex, several other coal mines are nearby, including the Liddell Open Cut Coal Mine to the northwest, Hunter Valley Operations to the West, Ravensworth operations (including an underground and an open cut) to the southwest, Ashton Coal Mine to the south, and Integra Underground and Rix's Creek operations to the southeast.
25. In addition to these mines, AGL Macquarie's Liddell and Bayswater Power Stations are located to the west of the Complex. These are two of the State's largest coal-fired power stations. They occupy a large area of land, including land associated with their water storages (Lake Liddell and Plashett Dam, respectively) and fly-ash dams. Other industrial land uses in the locality include two quarries to the north along Hebden Road.
26. Despite the influence of industrial activities in the region, the land surrounding the Complex also supports a range of primary industries. The Complex is bounded to the northeast by the Ravensworth State Forest, regenerated vegetation in the New Forest Area and biodiversity offsets associated with the current Mount Owen Mine (**Figure 2**).
27. A range of agricultural enterprises and rural residential holdings exist within the locality. The Glendell Mine area itself has been extensively cleared and grazed since the late 1820s. Extensive evidence of cropping is evident on the alluvial flats associated with Bowmans Creek, Swamp Creek and parts of Yorks Creek.
28. The Glendell Mine is also located in close proximity to private receivers, with Camberwell Village located approximately 1 km from the southern boundary of the existing Glendell Mine (see **Figure 5**).

Glencore Operations in the Hunter Valley

29. As stated above, the Glendell Mine is located in the centre of a mining and industrial precinct within the Hunter Valley, NSW. Including the Glendell Mine, there is a total of 13 coal mines within approximately 15 km of the Project area (see **Figure 6**).
30. Glencore currently owns several of these operations, including the Ravensworth Open Cut and Underground, Liddell Coal Operations, Ravensworth East Open Cut, Mount Owen Open Cut, Glendell Open Cut, and Integra Underground.
31. The co-location of these mines enables Glencore to achieve several efficiencies (including shared use of CHPP processing capacities and infrastructure assets, train maintenance and refuelling areas and water management infrastructure) and coordinate its mine closure and rehabilitation strategies.
32. Glencore also operates an integrated water management system across the Mount Owen Complex, Ravensworth Complex and Liddell Coal Operations. This system, known as the Greater Ravensworth Water and Tailing Scheme (GRAWTS), allows Glencore to share water between these mines and better manage its regional water balance by better matching water makes and water takes.

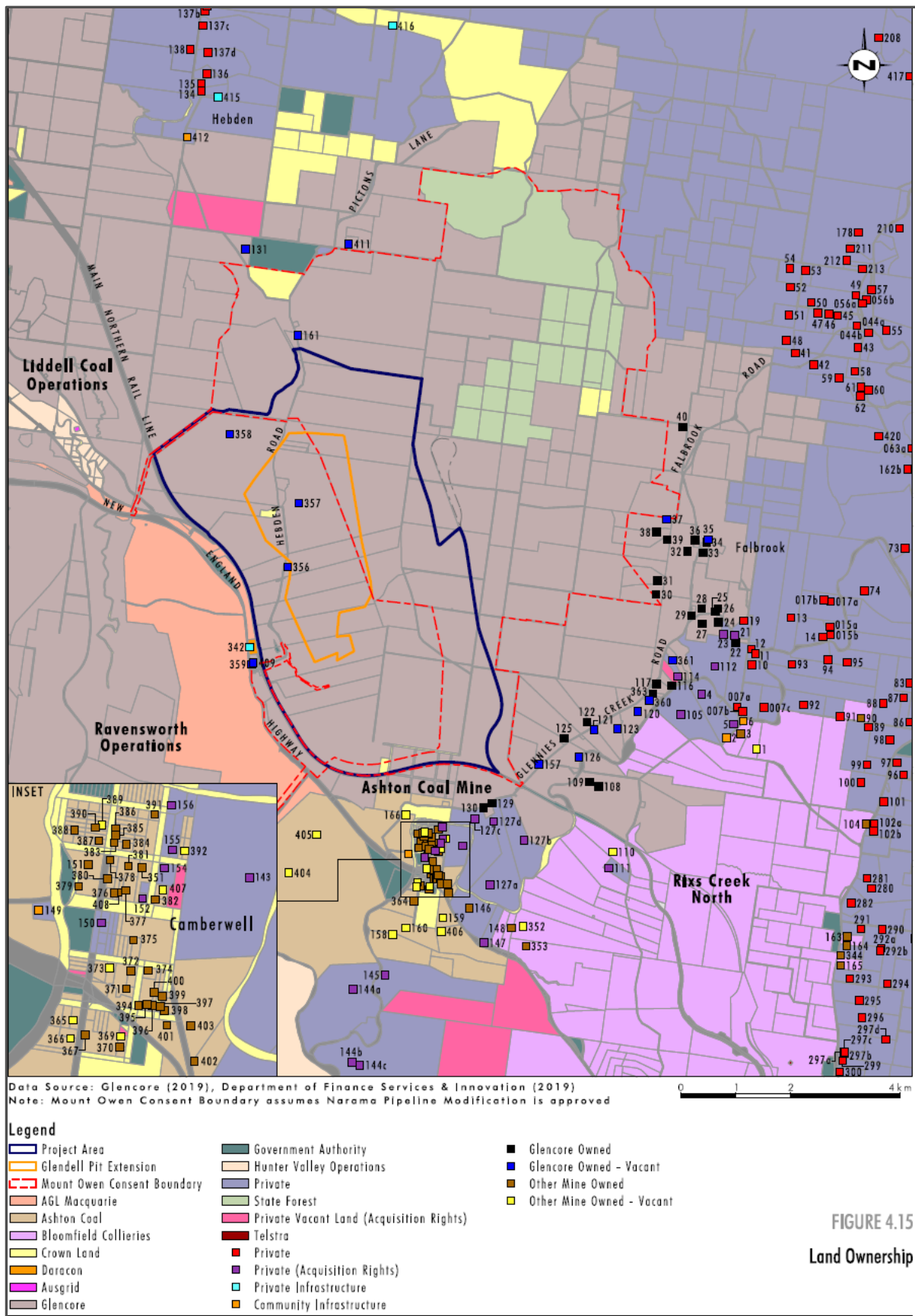


FIGURE 4.15
Land Ownership

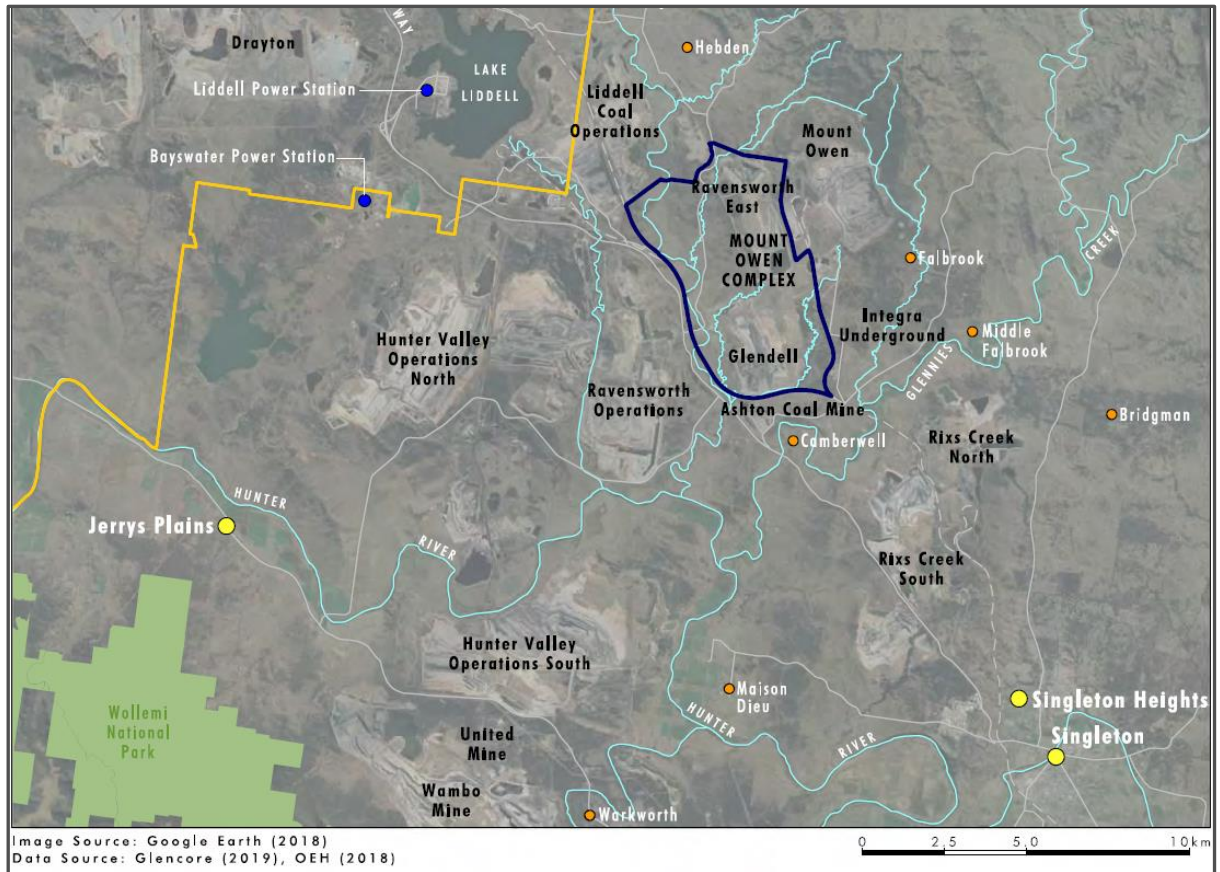


Figure 6 | Surrounding Coal Mines

33. In addition to providing efficiency gains for Glencore, the GRAWTS provides several environmental benefits including the beneficial reuse of dirty and mine-affected water, reduced discharges of excess water to the environment and reduced reliance on extraction of clean water from local watercourses (benefiting the environment, downstream water users and reducing demand for limited licensed water entitlements). By consolidating water discharges under the environment protection licences (EPLs) for the Ravensworth and Liddell coal mines, the GRAWTS also enables more efficient management and enforcement of discharge limits.
34. The close proximity of these mines enables the strategic planning of post-mining land uses and rehabilitation corridors, at a regional scale. Glencore has already coordinated the location of several existing biodiversity offset and rehabilitation areas to provide long-term habitat linkages throughout the greater Ravensworth area.
35. The Project would continue to rely on existing infrastructure by utilising the existing Mount Owen CHPP and rail load out facilities. In addition, as part of the Project, Glencore would continue to transfer gravel from the Complex to the neighbouring Liddell Coal Mine (for use as road base to reduce dust emissions) and the consolidated emplacement of tailings from the Mount Owen and other nearby CHPPs in the approved tailings emplacement areas at the Complex.
36. If approved, the Project would commence at a time when production at Glencore’s adjacent Liddell Coal Operations, and the Ravensworth East and Glendell Mines would cease and production at Mount Owen Mine would reduce. The coal produced by the Project would provide ‘replacement production’ that would help to maintain Glencore’s long-term production profile at the Mount Owen Complex.

3.2 Policies, Guidelines and Plans

UNFCCC Paris Agreement 2015

37. Under the *United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement 2015* (Paris Agreement), each signatory must identify its own post-2020 climate actions to achieve a balance between anthropogenic emissions and removal by GHG sinks in the latter half of this century. These actions are referred to as Nationally Determined Contributions (NDCs).
38. Australia's NDC adopts a target of net zero emissions by 2050 by committing to seven low emissions technology stretch goals. These include clean hydrogen production, ultra-low-cost solar, energy storage, low emissions steel production, low emissions aluminium production, carbon capture and storage and soil carbon measurements.
39. Australia's updated NDC (dated October 2021) also reaffirm its commitment to reduce national GHG emissions by between 26 and 28 percent from 2005 levels by. Australia's emissions projections from 2021 demonstrate that it is on track to reduce emissions by up to 35% below 2005 levels by 2030.
40. The established national policy frameworks focus on broader structural economic adjustment and abatement measures to achieve GHG emissions targets and outcomes, and do not seek to restrict private development in order to meet Australia's commitments under the Paris Agreement.
41. These frameworks do not impose any prescriptive emissions criteria or targets which can be applied in development assessment of individual projects.

Australia's Long-Term Emissions Reduction Plan

42. The Commonwealth Government has recently developed *Australia's Long-Term Emissions Reduction Plan* (the Emissions Reduction Plan) which is a whole-of-economy plan to achieve net zero emissions by 2050.
43. The Emissions Reduction Plan aims to ensure regional communities are able to capitalise on the opportunities of the new energy economy in order to experience new sources of growth. Of particular relevant to this Project, the Emissions Reduction Plan states:

These shifts will unfold over decades, and these sectors (including coal and gas) will continue to provide jobs and underpin regional communities for many years to come.
44. Australia's long-term strategy and domestic actions, as outlined in the Emissions Reduction Plan, are underpinned by rigorous emissions monitoring and accountability systems. This includes *National Greenhouse and Energy Reporting Scheme* (NGERS) and the associated *Safeguard Mechanism* to which Glencore is a participant.
45. As a participant of the NGERS, Glencore would continue to undertake regular reviews of the technologies being used and abatement measures being implemented at its operations to continue to reduce emissions.

Net Zero Plan Stage 1: 2020-2023 Implementation Update

46. The NSW Government has recently released its *Net Zero Plan Stage 1: 2020-2030 Implementation Update* (the Net Zero Plan) which outlines the actions it proposes to take in order to help achieve the State's objective to deliver a 50% reduction in carbon emissions by 2030 compared to 2005 levels.
47. In line with the objectives set out in the Net Zero Plan, Glencore has committed to a decarbonisation pathway across its global mining business and seeks to achieve net zero emissions by 2050. In the short and medium term, Glencore is targeting a 15% emission reduction by 2026 and a 50% reduction in emissions by 2035 across its global mining business. Glencore's emission reduction targets refer to total emissions (i.e. Scope 1, 2 and 3).
48. This reduction will be largely met by the depletion of Glencore's coal assets in Columbia and South Africa, with Glencore's Australian coal business continuing to supply the high-quality coal required to meet global demand for their remaining life.
49. One initiative outlined in the Net Zero Plan of relevance to the Project is the Coal Innovation Program. The Coal Innovation Program recognises that the mining sector is one of NSW's biggest economic contributors and states that:

Mining will continue to be an important part of the economy into the future and it is important that the State's action on climate change does not undermine those businesses and the jobs and communities they support.
50. The Coal Innovation Program is primarily focused on limiting fugitive emissions that come from coal mining, through the capture and combustion of these emissions to provide a new revenue streams to the mining sector.
51. The Department's assessment on greenhouse gas emissions, including consideration of measures to reduce fugitive emissions is provided in **Section 6.5**.

Strategic Statement on Coal Exploration and Mining in NSW

52. On 24 June 2020, the NSW Government released its *Strategic Statement on Coal Exploration and Mining in NSW* (the Statement) which sets out its approach to transition to a low carbon future (consistent with Australia's commitments under the Paris Agreement), and how to manage the impact on coal-reliant communities.
53. The Statement identifies that there is a global transition away from fossil fuels to low carbon sources of energy in order to meet commitments made under the Paris Agreement. While this will ultimately lead to the global phasing out of coal for electricity generation (i.e. thermal coal), the Statement identifies that this is likely to take some decades to complete.
54. Despite this global trend for reduced reliance on fossil fuels, coal mining for export from NSW is expected to continue to have an important role to play in the short to medium term, as coal currently remains a critical energy source all over the world.
55. The Statement also recognises that the use of coal for the manufacturing of steel (i.e. metallurgical/coking coal) is likely to be sustained for a longer period as there are currently limited practical substitutes available.

56. The transition to new energy sources is recognised as a long-term economic change that will continue to reshape our regional communities, like those in the Singleton area, which currently rely on the export coal industry. As described in the Statement, these communities will be able to adapt, however they will need time to diversify their economies and develop new sources of employment.
57. To support the intentions of the Statement, the NSW Government has identified a proportion of the State's coal regions where mining is not supported and/or is prohibited, and areas considered for proactive release for coal exploration. The Project would not be located in any of these 'no-go' areas, but would be located in an area where coal exploration and mining titles already exist.

Upper Hunter Strategic Regional Land Use Plan

58. The *Upper Hunter Strategic Regional Land Use Plan* (SRLUP) (September 2012) provides a framework for balancing strong economic growth with the protection of high value agricultural land within the Upper Hunter region. The plan identifies key regional planning challenges as:
 - improving the balance between agricultural land uses and resource development proposals, focusing on achieving co-existence between mining, coal seam gas and agriculture;
 - maintaining or enhancing opportunities for environmentally responsible mining and coal seam gas development to deliver reliable energy supplies to the State that reduce energy costs and carbon emissions and that generate economic wealth for the State;
 - maintaining or enhancing future opportunities for sustainable agriculture; and
 - defining and protecting strategic agricultural land.
59. In order to assist in achieving these outcomes, the NSW Government identified and mapped three categories of strategic agricultural land in the region. These include Biophysical Strategic Agricultural Land (BSAL), which is essentially the best farming land in the region, and the Equine and Viticulture Critical Industry Clusters (CICs), which represent a unique concentration of productive agricultural enterprises associated with two iconic agricultural industries in the Upper Hunter region.
60. To ensure that potential impacts on these strategic agricultural lands are appropriately considered, any mining or coal seam gas proposals that occur on strategic agricultural land outside existing mining lease areas must be referred to the independent Mining and Petroleum Gateway Panel.
61. As the Project was identified as being located on BSAL, Glencore prepared a Site Verification Report and Gateway Application, which were lodged with the Department in April 2019. The Project would not impact any areas of Equine and Viticulture CICs
62. Based on the assessment undertaken in accordance with the Interim Protocol, there is approximately 34 ha of BSAL that would be disturbed by the Project.
63. A Conditional Gateway Certificate for the Project was obtained on 24 July 2019 and is attached as Appendix 4 of the EIS (see **Appendix A**).
64. Some components of the Project would result in a permanent or long-term impact (e.g. realignment of Hebden Road, MIA and Heavy Vehicle Access Road). However, Glencore has committed to rehabilitating the areas either not impacted by the Hebden Road realignment, or areas where landform shaping is required for final landform development and/or drainage purposes, to at least Land Soil Capability (LSC) Class 4 land (approximately 21 ha).

65. The Department acknowledges that some stakeholders and sections of the community would be critical of the removal of any BSAL from agricultural production. However, the Department recognises that the stated purpose of the SRLUP's is to balance the protection of agricultural land and the sustainable management of natural resources with the strong economic growth of regional NSW.
66. The Department's assessment of impacts on the agricultural industry is provided in **Section 6.12**.

Hunter Regional Plan 2036

67. The Department's *Hunter Regional Plan 2036* (the Plan) sets out the strategic vision for the Hunter Region based on four key goals, which are to establish:
- a leading regional economy in Australia;
 - a biodiversity-rich natural environment;
 - thriving communities; and
 - greater housing choice and jobs.
68. These goals are to be achieved by delivering on a range of directions and actions set out in the Plan.
69. In broad terms, the Plan's directions and actions aim to support new and established industries in the Hunter Valley and leverage their proximity to Asian markets. The directions recognise the strategic importance of the established coal mining industry and its infrastructure links to the export market via the Port of Newcastle, as well as recognising the important role that industries including renewable energy, agriculture, viticulture and equine operations play in delivering a diversified regional economy.
70. Importantly, the Plan emphasises the need to manage these different land uses in pursuit of complementary outcomes and attainment of the overriding goals of the Plan.
71. The Department's consideration of impact on surrounding land uses is provided in **Section 6.12**.

4 Statutory context

72. The Department's assessment of the Project has given detailed consideration to a number of statutory requirements. These include the:

- objects found in section 1.3 of the EP&A Act; and
- the matters listed under section 4.15(1) of the EP&A Act, including applicable environmental planning instruments and regulations.

73. The Department has considered all of these matters in its preliminary assessment of the Project and has provided a summary of this consideration below. Further consideration of the objects and other relevant provisions of the EP&A Act and environmental planning instruments is found in **Appendix G**.

4.1 State Significant Development

74. The proposed development is declared to be State significant development under section 4.36 of the EP&A Act as it triggers the criteria in clause 5 of Schedule 1 to *State Environmental Planning Policy (SEPP) (State and Regional Development) 2011*, as it is development for the purposes of coal mining.

75. In accordance with section 4.5 of the EP&A Act and clause 8A(1) of SEPP (*State and Regional Development) 2011*, the Independent Planning Commission of NSW (Commission) is the consent authority and must determine the application, as more than 50 unique public submissions in the nature of objection were received.

4.2 Permissibility

76. The Project Area is located in the Singleton LGA. All subject land within the proposed open cut mining areas is zoned RU1 (Primary Production) under the Singleton LEP.

77. Open cut mining is permissible with development consent in this zone under the Singleton LEP.

4.3 Associated Modifications

78. As identified in **Section 2.2**, the Project would require an associated modification to the Mount Owen development consent (SSD-5850) under section 4.55(2) of the EP&A Act.

79. The proposed changes would involve the extended use of the Mount Owen CHPP and associated transport infrastructure, the potential use of the Mount Owen MIA, along with the use of North Pit and Bayswater North Pit for water and/or tailings storage as part of the water management system at the Complex (see **Appendix J** for the Department's recommended Instrument of Modification).

80. These changes would result in a development which is substantially the same to the development originally approved under the Mount Owen Consent in 2016. Given these considerations, the Department is satisfied that the proposed modification is within the scope of section 4.55(2) and may be determined accordingly (see **Appendix J**).

4.4 Surrender of Development Consent

81. Section 4.63 of the EP&A Act (voluntary surrender of development consent) provides that if a development consent is surrendered as a condition of a new development consent and the new consent includes continuation of development that was authorised, then the consent authority:
- is not required to re-assess the likely impact of the continued development to the extent that it could have been carried out but for the surrender of the consent;
 - is not required to re-determine whether to authorise that continued development under the new development consent (or the manner in which it is to be carried out); and
 - may modify the manner in which that continued development is to be carried out for the purpose of the consolidation of the development consents applying to the land concerned.
82. If the Project is approved, Glencore would surrender the Glendell development consent (DA 80/952) and the mining operations on the site would be regulated under the new development consent, along with the modified Mount Owen consent (SSD-5850).
83. Glendell has assessed the total impact of the Project in its EIS, including:
- the noise and air quality assessments were based on the Project's maximum production rates and representative years of the Project;
 - the water balance and surface water assessments included the additional requirements for the Project and incorporation into the existing system and the GRAWTS;
 - the groundwater assessment was undertaken on the Project's mining operations and final landform including cumulative impacts from the approved Project and surrounding mining operations;
 - the biodiversity and Aboriginal cultural heritage impact assessments were undertaken on the incremental disturbance area only, but also considered indirect and cumulative impacts associated with the approved project and other developments in the area; and
 - the Project would provide for a fully integrated rehabilitation program and final landform.
84. The Department has recommended conditions that incorporate the relevant requirements of the approved project that are not being re-assessed, for example existing biodiversity offset obligations and transport of coal from the site to the Bayswater and/or Liddell Power Stations.

4.5 Mandatory Matters for Consideration

85. Under Section 4.40 of the EP&A Act, the Commission is required to evaluate the merits of the Project against the relevant matters for consideration set out in Section 4.15 of the prior to making its determination. This includes:
- the provisions of any environmental planning instruments;
 - the terms of the Applicant's offer to enter into planning agreements and whether it should impose a condition on the Project;
 - the likely impacts of the Project, including the environmental impacts on both the natural and built environments, and social and economic impacts in the locality;
 - the suitability of the site for the Project; and

- the public interest, which includes considering the relevant objects of the EP&A Act and Ecologically Sustainable Development (ESD).
86. The Department has considered all of these matters in its assessment of the Project and has provided a summary in this report. Further consideration has been provided in **Appendix G**.

4.6 Integrated & Other Approvals

87. Under Section 4.41 of the EP&A Act, a number of approvals are integrated into the State Significant Development assessment process, and consequently are not required to be separately obtained for the proposal. These include:
- various approvals relating to heritage required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1997*;
 - an authorisation under the recently repealed *Native Vegetation Act 2003* for the clearing of native vegetation; and
 - certain water approvals under the *Water Management Act 2000* (WM Act).
88. The Department has considered the matters covered by this legislation in consultation with the relevant agencies and has recommended conditions to mitigate and/or offset the potential impacts of the development on these matters.
89. Under Section 4.42 of the EP&A Act, a number of other approvals are required, but must be substantially consistent with any development consent for the Project. These include:
- variations to the existing mining leases and any new mining leases under the *Mining Act 1992*;
 - approvals for development within a Mine Subsidence District under the *Mine Subsidence Compensation Act 2017*;
 - variations to the site's existing EPL under the *Protection of the Environment Operations Act 1997*; and
 - consent for road works under section 138 of the *Roads Act 1993*.
90. The Department has consulted with the authorities responsible for granting these approvals during the assessment process. None of these authorities object to the approval of the Project, subject to the imposition of suitable conditions (see **Section 5.3**).

4.7 Site Verification Certificate

91. As outlined in **Section 3.2**, the proposed Project requires a new mining lease to be issued to enable open cut mining to occur in the proposed Glendell Pit Extension Area. Consequently, the provisions of clause 50A of the EP&A Regulation apply and Glencore is required to obtain a site verification certificate or Gateway Certificate for the Project.
92. A Conditional Gateway Certificate for the Project was obtained on 24 July 2019 in relation to the Project and is attached as Appendix 4 of the EIS (see **Appendix A**).

4.8 Biodiversity Development Assessment Report

93. Section 1.7 of the EP&A Act provides that the operation of the EP&A Act is subject to the requirements of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act). Section 7.9 of the BC Act requires that:
- an application for development consent for SSD is to be accompanied by a biodiversity development assessment report (BDAR) unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values; and
 - an EIS that accompanies any such application is to include the biodiversity assessment required by the environmental assessment requirements of the Planning Agency Head under the EP&A Act.
94. Section 7.14 of the BC Act requires the consent authority to take into consideration the likely impact of the proposed development on biodiversity values as assessed in the BDAR. Section 7.14 also enables the consent authority to grant a development consent subject to the requirement to retire biodiversity credits in accordance with the biodiversity offsets scheme established under the BC Act.
95. A BDAR for the Project, prepared in accordance with the Biodiversity Assessment Method established under the BC Act is provided in **Appendix A** and **Section 6.8** provides a summary of the findings from the BDAR.

4.9 Commonwealth Approval

96. On 10 July 2019, a delegate of the Commonwealth Minister for the Environment determined that the proposed Project is a 'controlled action' under the EPBC Act. The proposed Project was determined as being likely to have a significant impact on controlling provisions and matters protected under the EPBC Act, including:
- listed threatened species and communities (under sections 18 & 18A of the EPBC Act); and
 - a water resource in relation to coal seam gas development and large coal mining development (under sections 24D & 24E).
97. The Commonwealth Department of Agriculture, Water and Environment (DAWE, formerly the Department of Energy and Environment) considered the Project may result in a significant impact on:
- Central Hunter Valley Eucalypt Forest and Woodland ecological community;
 - Regent Honeyeater (*Anthochaera Phrygia*);
 - Swift Parrot (*Lathamus discolor*);
 - Green and Golden Bell Frog (*Litoria aurea*);
 - Spotted-tailed Quoll (*Dasyurus maculatus maculatus*);
 - Large-eared Pied Bat (*Chalinolobus dwyeri*);
 - Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT);
 - New Holland Mouse (*Pseudomys novaehollandiae*);
 - Grey-headed Flying-fox (*Pteropus poliocephalus*);

- Trailing Woodruff (*Asperula asthenes*); and
 - groundwater and surface water resources.
98. The Commonwealth Government has previously accredited the State's environmental assessment processes under the EP&A Act, via a Bilateral Agreement between the Commonwealth and the NSW Governments. As part of its controlled action determination, DAWE advised that the assessment of the Project would be undertaken by the NSW Government in accordance with the Bilateral Agreement. However, the Commonwealth's decision-maker maintains a separate approval role, which will be exercised following the Commission's determination of the development application.
99. On 12 August 2019, the Department issued revised environmental assessment requirements for the Project, including an attachment covering the Commonwealth's matters.
100. The Department has assessed the potential impact of the Project on the relevant MNES in accordance with the requirements of the bilateral agreement. This assessment is provided in **Appendix H** of this report and includes sufficient detail for the Commonwealth decision-maker to fully consider these impacts when determining whether to approve the controlled action.
101. The proposed Project was jointly referred by the Department and DAWE to the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC) for advice on surface and ground water impacts, as well as potential impacts on downstream watercourses and receiving environments. The IESC's advice and Glencore's subsequent responses are provided in **Appendix D**.
102. Following the NSW determination of the development application, the matter will be referred to the DAWE for Commonwealth determination in accordance with the relevant provisions of the EPBC Act.

4.10 Independent Planning Commission

103. Under Section 2.9(1)(d) of the EP&A Act the Independent Planning Commission (Commission) must hold a public hearing for any matter as requested by the Minister for Planning.
104. On 9 September 2021, the then Minister for Planning and Public Spaces finalised the following terms of reference requesting that the Commission:
- conduct a public hearing into the carrying out of the Glendell Continued Operations Project (SSD 9349) as part of its determination of the development application for the Project;
 - make arrangements to conduct the public hearing as soon as practicable following receipt of the Department's assessment report and any recommended conditions of consent; and
 - consider the information contained in the Department's assessment report, any recommended conditions of consent and other relevant documents, in carrying out the public hearing and as part of its determination of the Project as the consent authority under the EP&A Act.

5 Engagement

5.1 Background

105. After accepting the EIS, the Department publicly exhibited the EIS for an extended period from 11 December 2019 until 14 February 2020. The EIS was made available at the following locations:
- on the Department's website;
 - at the Department's office in Sydney;
 - at Singleton Shire Council's office;
 - at the Singleton library; and
 - at the Nature Conservation Council's office.
106. The Department advertised the exhibition in the *Sydney Morning Herald*, *The Australian*, *Daily Telegraph*, *Hunter Valley News* and *Singleton Argus*.
107. The Department also notified:
- relevant State Government agencies, including Singleton Shire Council; and
 - relevant transport and infrastructure authorities in accordance with the Mining SEPP and the Infrastructure SEPP.
108. In undertaking these processes, the Department considers that its engagement process met the notification requirements of clause 9 of Schedule 1 of the EP&A Act and the relevant environmental planning instruments. The Department also considers that this process has fulfilled the State's obligation under the Bilateral Agreement with the Commonwealth Government.

5.2 Summary of submissions

109. During the exhibition period, the Department received a total of 340 public submissions, including 324 submissions from individuals and 16 from special interest groups. These submissions comprised:
- 205 (60%) submissions expressing support for the Project;
 - 125 (37%) submissions objecting to the Project, of which 111 were considered to be unique; and
 - 10 (3%) submissions that provided comments on the Project.
110. The issues raised in the public submissions are discussed in **Section 5.4**. The geographical distribution of submitters is shown in **Figure 7** and demonstrates that the majority of supporting submissions were received from the Singleton area, while the majority of objections were received from further afield (e.g. Newcastle and surrounds).

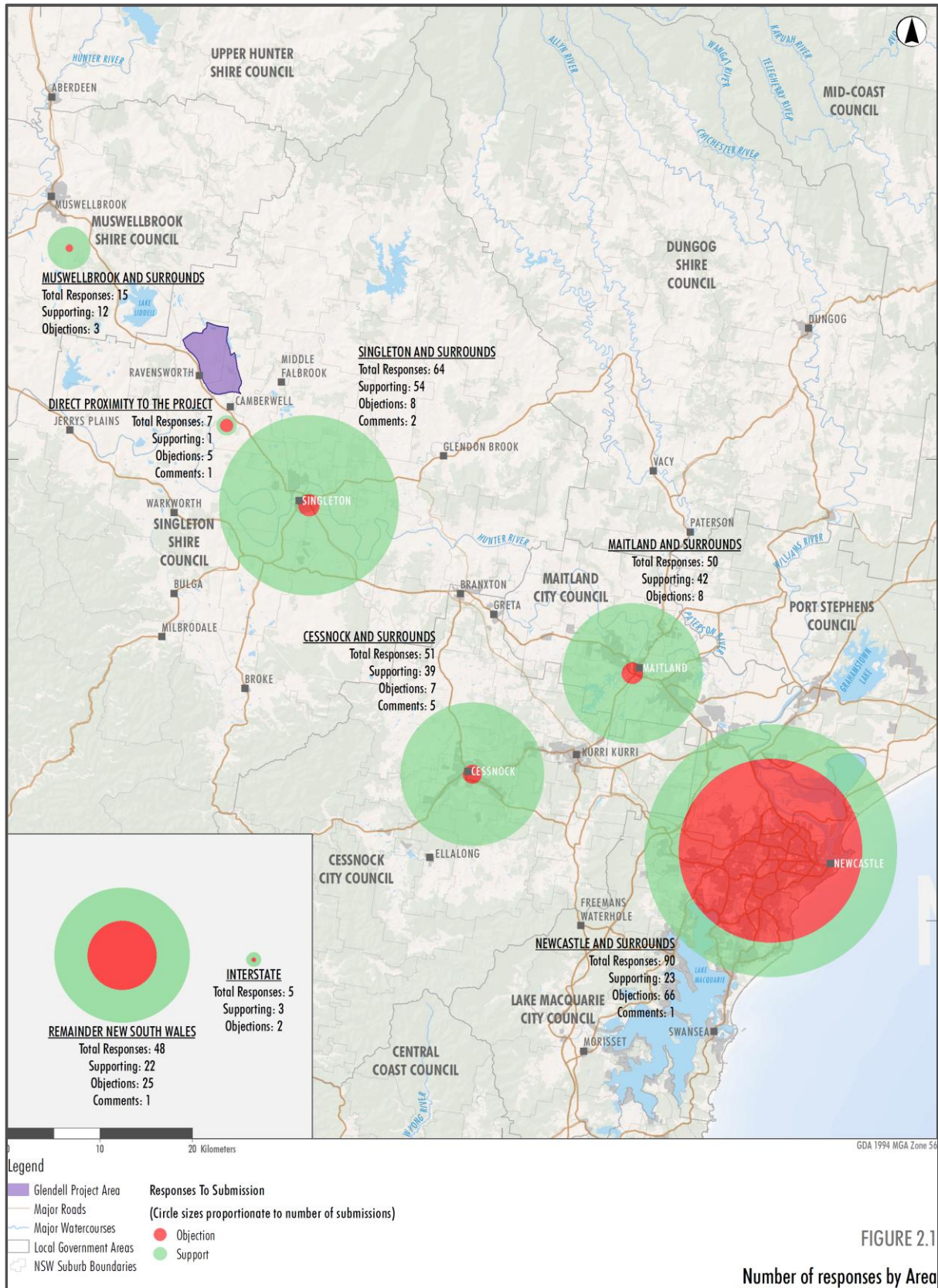


FIGURE 2.1

Number of responses by Area

Figure 7 | Geographical Distribution of Public Submissions

111. The Department also received advice on the Project from 16 government agencies, including the IESC. The issues raised in the agency advice are discussed in **Section 5.3**.
112. A full copy of the public submissions and agency advice is provided in **Appendix B** and **Appendix E** respectively.

5.3 Advice from government agencies

113. No government agencies objected to the Project. However, most raised issues or expressed concerns with specific aspects of the Project and/or provided recommendations relating to their administrative and regulatory responsibilities.
114. The following table provides an overview of the key comments made by public authorities. Links to each Agency's advice are provided in **Appendix E**.

Table 2 | Agency Advice on the Project

Agency	Key Comments
Biodiversity Conservation Division	<ul style="list-style-type: none"> BCD requested further information with respect to biodiversity, Aboriginal heritage, rehabilitation and flooding impacts. Following its review of the Response to Submissions (RTS) report and subsequent correspondence, the BCD confirmed it was satisfied by the information provided by Glencore regarding flooding, biodiversity and rehabilitation. These matters are discussed further in Sections 6.7, 6.8 and 6.10 respectively.
Heritage NSW¹	<ul style="list-style-type: none"> Heritage NSW confirmed it was satisfied with the information provided in the RTS regarding Aboriginal heritage and considered the values of the Project Area had been adequately assessed. Heritage NSW also provided a number of recommendations to manage impacts to Aboriginal heritage which have been considered by the Department in the development of recommended conditions in Appendix I.
Climate and Atmospheric Science (CAS) Branch within the Environment, Energy and Science Division	<ul style="list-style-type: none"> With the release of the <i>Net Zero Plan Stage 1: 2020-2030 Implementation Update</i>, the Department also sought advice from CAS to provide targeted advice on GHG emissions estimates, comparison to assumptions used in the 2030 reduction target and 2050 net zero target, and on any additional mitigation measures. The Department has considered this advice and included recommendations to address concerns raised by CAS. Potential impacts from GHG emissions are discussed further in Section 6.5.
Crown Lands Group within the Department	<ul style="list-style-type: none"> DPE Crown Lands advised that any Crown Land and Crown Roads proposed to be impacted by the Project require existing or proposed occupation to be authorized under the <i>Crown Land Management Act 2016</i> or <i>Roads Act 1993</i>. In response, Glencore identified that a small parcel of Crown Land is located within the Project footprint, and discussions with the Crown Lands Group regarding a compensation agreement are underway.

Agency	Key Comments
Environment Protection Authority	<ul style="list-style-type: none"> The EPA requested additional information with respect to air quality and waste management impacts associated with the Project. These matters were addressed in Glencore's RTS and are discussed further in Sections 6.4 and 6.12 respectively. Following its review of the RTS, the EPA advised that sufficient information had been provided to adequately assess the environmental impacts of the Project and issued a number of indicative conditions which the Department has considered in the development of its recommended conditions in Appendix I.
Mining, Exploration and Geoscience²	<ul style="list-style-type: none"> MEG recommended that an independent expert be commissioned to review Glencore's proposed final landform. As such, the Department commissioned MineCraft to conduct an independent review of the preferred mine plan and final landform. Further details regarding the outcome of the mine plan review is provided in Section 6.2.
NSW Health	<ul style="list-style-type: none"> NSW Health raised concerns regarding impacts on human health associated with decreased air quality, noise impacts and provision of potable water on-site. Glencore subsequently confirmed that proactive and reactive dust control strategies would continue to be implemented on-site (see Section 6.4), and potable water would continue to be transported to the Project site via water sourced from the Singleton reticulated water supply.
NSW Heritage Council	<ul style="list-style-type: none"> The NSW Heritage Council raised concerns relating to the proposed relocation of the Ravensworth homestead, noting that it has recommended the Ravensworth Homestead for nomination on the State Heritage Register (SHR) and does not support its relocation as this would result in an unacceptable heritage impact. The NSW Heritage Council considers that relocating the homestead may remove its State significant values and the relocated buildings would be unlikely to meet the criteria for state heritage significance. In particular, the NSW Heritage Council requested further information with respect to: <ul style="list-style-type: none"> the relationship between the Ravensworth Homestead and Aboriginal people; the heritage significance of the homestead, including its surrounding garden and landscape; information regarding alternative options to avoid relocating the Homestead; and additional relocation options, noting neither option proposed provides for the relocation of the entirety of Ravensworth Homestead without demolition or removal of significant fabric (e.g. the original homestead footings). Glencore provided additional information responding to the issues raised by NSW Heritage Council in its RTS, including detailed responses to an independent mine plan review investigating the potential for an alternative mine plan which would avoid the need to relocate the Ravensworth Homestead. In addition, the Department commissioned an independent heritage expert to review the relevant documentation to assess whether the proposed relocation would allow for the preservation of some heritage features associated with the estate. Following provision of these documents, the Department met with the Heritage Council to present the additional information on 6 October 2021 and seek additional advice. Following the meeting, Heritage Council confirmed that it maintained its view that the Ravensworth Homestead should not be relocated. It also asked for consideration of different mine plans (e.g. 200-300m standoff), or potentially even a staged approach to the approval. Further discussion regarding the relocation of the Ravensworth Homestead, including the Department's assessment and recommendations, is provided in Section 6.2.

Agency	Key Comments
Rural Fire Service of NSW	<ul style="list-style-type: none"> RFS advised it does not object to the Project and requested Glencore be required to prepare a fire management plan in consultation with RFS.
Singleton Council	<ul style="list-style-type: none"> Singleton Council did not object to the Project but it did raise concern regard the following matters: <ul style="list-style-type: none"> Hebden Road realignment (provision of long-term maintenance costs and process for closure of the existing alignment); relocation of Ravensworth Homestead (future ownership, practicalities and logistics of relocating to Broke, proposed management actions should it not be relocated); rehabilitation and mine closure planning (up-front preparation of detailed designs, consideration of post-mine land use options, management of the final void); Voluntary Planning Agreement (VPA); greenhouse gas emissions and implications for climate change; social, biodiversity and air quality impacts; water licensing; and waste management. Following its review of the additional information provided in the RTS and subsequent correspondence, Singleton Council maintains concerns regarding a number of the above items, with the key outstanding issues relating to the lack of a VPA and lack of compensation agreement relating to the closure and acquisition of the current Hebden Road alignment. At the time of writing this report the Department understands that negotiations between Council and Glencore are still underway regarding the compensation agreement.
Subsidence Advisory NSW	<ul style="list-style-type: none"> Subsidence Advisory NSW acknowledged that the Project would require approval under Section 22 of the <i>Coal Mine Subsidence Compensation Act 2017</i> (see Section 4.6) and advised it had no further comment. In its RTS, Glencore confirmed it received approval for the proposed works within the Mine Subsidence District on 7 May 2020 from Subsidence Advisory NSW.
Transport for NSW	<ul style="list-style-type: none"> TfNSW requested confirmation that: <ul style="list-style-type: none"> the realigned section of Hebden Road would be maintained for 25/26 m B-Double vehicles; the types of heavy vehicles used for the Project would be consistent with the existing fleet, and that these were considered in the traffic modelling undertaken for the EIS; transport of dangerous goods (e.g. fuels and explosives) had been considered in the EIS; and the Project does not involve any changes to the currently approved works on the Mount Owen Rail Loop. Glencore provided confirmation of the above in its RTS, following which TfNSW confirmed it had no further comments.

Agency	Key Comments
Water Group within the Department	<ul style="list-style-type: none"> DPE Water and the Natural Resources Access Regulator (NRAR) provided joint advice on the Project. DPE Water requested the proponent address the NSW Aquifer Interference Policy (AIP) minimal impact consideration in relation to connected surface water impacts. Glencore confirmed in its RTS that the top of the high bank of Bowmans Creek was surveyed to ensure the pit crest was set back a minimum of 200 m from the high bank to ensure the AIP minimal impact consideration was satisfied. Following its review of the RTS, DPE Water and NRAR advised it had no further comments on the Project and requested that Glencore consult with DPE Water during the post-approval stage to further discuss the detailed design and realignment of Yorks Creek. The Department has incorporated this request into its recommended conditions in Appendix I.
Department of Primary Industries Dams Safety NSW The Resources Regulator Department of Agriculture, Water and the Environment	<ul style="list-style-type: none"> All advised they had no comment on the Project.

¹ Heritage NSW within the Department of Premier and Cabinet was formerly the Heritage Branch of BCD.

² MEG was formerly known as the Division of Resources and Geoscience (DRG) within the Department.

5.4 Public submissions

Submissions in Support

115. Submissions in support of the Project came from various locations throughout NSW and interstate (see **Figure 7**). The majority of these submissions (approximately 87%) commented on the Project's potential economic benefits, including job creation and the payment of royalties. These submissions also discussed the positive social impacts of the Project, noting Glencore's support for local businesses and community organisations, as well as increased wellbeing associated with employment opportunities and local investment. The social and economic impacts of the Project are discussed further in **Section 6.11**.
116. Many submissions also noted Glencore's ongoing commitment to environmental management, including its proven track record for rehabilitation, and supported the proposed use of existing mine infrastructure.
117. A number of these submissions (approximately 12%) also supported the proposed relocation of the Ravensworth Homestead, noting that it would provide an asset to the community of Broke, should it be relocated there.

Submissions in Objection

118. The key reasons given for objecting to the Project are summarised in **Figure 8** and discussed in further detail below.
119. The majority of objectors expressed varying degrees of concern with the cumulative health, impacts of mining in the broader Hunter region, with a particular focus on cumulative impacts to air quality and water resources.

120. Submitters raised concerns about the existing air quality in the Hunter region and considered that the Project would contribute additional dust to an area already subject to high levels.
121. The Department has undertaken a detailed assessment of the air quality impacts of the Project in **Section 6.4** and has integrated consideration of cumulative impacts into its assessment of the Project and development of recommended conditions in **Appendix I**.
122. The predicted impacts of the Project on water resources during and following operations was a key issue raised in public submissions, with many submitters concerned over the potential impacts which may be experienced by downstream water uses, including agricultural operations.
123. The Department has conducted a detailed assessment of potential groundwater and surface water impacts, in consultation with relevant agencies and having regard to the advice provided by the IESC. The Department's assessment is provided in **Section 6.7**.
124. A number of submissions also objected to the proposal to relocate the Ravensworth Homestead, stating that the proposed relocation would result in further loss of local heritage. The submissions also raised concern regarding potential irreversible damage to the homestead during the relocation process, and loss of historical significance associated with moving the homestead from its current context. The Department has undertaken a detailed assessment of the proposal to relocate the Ravensworth Homestead, including consultation with the NSW Heritage Council, and has considered its advice in the development of recommended conditions in **Appendix I**.

Key Issues in Public Objections

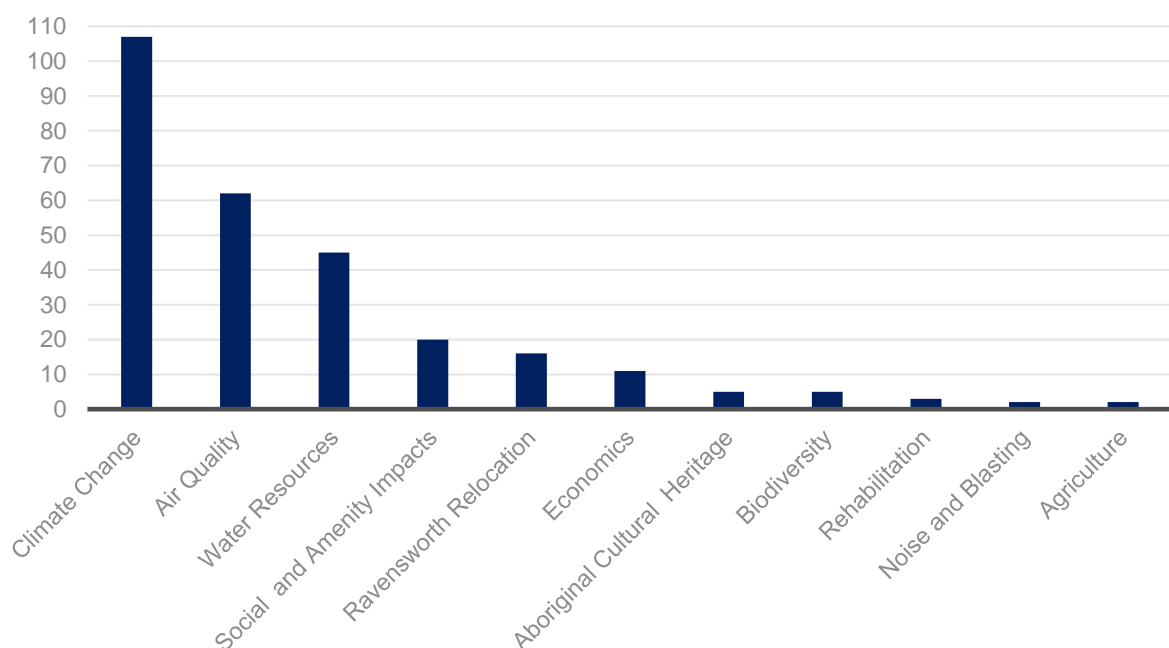


Figure 8 | Key reason for objection in public submissions

125. A submission made on behalf of the Plains Clan Wonnarua People raised concerns relating to the significance of the conflict sites from the early colonial period, stating the Ravensworth Homestead was a focal point of frontier violence and the location of an Aboriginal massacre in 1826.

126. The Department sought advice from Heritage NSW regarding the history of conflict at the Ravensworth Homestead. Heritage NSW confirmed in its advice on the RTS that, although there is historical evidence of conflict between the Wonnarua and the European settlers on several local properties along the Hunter River, “*there is no material evidence to show that the current Ravensworth Homestead itself, which was built in 1832, was specifically the site of such conflict*”.
127. The Department’s detailed assessment of impacts on Aboriginal cultural heritage values is provided in **Section 6.3**, and a copy of the Heritage NSW advice is provided in **Appendix E**.
128. In addition to project specific concerns, the majority of submissions in objection (approximately 85%) raised broader concerns with the mining industry, focused on the contribution of mining and coal fired power generation to greenhouse gas emissions and anthropogenic climate change. These submissions originated from various locations throughout the State (see **Figure 7**).
129. These submissions expressed broad objections to various NSW Government policies and land use planning decisions associated with the cumulative impacts of the mining industry in the Hunter Valley. Many of these submitters expressed concerns with anthropogenic climate change, referring to prolonged drought conditions and widespread bushfires experienced in the Hunter region over recent years, and advocated for a transition away from the use of fossil fuels in the NSW energy market. The Department’s assessment of impacts associated with the Project’s Greenhouse Gas emissions is provided in **Section 6.5**.

5.5 Response to submissions

130. On 17 February 2020, the Department requested that Glencore prepare a report that responded to the issues raised in agency advice and public.
131. Glencore submitted its RTS report responding to the submissions in two parts. On 26 May 2020 Part A of the RTS was submitted to the Department addressing all issues raised on the EIS with the exception of heritage-related matters. Part B of the RTS was submitted on 21 August 2020 and provided a response to all heritage-related matters.
132. On 7 August 2020, Glencore separately provided a document responding to the issues raised by the Commonwealth IESC in its advice on the Project.
133. A copy of the RTS and response to the IESC advice is provided in **Appendix C** and **Appendix D** respectively.

6 Assessment

6.1 Introduction

134. The Department recognises that the Project is a 'brownfields' (i.e. extension) project, and that it relies on integration with the existing Mount Owen processing and transport infrastructure and rail loadout facilities, which allow for a reduced environmental footprint compared with the construction of new facilities for a greenfield project located elsewhere in NSW.
135. In addition, the land within the Project area is gently undulating (generally sloping north to south) and has been heavily influenced by active and historic mining operations, noting that there are a total of 13 coal mines located within approximately 15 km of the Project area.
136. However, the public submissions and agency advice provided during the public exhibition period highlighted three key issues associated with the Project, namely:
- *Historic and Aboriginal heritage:* Impacts on both historic and aboriginal heritage values associated with the proposed relocation of the Ravensworth Homestead;
 - *Air quality impacts:* Cumulative air quality impacts are a key concern for residents of the Hunter Valley given the high density of coal mining projects in the region; and
 - *Greenhouse gas emissions and climate change:* The vast majority of public submissions also expressed concerns with anthropogenic climate change, referring to prolonged drought conditions and widespread bushfires experienced in the Hunter region over recent years.
137. The Department agrees that the potential impacts highlighted above are considered the key issues for this assessment.

6.2 Historic Heritage

Introduction

138. The potential impacts on the historic Ravensworth Estate, which is located in the centre of the proposed pit extension, is one of the key and most contentious issues associated with the Project.
139. The Estate was one of the first land grants in the Hunter Valley, and contains a homestead complex and other archaeological resources that date back to the early days of European settlement in the valley.
140. This resource includes evidence of early agriculture by prominent settlers, contact with local Aboriginal people, the use of convict labour, and colonial architecture.
141. A large number of studies have now been undertaken to assess the heritage-related impacts of the Project. The EIS includes a:
- Heritage Analysis and Statement of Significance – Ravensworth Estate, prepared by Lucas Stapleton Johnson (LSJ);
 - Ravensworth Homestead Complex Measured Drawings, prepared by LSJ;
 - Statement of Heritage Impact, prepared by LSJ;
 - Archaeological Test Excavation Report and Impact Statement, prepared by Casey and Lowe;

- Ravensworth Homestead Relocation Justification Report, prepared by Glencore;
 - Ravensworth Homestead Relocation Options Identification and Assessment Report, prepared by Glencore with a multidisciplinary team to assess relocation options;
 - Ravensworth Homestead Relocation Preferred Options Proposal Reports (Ravensworth Farm Proposal and Broke Village Proposal), prepared by a multidisciplinary team; and
 - Hebden Public School Preliminary Scope of Works (for stabilisation), prepared by LSJ.
142. Glencore expanded on these studies in its RTS to address issues raised in submissions. The additional studies included:
- an expanded Statement of Significance for the Ravensworth Homestead;
 - additional engineering investigation, risk assessment and information to justify the practicality of relocation of the Ravensworth Homestead structures;
 - additional information on the Registered Aboriginal Parties' views on the relocation of Ravensworth Homestead; and
 - additional review of the potential for the Project area to have been the site of conflict between Aboriginal people and the European settlers.
143. Glencore has also established (in October 2017) a community consultative committee, known as the Ravensworth Homestead Advisory Committee (RHAC), to review and advise on heritage issues including the relocation options for the Ravensworth Homestead. The RHAC is independently chaired, and comprises former owners of Ravensworth Homestead, as well as representatives from the community and Singleton's heritage and business groups.
144. The Department engaged a number of independent experts to review issues associated with the project's heritage impacts, including:
- mine planning experts MineCraft, to review whether there are reasonable and feasible alternative mine plans that would retain the Ravensworth Homestead Complex in-situ;
 - economics experts The Centre for International Economics (CIE), to review whether the alternative mine plans are economically feasible; and
 - heritage expert Hector Abrahams Architects, to review the heritage impacts of the project and the homestead relocation options.

Heritage Context

145. The Singleton area was first explored by European settlers in 1820. Based on favourable reports of the agricultural potential of the Hunter Valley, the area saw exponential growth in the period from 1821 to 1828.
146. In this period of less than 10 years, agricultural development by the colonists grew from next to nothing to over 1.5 million acres of land grants, almost 120,000 sheep, and almost 47,000 cattle.
147. This growth resulted in inevitable interactions between local Aboriginal people and the early settlers, particularly in the period to 1827/28. These interactions included a number of violent altercations (see further detail under a separate heading below).
148. In 1824, Dr James Bowman (1784-1846) obtained the original land grant for the Ravensworth Estate, with further grants and purchases made to the estate in the period to 1833. Dr Bowman was the colonial surgeon in charge of Sydney Hospital, and married Mary Macarthur, daughter of John and Elizabeth Macarthur, in 1823.

149. The first homestead on the Estate is believed to have been built in 1825, about 850 metres to the west of the current homestead, between Foy Brook (now Bowmans Creek) and Yorks Creek. This area is within the project footprint.
150. No evidence of the original homestead has been discovered, despite detailed archaeological investigation and excavations undertaken for the Project.
151. The current homestead complex dates from 1832, with the complex expanding over time (see below).
152. In the 1841 census, there were 87 people on Ravensworth, including 76 males and 11 females. The males included 32 convicts.
153. John and Mary Bowman moved their permanent residence from Sydney to Ravensworth in 1843, after financial difficulties forced them to sell a number of assets.
154. Dr John Bowman died at Ravensworth in 1846. His place of burial is unknown. No evidence of his burial on Ravensworth has been found, despite detailed investigations for the Project (including test excavation and ground penetrating radar).
155. Following Bowman's death, the property was sold in 1847 to recoup debts, and Mary and the children moved back to Sydney to live with the Macarthurs in Camden. A number of sales and subdivisions followed the original 10,000 acre grant, carving the Ravensworth property into numerous smaller landholdings.
156. However, the 'core estate lands'², including the Ravensworth Homestead, have remained intact to this day.
157. Since the late 1990s with the intensification of coal mining in the Hunter Valley, much of the original 10,000 acre grant has been re-consolidated under a single ownership, with Glencore now owning most of the original land grant.
158. Today, the Ravensworth Homestead complex is owned and managed by Glencore as part of its Mt Owen mining operations. The homestead complex comprises four stone buildings dating from 1832, and one timber building dating from 1900, arranged around a farmyard square. Key buildings include (see **Figure 9**):
 - Main House;
 - Kitchen Wing;
 - The Barn;
 - The Stable;
 - Early 20th century post and corrugated steel shed and stone water tank;
 - Early 20th century Men's Quarters; and
 - Stone Privy (toilet).
159. Representative photos of the structures are shown on **Figure 10** below.

² Defined to include the Ravensworth Homestead complex and the land to the west between Yorks Creek and Bowmans Creek.

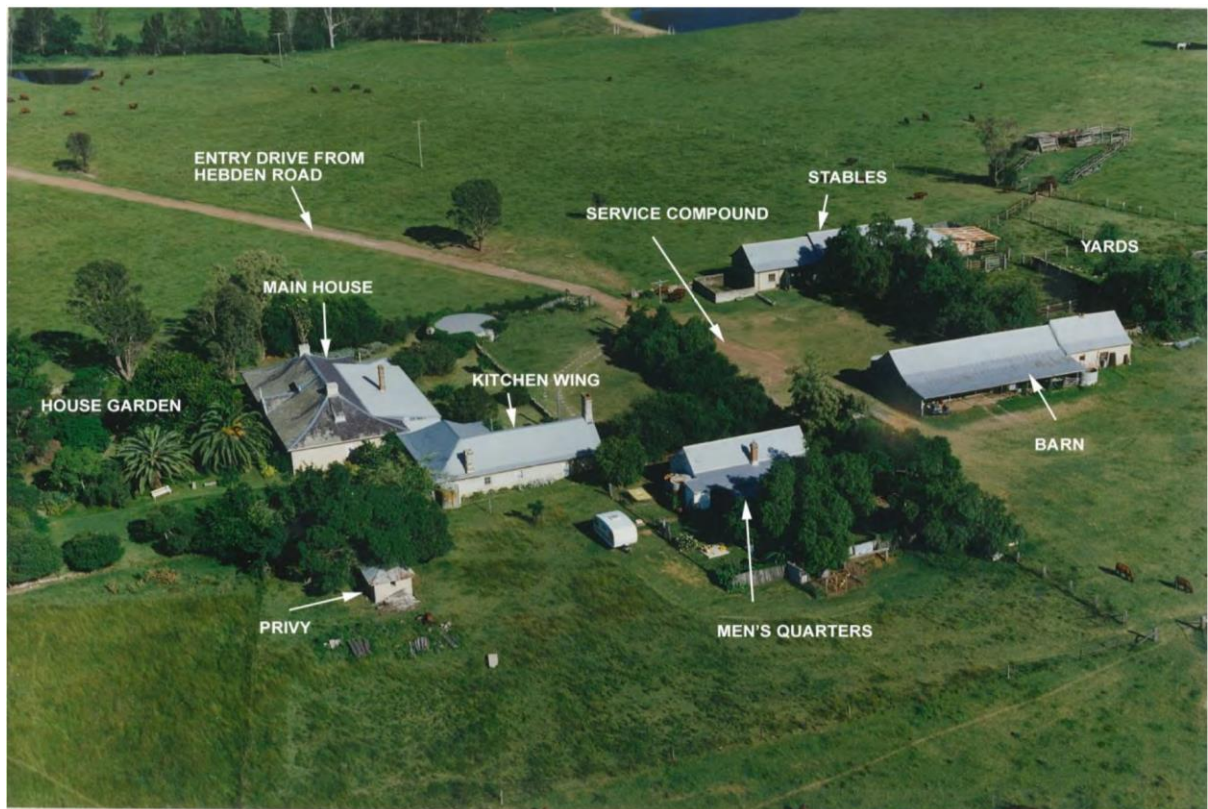


Figure 9 | Ravensworth Homestead Complex

160. A number of test excavations (29 trenches across 7 test areas, see **Figure 11**) were carried out as part of the archaeological assessments around the current Ravensworth Homestead complex and the wider core estate lands, to investigate the archaeological resource. The program targeted excavation of high significance sites related to the Bowman era, including the Ravensworth Homestead complex, surrounding cultivation areas, the potential site of the first homestead, and potential burial site.
161. Excavations found a range of archaeological remains, including:
- building foundations understood to comprise former convict barracks (Test Area 4);
 - foundations and other building evidence north-west of the main house (Test Areas 5 and 6);
 - archaeological evidence of agricultural activity in several areas (Test Areas 2, 6 and 8); and
 - miscellaneous archaeological relics (Test Areas 3, 4, 5, 6 and 9).
162. No evidence of burials or the first homestead were discovered.



Homestead south (Front) elevation



Homestead north (Rear) elevation



Kitchen Wing north elevation



North elevation of the Barn showing the bellcast eaves



Roof structure of the Barn.

Photo: D. Liddle, 2018



Arched columns on east elevation of Stables

Figure 10 | Ravensworth Homestead – Representative Photos

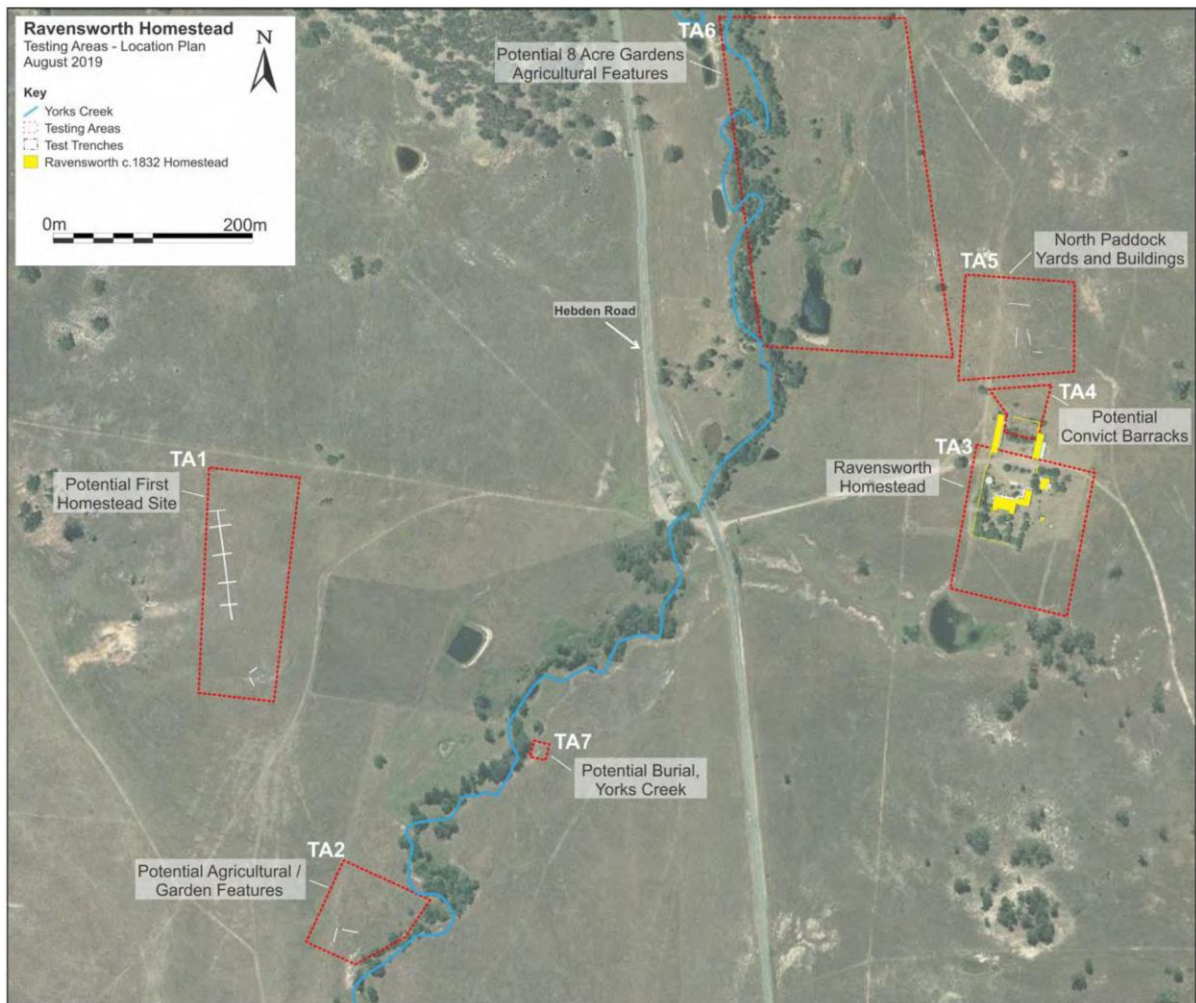


Figure 11 | Test Excavation areas

Significance

163. The Ravensworth Homestead complex is listed under the Singleton LEP as being of local significance.
164. However, both Glencore’s consultants and the Heritage Council believe that elements of the complex are of State heritage significance, and the Heritage Council has recommended it for nomination on the State Heritage Register. Glencore’s assessment has been undertaken in consideration of the relevant State Heritage values and the Department considers that the outcomes of the assessment would not change should the State Heritage Listing be in place.
165. Glencore's Statement of Significance notes that the Ravensworth Estate is part of the traditional lands of the Wonnarua people, made more meaningful by recorded reports of interactions and conflicts with colonists in the Ravensworth locality (see separate section below).
166. The Statement of Significance also notes that the Estate is representative of the rapid colonisation of the Hunter Valley in the period from the 1820s to 1840s.

167. The Statement considers that the entire Ravensworth Estate, the core estate lands, and the Ravensworth Homestead complex are of high to exceptional significance, concluding that the archaeological landscape, sites and material culture of the Estate have the ability to be of both State and local heritage significance despite the fact that the homestead has undergone a number of unsympathetic modern upgrades.
168. The Heritage Council notes that the Ravensworth Homestead is one of 19 places identified as a very early homestead in the Hunter Valley (in a 2013 Heritage Council study), and considers it to be of State heritage significance for its aesthetic, historic, scientific and social values.
169. The Heritage Council also noted (in response to the RTS) that the homestead is one of only three extant 'H-Plan' colonial bungalow houses in New South Wales (with the other two located in Horsley Park and Glenlee). The H-Plan layout of the house is shown on **Figure 9**.
170. The Heritage Council raised a number of concerns about Glencore's heritage assessment and Statement of Significance, including inadequate consideration of the:
- connection of Ravensworth Homestead to a range of significant historical places and people;
 - connection to John Verge, one of Australia's pre-eminent colonial architects, who may have been involved in the design of the homestead and stables³;
 - the curtilage of the homestead and cumulative impacts on the core estate lands;
 - comparative analysis with pre-1850 Hunter Valley homesteads; and
 - conflicts between Aboriginal people and European settlers.
171. Glencore provided detailed responses to the issues raised by the Heritage Council in its RTS and the Department notes that these issues were not emphasised in the Heritage Council's final advice. Despite these issues, both Glencore and the Heritage Council agreed that the Estate and homestead complex are of high to exceptional heritage significance.

Early Aboriginal Interactions

172. Some stakeholders, including the Heritage Council and the Plains Clan of the Wonnarua People (PCWP) Aboriginal group, suggest that Ravensworth is highly significant for its reported association with frontier conflict between European and Aboriginal people, including a reported massacre.
173. Other Aboriginal stakeholders have presented a very different perspective, including the Wonnarua Nation Aboriginal Corporation (WNAC), which believes that there is nothing more significant about the project area than other areas. WNAC has stated that it is not aware of a massacre at Ravensworth, noting that their ancestors would have known about such an incident.
174. The Heritage Council submission notes that 6 reported incidents are associated with the Ravensworth property, including one incident popularly referred to as the 'Ravensworth Massacre'.
175. An Aboriginal site referred to until recently as the 'Ravensworth Massacre' site (AHIMS Site #37-3-0390) was located near, but outside, the Project area. The AHIMS site card noted that the massacre was 'near the town of Ravensworth, although the exact location is unknown'

³ No evidence of John Verge's involvement in the design the homestead complex has been found, although LSJ acknowledges that he may have influenced the design.

176. The EIS includes a detailed review of the historical documents and records relating to evidence of conflict between Aboriginal people and the early settlers between 1824 and the mid-1830s. The historical research, undertaken by Dr Mark Dunn, was expanded upon and updated in the RTS.
177. Dr Dunn is a leading expert in this particular field. He has a Masters degree in Applied History from UTS Sydney, and was awarded a PhD from UNSW for his thesis on interaction between Aboriginal people and colonial settlers in the Hunter Valley in the period from 1820 to 1850. Dr Dunn has served as Chair of the Heritage Committee, NSW Heritage Office and Chair of the Professional Historians Association of NSW and ACT and has previously been the Deputy Chair of the Heritage Council NSW, and President of the History Council.
178. Dr Dunn's research found that there were reported tensions and conflicts between Aboriginal people and the early European settlers across the Hunter Valley from the first land grants, and especially in the rapid colonising years to about mid-1827. A timeline of the main incidents is shown on **Figure 12**.

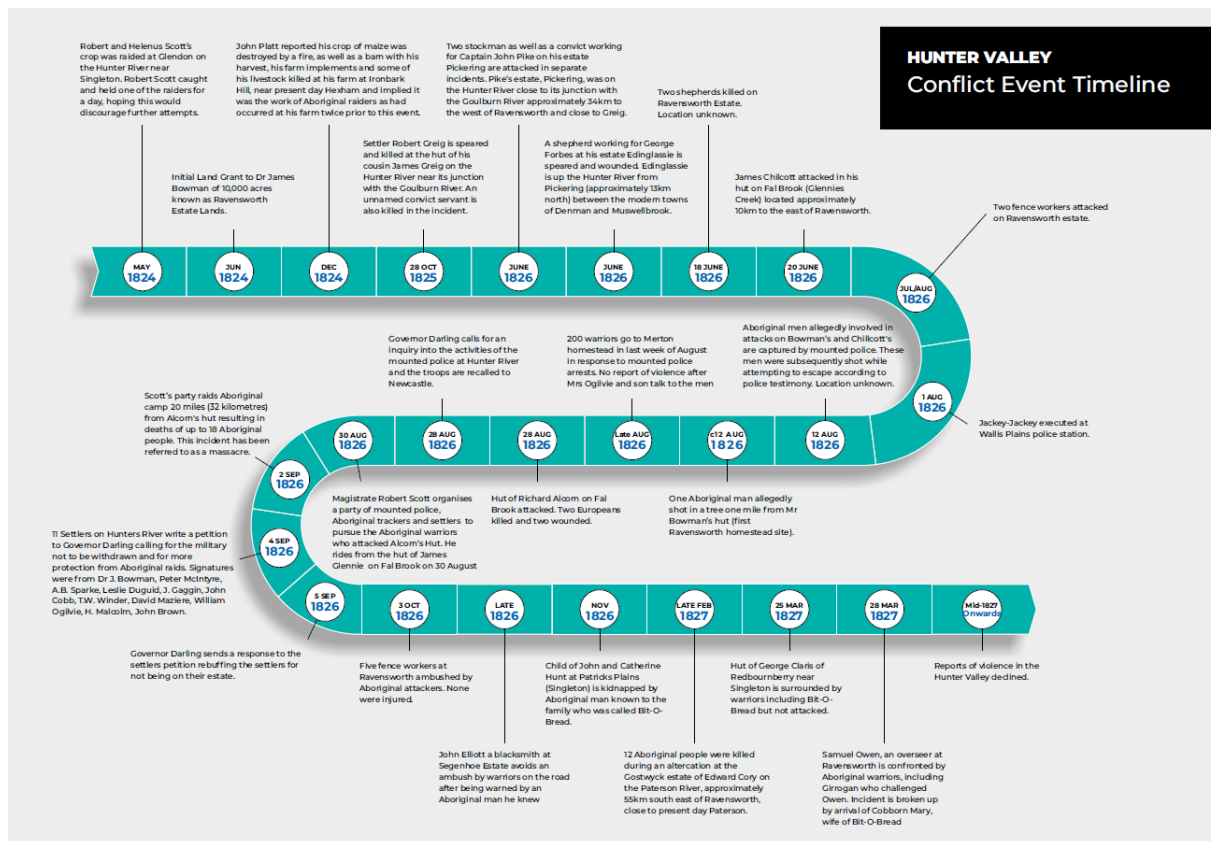


Figure 12 | Conflict Event Timeline

179. Most of the early incidents concerned small scale taking of maize crops, and involved little direct conflict. However, violent altercations increased from late 1825, with a number of fatalities to both Aboriginal people and settlers.
180. Conflicts occurred at several places across the Hunter Valley. Dunn noted that this violence was not unusual in the colonial period of NSW, with similar periods occurring in Sydney and Bathurst. The incidents in the Hunter Valley were sporadic and isolated, with no 'frontline' or central focus location for the conflict.

181. The Ravensworth Estate was the site of 4 specific conflicts and clashes, resulting in two Europeans killed and two wounded, and one Aboriginal man reportedly killed and one wounded. The incidents all occurred in 1826, and included:
- on 18 June 1826, two assigned convicts at Ravensworth were killed by Aboriginal attack, one in the bush and another in a hut on the Estate;
 - soon after, two of Bowman's men working in the bush on fences around Ravensworth were attacked, with both men severely wounded;
 - after this, according to one account, one of the Aboriginal men suspected of involvement in the wounding of Bowman's men was shot and hung from a tree about one mile from what is believed to be Bowman's first homestead; and
 - in October 1826, a group of Aboriginal warriors attacked some fencers working at Ravensworth, resulting in the wounding of an Aboriginal man.
182. The incident previously referred to as the Ravensworth Massacre is believed to have occurred in early September 1826. The incident occurred following two separate incidents, including one in which about 200 Aboriginal warriors reportedly surrounded William Ogilvie's property near Denman (ending without conflict), and an attack on Richard Alcorn's hut at Falbrook in which two Europeans were killed.
183. A party that set out to pursue the attackers reportedly resulted in the death of 18 Aborigines and the capture of a man and a woman, at an Aboriginal campsite approximately '20 miles (32 km) from Alcorn's Hut'.
184. The plotting of a 20 mile radius from Alcorn's Hut places the conflict site well beyond the Ravensworth Estate.
185. As a result of the evidence placing the massacre site well outside the Ravensworth Estate, in June 2020 the 'Ravensworth Massacre' AHIMS site (#37-3-0390) was renamed as the 'Upper Hunter Valley Massacre' site.
186. Despite this, the Heritage Council maintains that the Aboriginal pre- and post-contact history of the Ravensworth Homestead is contested, and recommends that a precautionary approach is adopted around areas of contested Aboriginal history and heritage, particularly 'following recent incidents in other states involving mining and Aboriginal cultural heritage'.
187. Heritage NSW accepts that while there is evidence of conflict on several properties along the Hunter River, Bowmans Creek and Fal Brook (Glennies Creek) inside and outside the Project area, there is no material evidence to show that the current Ravensworth Homestead, itself built in 1832 (i.e. after the main period of conflict), is specifically the site of such conflicts.
188. Heritage NSW also acknowledges that the Upper Hunter Valley Massacre site is outside the Project area, adding that numerous surveys, salvage and excavations in the area have not identified any burials or human remains on the site.
189. The Department agrees that whilst the available evidence suggests that the Ravensworth Estate was the site of conflicts between Aboriginal people and early European settlers, these incidents were not unique to the Estate, and that the Estate was not the centre of such conflict.
190. Further, the evidence suggests that the Estate was not the site of the reported Upper Hunter Valley Aboriginal massacre.

191. The current Ravensworth Homestead itself was constructed circa 1832, after the period of the most intense conflict, and there are no reports of conflict associated with the homestead complex.
192. The Department's assessment of potential impacts on other Aboriginal sites (e.g. artefacts) is provided in **Section 6.3**.

Impacts on the Ravensworth Estate

193. Glencore proposes to relocate the Ravensworth Homestead complex, and to salvage the available archaeological resource within the core estate lands, to allow the expansion of the Glendell mine and extraction of the coal resource below the homestead.
194. Two relocation options have been shortlisted following a comprehensive options investigation. The two options are described in detail below.
195. The Department acknowledges that any proposal to relocate the homestead complex would have a high heritage impact, in that it would remove the buildings from their historic location and setting.
196. In this regard, the Burra Charter states that:

“Relocation is generally unacceptable unless this is the sole practical means of its survival.”
197. Glencore's heritage experts accept that any relocation option would have a significant impact on the heritage values of the Ravensworth Estate, but that the loss of archaeological resource would be mitigated through the proposed comprehensive archaeological salvage excavation, and the adaptive re-use of the relocated structures (their views on the heritage values of the respective relocation options is expanded upon below). The archaeological salvage program is seen as an opportunity to investigate a rural-based colonial convict site that has not been substantially disturbed.
198. The Heritage Council does not support the relocation of the Ravensworth Homestead in any form, as it considers that relocation would result in irreversible loss of its identified high and exceptional significance in the form of its intact fabric, setting, views and meaning. It believes that either relocation option would result in an unacceptable, even catastrophic, heritage impact.
199. It further believes that a balance of economic and heritage outcomes could be achieved with the Ravensworth Homestead remaining in-situ, although it does not provide any evidence to support this statement.
200. The Department accepts the advice from both Glencore's experts and the Heritage Council that relocation of the Ravensworth Homestead would have a significant heritage impact, both on the built structures and the associated archaeological resource.
201. As such, and in accordance with the Burra Charter, the Department has carefully considered whether relocation of the homestead and disturbance of the archaeological resource is justified at all, based on detailed consideration of economic, social and environmental costs and benefits. This consideration is summarised below.

Retaining the Homestead In-Situ

202. Leaving the homestead in-situ would preserve its existing heritage and archaeological values, however it would affect the extraction of the coal resource, and potentially the economic viability of the Project.

203. To assess this, the Department engaged mine planning consultants Minecraft to undertake a detailed independent review of Glencore's mine plan, including the options identified in the EIS which retain the Ravensworth Homestead in-situ.
204. Options identified in the EIS which would retain the homestead in-situ, and a summary of Glencore's consideration of each option, is provided in **Table 3**.

Table 3 | Options Retaining Ravensworth Homestead In-Situ

Option ¹	ROM tonnes (Mt)	Approx. Mine Life (Years)	Royalties to NSW (\$M)	Glencore's Consideration	
				Reasonable and Feasible?	Glencore Comments
Option 1 – No project	12	3	0	No	<ul style="list-style-type: none"> Economic benefit of Project lost
Option 6 – Homestead mine around (to within 100m)	89	18	460	No	<ul style="list-style-type: none"> Long term highwall instability issues Blast vibration impacts to homestead Visual impacts to homestead setting
Option 7 – Homestead 500m standoff (or 900m standoff)	57 (35)	10 (7)	290 (190)	No	<ul style="list-style-type: none"> Significant reduction in resource recovery and mine life Economically unviable
Option 8 – Underground extraction	10	5-8	50	No	<ul style="list-style-type: none"> Unfavourable geology Significant reduction in resource recovery and mine life High capital cost
Proposed mine plan	135	22	710	Yes	<ul style="list-style-type: none"> Provides best balance between mine planning, economic, environmental and social outcomes

1 The EIS includes consideration of a number of other mine plan options, which are not relevant to the Ravensworth Homestead relocation. Only the relevant options are identified in the table.

205. Minecraft critically reviewed these mine plan options, including implications for mining operations, total coal recovery and changes in Project economics, including rate of return on capital and net present value (NPV), and income to the state of NSW.
206. Minecraft considers that Option 6 is not viable, primarily because this option would likely result in blast-related damage to Ravensworth Homestead and loss of its amenity, including site isolation and practical access. This option would also result in the sterilisation of approximately 46 Mt of ROM coal, and reduce NPV by some \$230 million.
207. With regard to Option 7, Minecraft notes that this option (mining to within 500 metres, or even 300 metres of the homestead) would address most of the blast-related and amenity impacts on Ravensworth Homestead. However, it accepts that the economic analysis indicates that this option would not be reasonable or feasible. This option would reduce NPV by some \$606 million.

208. Option 8 (underground mining) would have the benefit of negating the relocation of Ravensworth Homestead (and Hebden Road), and reducing impacts on Yorks and Swamp Creeks. Minecraft considered this option, including hybrid options such as a punch highwall mine beneath the homestead. Whilst noting that there are a number of underground mines in the locality, Minecraft's analysis found that underground options would not be viable for a number of reasons, including the complex nature of the site's geology (including the Camberwell anticline which runs through the middle of the target resource), localised geotechnical risks associated with faults around the anticline, restriction of mining to one main seam group (the Liddell seam), and high capital costs.
209. Glencore provided additional commercial-in-confidence information on the internal rates of return (IRRs) associated with the various options, along with a review of the IRR by Ernst & Young. This information identified that Options 6, 7 and 8 would not meet a reasonable IRR that any reasonable mining company would progress these options.
210. The Department engaged an independent economics expert, The Centre for International Economics (CIE), to review the IRR information provided by Glencore. This review supported Glencore's conclusions that, even though Options 6 and 7 may have a theoretical positive NPV, they are not considered to be economically viable given the low IRRs associated with both options.
211. Based on the Minecraft review and the additional commercial-in-confidence information provided by Glencore, as well as the review by the Department's independent expert, the Department accepts that the options to retain the Ravensworth Homestead in-situ would essentially render the Project unviable, and would mean that it would not proceed in any form.
212. This would result in the loss of all of the social and economic benefits of the Project, including approximately 350 construction jobs, ongoing employment for 690 operational employees, \$515 million in capital investment and significant benefits to the NSW economy (ranging from \$151 million to \$1.1 billion in NPV terms) (see **Section 6.11**).
213. Although the Heritage Council sought consideration of different mine plans, including standing-off the homestead by 200-300m, or potentially even a staged approach to the approval, the Department considers that further investigation of these options is not warranted for the following reasons:
1. A 200-300m standoff would have the same issues identified for Option 6 (e.g. blast-related damage to Ravensworth Homestead).
 2. It can't issue an approval for a subset of the Project which is inevitably reliant on a future approval of the remainder of the Project in order to make it viable (i.e. this would essentially represent Option 7, which is not considered to be financially viable on its own).
214. In weighing up the heritage impacts of relocating Ravensworth Homestead against the social and economic impacts of not relocating the homestead, the Department notes that:
- relocating Ravensworth Homestead would have significant heritage impacts on the heritage site, however it would retain at least some of the heritage values (see discussion below);
 - Ravensworth Homestead is privately-owned by Glencore, and is not publicly accessible, and therefore has relatively low public utility in its present state and ownership;
 - relocation would provide a beneficial use for the homestead complex, which would provide incentive for its ongoing maintenance;

- relocation of the homestead has the opportunity to preserve and enhance the structural condition of the homestead, which is degraded;
 - relocation of the homestead, and the associated archaeological investigation and salvage, would provide an opportunity for researching a rural-based colonial convict site;
 - relocation of the homestead is technically viable from an engineering viewpoint;
 - the coal resource is located in the middle of an intensive and longstanding mining precinct, and the proposed expansion represents a logical brownfield expansion to an existing mine; and
 - not relocating the homestead would mean that the Project would not go ahead, negating all of its social and economic benefits.
215. As retention is not considered reasonable, and nor is demolition (given the available alternative of relocation), the Department believes that if the project is approved the homestead should be relocated, and the archaeological resource comprehensively researched and salvaged, to mitigate and/or at least compensate for the heritage impacts of the Project.

Relocation Options Analysis

216. Glencore, together with the RHAC, have investigated a range of options for the relocation of the Ravensworth Homestead, based on a number of key considerations. In addition to logistical, planning and environmental considerations, the key considerations included that the relocation site should:
- be located in the Singleton LGA;
 - retain as much heritage fabric as possible;
 - provide for sustainable and commercially-viable re-use;
 - provide for public access;
 - provide verisimilitude (authenticity) in setting;
 - provide (preference) for public ownership; and
 - provide a public benefit.
217. In total, 11 options were investigated (see **Figure 13**), and two relocation methods were investigated, namely:
1. Moving intact (or large intact sections); or
 2. Dismantling and rebuilding.
218. The intact move method would preserve more of the heritage fabric of the structures (e.g. by not requiring removal of building elements such as mortar and fixings), but is not feasible for options further from the site due to physical constraints of the routes.
219. Glencore has provided detailed engineering information on the relocation methods, including information from specialist building moving contractor Mammoth Movers demonstrating the feasibility of the intact move method for those sites where this is a feasible option. The Department is satisfied that this analysis provides a reasonable consideration of the feasibility of both relocation methods, demonstrating that both relocation methods are feasible.

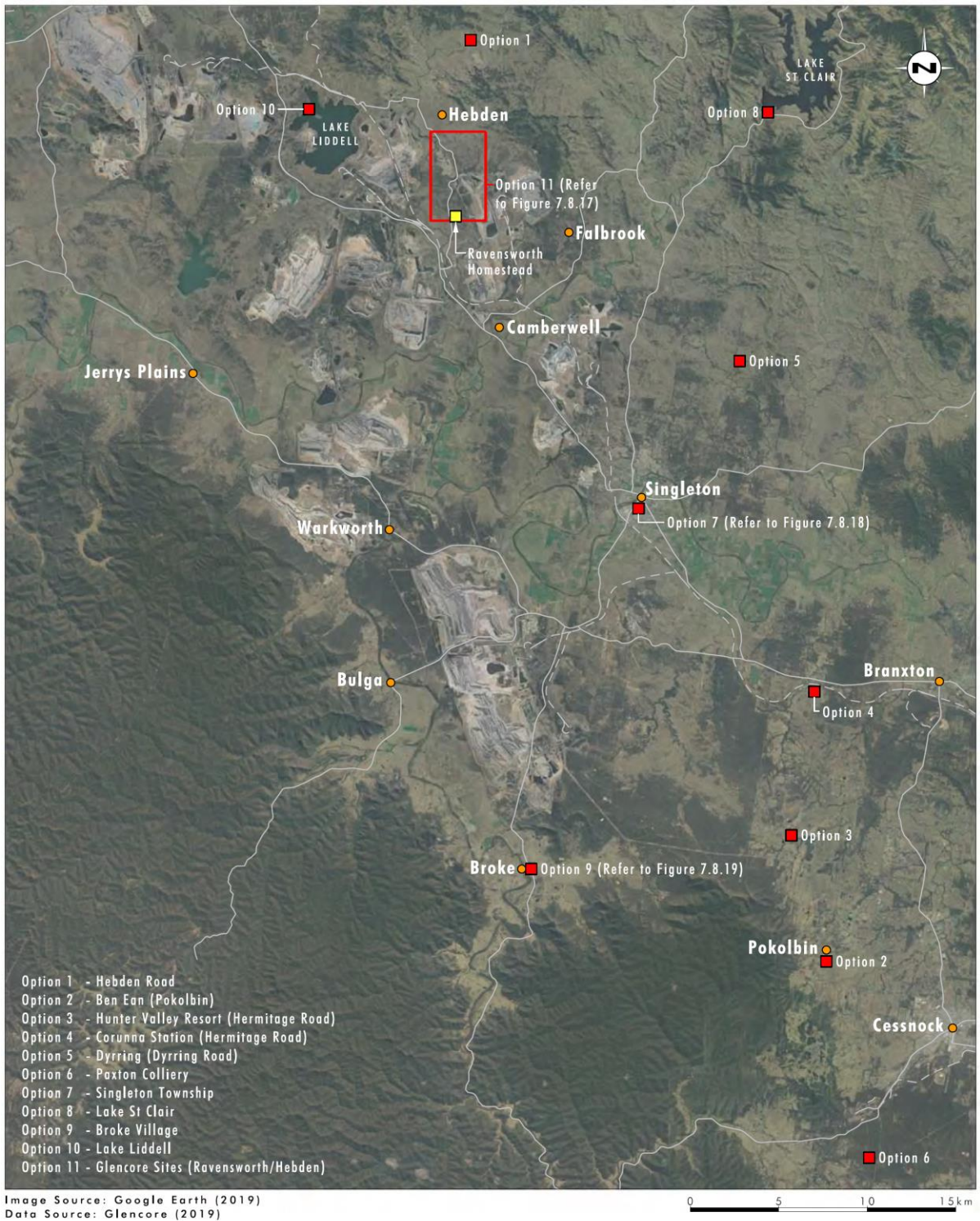


Figure 13 | Relocation Option Sites

220. Following detailed multi-criteria analysis, two preferred options have been identified, namely:
- Option 1 – Ravensworth Farm Option (intact move); and
 - Option 2 – Broke Village Option (dismantle and rebuild).
221. The Department has considered the multi-criteria analysis and the other identified options, and is satisfied that the choice of the two preferred options has been based on a reasonable and detailed analysis, and that the other options do not provide compelling advantages over the chosen preferred options.
222. Consequently, and given there is no overwhelming community/stakeholder appeal for the other identified options, the Department’s assessment below has focused on the two preferred options.
223. The merits of each option are discussed in more detail below. In short, the Ravensworth Farm option would provide greater heritage benefits, but lower public use and community benefits. The Broke Village option, on the other hand, would provide greater public/community benefits, but lower heritage benefits.

Ravensworth Farm Option

224. The Ravensworth Farm option involves moving the homestead structures, via the intact move method, to a site within the original Ravensworth Estate approximately 1.7 kilometres from the existing homestead location, on Glencore-owned land (see **Figure 14**).
225. The option seeks to replicate, as far as practicable, the existing site features (including approach direction, landform and visual catchment), and configuration and arrangement of the buildings and landscaping (see **Figure 15 and Figure 16**). The focus is on replicating the physical characteristics of the existing homestead site to maintain its verisimilitude (authenticity).
226. The relocated homestead complex would be used by Glencore as an administrative centre for the duration of mining operations (approximately 20 years), and would be surrounded by mining infrastructure (including the proposed MIA) during this time.
227. Aboriginal and historical heritage features and artefacts would be stored and displayed in the relocated buildings (in the Men’s Quarters).
228. At the completion of mining and rehabilitation, the relocated homestead would be returned to use as a private residence on the rural landholding, or another use consistent with the prevailing planning legislation at that time.

Broke Village Option

229. The Broke Village option was originally proposed by members of the Broke-Fordwich community, and involves relocating the Ravensworth Homestead structures, via the dismantle and rebuild method⁴, to the publicly-owned McNamara Park (Crown land) near Wollombi Brook in Broke (see **Figure 17**).

⁴ Intact move not feasible to this location.

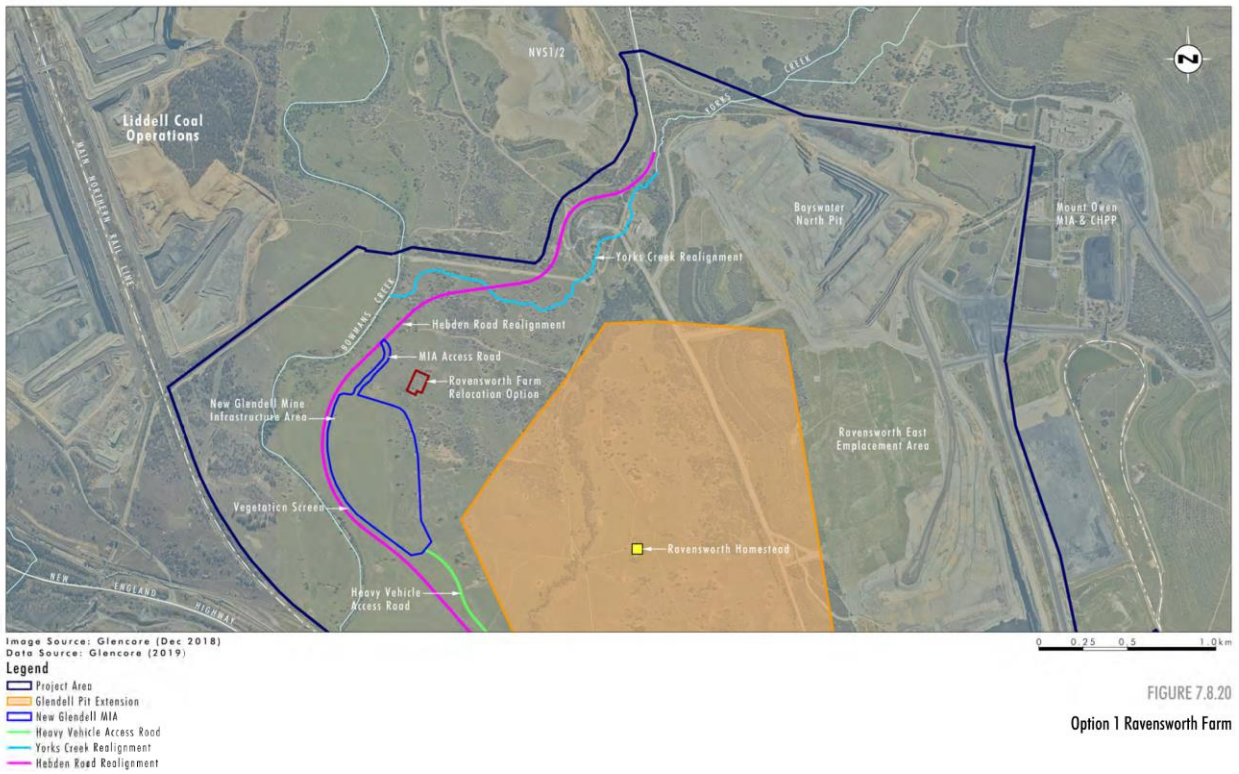


FIGURE 7.8.20
 Option 1 Ravensworth Farm

Figure 14 | Ravensworth Farm Option Location

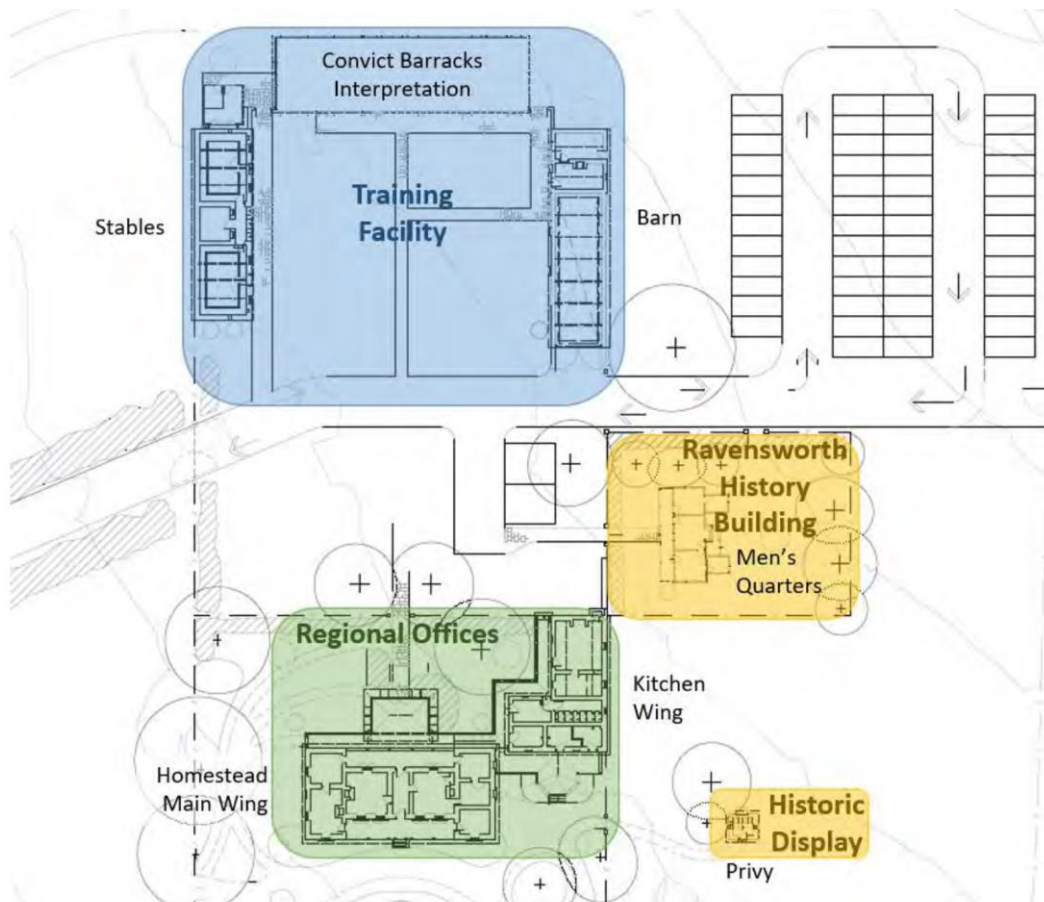


Figure 15 | Ravensworth Farm Option Concept Plan



Figure 16 | Ravensworth Farm Option Concept Perspective



Image Source: Nearmap (Aug 2019), Google Earth (2018)
 Data Source: Glendell (2019)

0 100 250 500m

- Legend**
- ▭ Project Area
 - ▭ Glendell Pit Extension
 - ▭ Relocation Option

FIGURE 7.8.23
Option 2 Broke Village

Figure 17 | Broke Village Option Location

230. This option seeks to maximise community benefit through rebuilding the homestead buildings to form a 'Broke Village Square', providing a focal point for the village and related tourism. The village does not currently have any central commercial core or village square, despite being a growing part of the Hunter Valley's tourism and wine industry.
231. The buildings would be rebuilt in a configuration that is similar to their current configuration, however the alignment of the building group has been skewed to fit within the site, and the distance between some buildings has been reduced to improve layout for its intended use (see **Figure 18 and Figure 19**).
232. The relocated homestead complex would have a multi-purpose usage, including a cultural precinct (including Aboriginal and historical interpretation), food precinct, tourism precinct (including cellar door/wine tasting and function centre), market square (for markets and events), and service and amenities facilities.
233. Glencore would rebuild the homestead complex, but ownership would then be transferred to a community-owned structure, governed by a Board of Trustees or similar.

Analysis of the Options

234. Glencore's heritage experts (LSJ) believe that, from a heritage impact perspective, the Ravensworth Farm option is clearly preferred. Given the viable alternative of the intact move, LSJ considers that the dismantle and rebuild approach is not entirely consistent with the Burra Charter, which calls for 'changing as much as necessary but as little as possible'.
235. Whilst noting that both options would have a high heritage impact, LSJ believes that Option 1 is preferred, as it puts the buildings in an appropriate setting, involves the least damage to the heritage fabric, and provides the most likelihood of ongoing sympathetic use, treatment and maintenance.
236. The RHAC has endorsed both the Ravensworth Farm and Broke Village relocation options.
237. The Heritage Council has not identified a preferred option, as it does not support the relocation at all.
238. Singleton Council has also not identified a preferred option, in part because it does not support Glencore deferring identification of the preferred option and leaving it to the community to decide. It also notes that Option 2 does not adequately consider the objectives of the Plan of Management for McNamara Park, which focuses primarily on passive recreation, and doesn't include detailed information on planning approvals and ongoing maintenance and ownership structure for this option.
239. Glencore has since provided further information on these details for the Broke Village option. This information indicates that there are some planning-related issues associated with this option that would need to be resolved, including that the site would need to be rezoned to allow the proposed uses, as well as some environmental constraints relating to flooding, biodiversity, and historic heritage.
240. Regarding ownership structure for this option, Glencore notes that a community entity, Broke Village Square Limited, has been established to manage this option, with the organisation to operate as trustee with financial benefits generated by the development to be used for community purposes. The land would be leased (or purchased) by the trustee from the Crown.

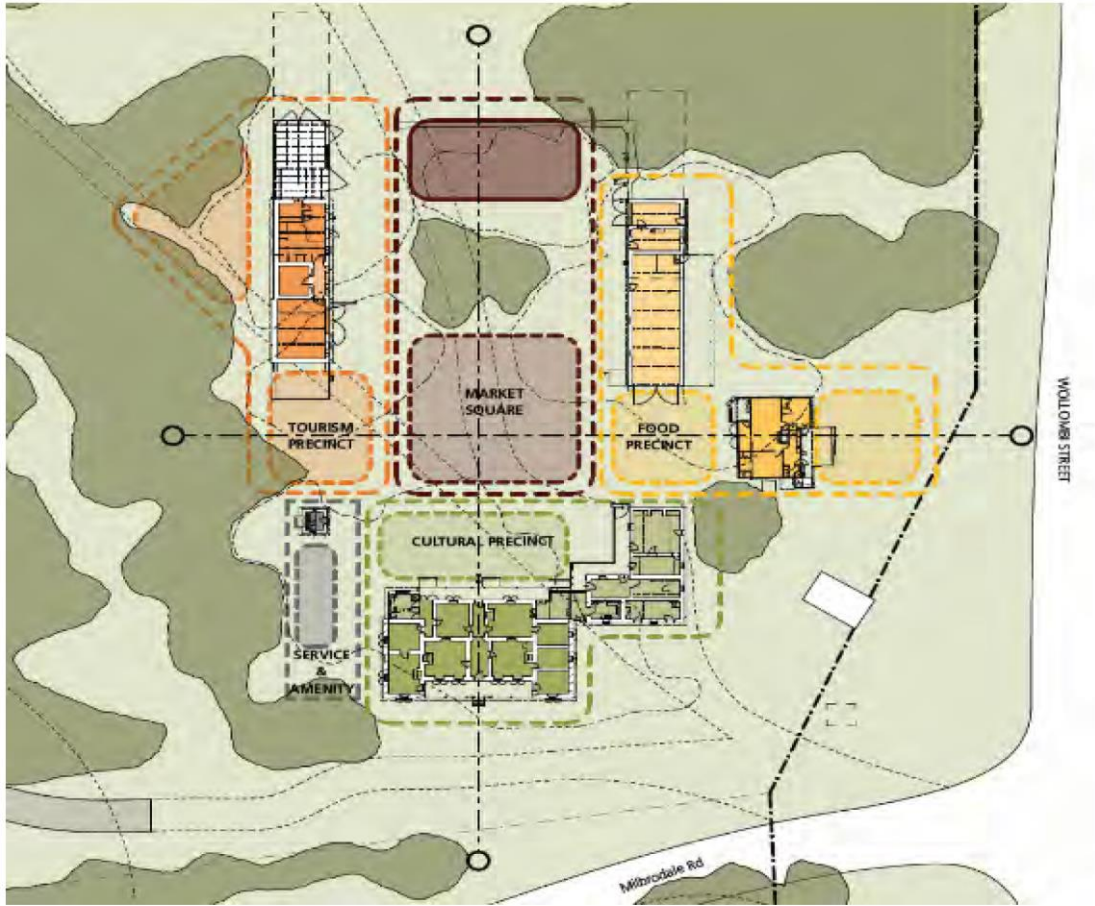


Figure 18 | Broke Village Option Concept Plan

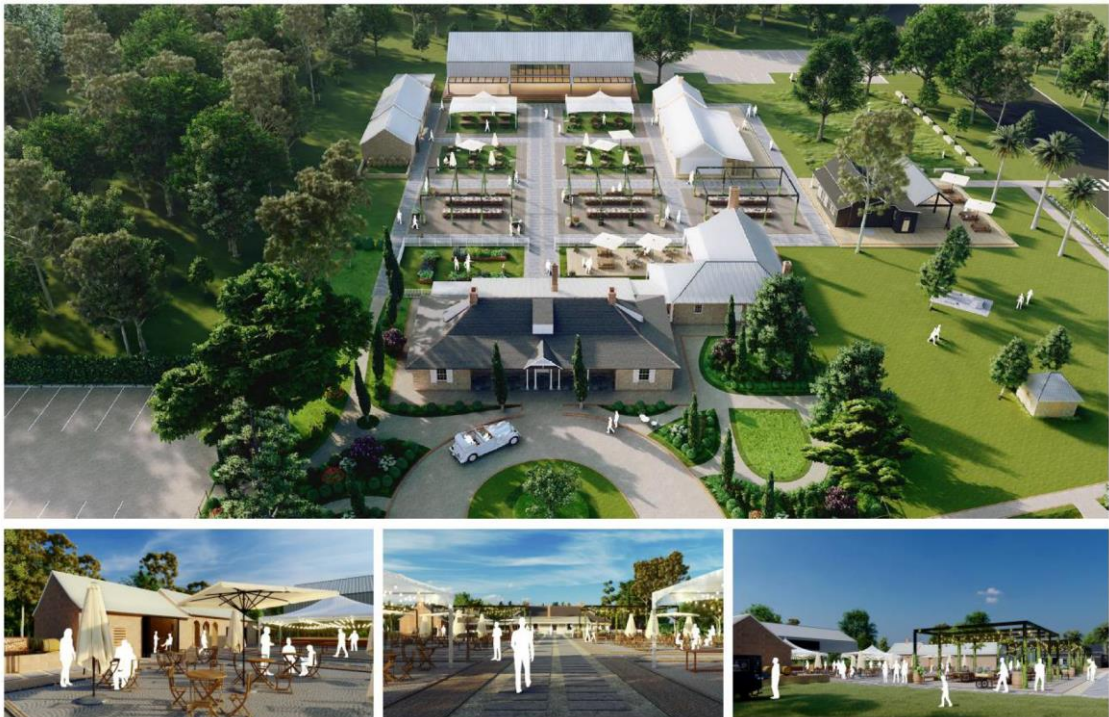


Figure 19 | Broke Village Option Concept Perspectives

241. Glencore has also undertaken detailed community consultation to ascertain the community's views on the preferred relocation option, including consultation with near neighbours⁵, heritage groups, Aboriginal stakeholders and the wider Singleton LGA. From a key stakeholder perspective (i.e. near neighbours, Aboriginal groups, local community and heritage stakeholders):
- 36% preferred Option 2 – Broke Village;
 - 32% preferred Option 1 – Ravensworth Farm;
 - 24% did not identify a preference; and
 - 8% considered that the homestead should not be relocated at all.
242. As indicated in the Project Social Impact Assessment, the breakdown differed somewhat between the stakeholder groups, with the wider LGA and Aboriginal stakeholder groups clearly favouring the Broke Village option, and near neighbours generally favouring the Ravensworth Farm option.
243. The Department has considered the relative merits of each relocation option, a summary of which is provided in **Table 4**.
244. In consideration of the above, the Department believes that both options have merit, and that both are reasonable and feasible. While the Ravensworth Farm option is certainly preferable from a purely heritage perspective, as it retains more of the heritage values, the Broke Village option has greater public benefit in terms of facilitating public access and ongoing engagement and use.
245. The Department's independent heritage expert, Hector Abrahams Architects, considers that the relocation of the Ravensworth Homestead, although reducing the heritage significance of the site, would allow for the retention of many aspects of its heritage value. The advice concluded that the Ravensworth Farm relocation option *"better preserves many more aspects of significance than the rebuilding at Broke"*.
246. However, the advice also noted that the potential future use of the homestead as a residence under the Ravensworth Farm option may be limited given the layout of the structures, which were not designed for permanent residency by the owner, and may only suit occupants 'of antiquarian disposition'.
247. The Department notes that the Broke Village option site at McNamara Park is not identified as a commercial or village centre site in Council's strategic plans. It is also understood that Council's plans do not identify any commercial centre for Broke at present.
248. That is not to say that the proposed location is not appropriate, but that there is currently less than ideal information demonstrating that the site is suitable, and that there may be opportunities for other, potentially more appropriate sites in Broke for a village centre.
249. The Department acknowledges that a commercial and village centre for Broke would be a valuable asset for the community. However, any such centre should be located in accordance with detailed strategic planning studies.

⁵ Landholders near the existing mine

Table 4 | Relocation Options Comparison

Aspect	Option 1 – Ravensworth Farm	Option 2 – Broke Village
Heritage	<ul style="list-style-type: none"> Retains complex within original Ravensworth Estate 	<ul style="list-style-type: none"> Removes complex from historic setting, but within LGA
	<ul style="list-style-type: none"> Retains more verisimilitude 	<ul style="list-style-type: none"> Retains key elements of the layout of the complex, but considerably less verisimilitude
	<ul style="list-style-type: none"> Retains more heritage fabric of the structures 	<ul style="list-style-type: none"> Retains less heritage fabric (due to requirements for the dismantle and rebuild method), but retains key elements
	<ul style="list-style-type: none"> Provides some opportunity for interpretation and display of archaeological resource 	<ul style="list-style-type: none"> Provides more opportunity for interpretation and public display of archaeological resources, given public access
	<ul style="list-style-type: none"> Clearly more preferred option from purely heritage perspective 	<ul style="list-style-type: none"> Inferior option from heritage preservation perspective
Public Benefit	<ul style="list-style-type: none"> Retains complex in private ownership with no significant opportunity for public access 	<ul style="list-style-type: none"> Facilitates public ownership of heritage resource, and ongoing opportunity for public access
	<ul style="list-style-type: none"> Retains more heritage-related public benefits associated with the 'intrinsic' value of the complex in its original setting 	<ul style="list-style-type: none"> Retains less of the intrinsic value, but considerably greater opportunity for public engagement with the heritage resource
	<ul style="list-style-type: none"> Option less preferred by the community 	<ul style="list-style-type: none"> Option more preferred by the community
	<ul style="list-style-type: none"> Doesn't impact any existing public land 	<ul style="list-style-type: none"> Impacts some existing public land which is currently used primarily for passive recreation
	<ul style="list-style-type: none"> Does not facilitate a permanent community-owned asset 	<ul style="list-style-type: none"> Provides a community and tourism focal centre and resource for Broke, which doesn't currently exist
Planning and Environment	<ul style="list-style-type: none"> Straightforward planning process (i.e. this application) 	<ul style="list-style-type: none"> Requires secondary approvals (including rezoning), and the proposed site not identified in strategic plans for such a use
	<ul style="list-style-type: none"> Relatively minor environmental impacts associated with host site 	<ul style="list-style-type: none"> Relatively greater environmental impacts (requires vegetation removal, filling of flood-affected land, potential bushfire risks, etc.)
	<ul style="list-style-type: none"> Homestead surrounded by ongoing mining operations for at least 20 years 	<ul style="list-style-type: none"> Provides public use and benefits immediately following relocation
Logistics and Maintenance	<ul style="list-style-type: none"> Feasible relocation method, with relatively lower risk of impact to heritage fabric 	<ul style="list-style-type: none"> Feasible relocation method, with more impact to heritage fabric
	<ul style="list-style-type: none"> Provides commercially viable option for heritage maintenance during mining operations, but unknown post mining operations 	<ul style="list-style-type: none"> Provides commercially viable option for long term heritage maintenance in public ownership
Independent Expert Advice	<ul style="list-style-type: none"> Better preserves more aspects of heritage significance, however additional investigation required to identify more suitable long-term use. 	<ul style="list-style-type: none"> Poor option by comparison but provides a more suitable long-term use.

250. Council has raised such concerns in relation to the Broke Village option, including that Glencore does not identify the required approvals for this option, and that Glencore hasn't adequately considered the Plan of Management for McNamara Park. Questions also remain about the ownership and ongoing maintenance structure for this option.
251. Glencore has since provided more information on these matters, but it does remain that the Broke Village option is dependent on secondary approvals (including rezoning), and that detailed consideration of strategic planning issues should be undertaken.
252. Given these uncertainties and the advice provided by the independent expert, the Department believes that the Ravensworth Farm option should be the preferred option for relocation. The Department also recommends that Glencore should be required to implement this option prior to mining within 1 kilometre of the homestead.
253. However, consistent with the advice provided by the independent expert, the Department recommends that Glencore undertake further investigations to identify a suitable long-term use for the homestead following cessation of mining.
254. The Department also notes that a number of additional mitigation measures were identified by its independent expert during their review of the relocation options. While some of these measures are not considered reasonable and/or feasible as part of this assessment (e.g. requiring the large landholders to remain under a single ownership, and reopening of a sandstone quarry), all recommendations were considered by Glencore in its response to the review and some were adopted (e.g. lengthening the driveway access to recreate (in part) the approach experience at the existing location of the homestead).

Conclusion

255. The Department acknowledges that the Ravensworth Homestead and the surrounding core estate lands and Ravensworth Estate have local and State heritage significance, with elements of high to exceptional significance.
256. The Department also acknowledges that elements of the site are relatively degraded, and/or have undergone unsympathetic modern upgrades. The homestead is also surrounded by intensive mining operations.
257. Given the available mitigation measures, the Department does not believe that the heritage values of the homestead outweigh the social and economic benefits of the coal resource such that it would warrant retention of the heritage item in-situ. Analysis indicates that any option that leaves the homestead in-situ would render the entire Project unviable.
258. However, the Department believes that if the project is approved the Ravensworth Homestead can and should be relocated, and that the loss of the associated archaeological resource should be mitigated through comprehensive salvage excavation.
259. The Department acknowledges that both relocation options would still have a high heritage impact, in that they would remove the buildings from their historic location setting. The Department accepts that these impacts can be adequately mitigated and/or compensated to an appropriate level.

260. In this regard, the Department has recommended conditions requiring Glencore to:
- relocate the homestead to the Ravensworth Farm site, and undertake comprehensive archaeological salvage of the core estate lands, prior to mining within 1 kilometre of the homestead;
 - undertake further investigation to identify a suitable long-term use for the homestead which would further preserve its heritage value following cessation of mining; and
 - prepare and implement a comprehensive Historic Heritage Management Plan for the Project, including a comprehensive Ravensworth Homestead Relocation Plan and a comprehensive conservation management plan for the ongoing management of the relocated Ravensworth Homestead.

6.3 Aboriginal Heritage

261. The Project site is in Wonnarua country, and the administrative area of the Wanaruah Local Aboriginal Land Council (LALC).
262. The EIS includes an Aboriginal Cultural Heritage Assessment (ACHA) undertaken by Australian Cultural Heritage Management, as well as an Aboriginal Archaeology Impact Assessment (AAIA) prepared by Ozark Environmental & Heritage.
263. The assessments were undertaken in consultation with Aboriginal stakeholders, which included 32 RAPs. Detailed consultation was undertaken with those RAPs identifying as Wonnarua people (referred to as 'key knowledge holder groups'), which included the Plains Clan of the Wonnarua People (PCWP) and the Wonnarua Nation Aboriginal Corporation (WNAC).
264. Heritage NSW is satisfied that the assessments have been undertaken in accordance relevant Aboriginal heritage assessment and consultation guidelines.
265. The assessments, which included detailed review of previous studies and field survey of the additional disturbance area (including test excavations), identified a total of 91 Aboriginal sites within or closely adjacent to the additional disturbance area (see **Figure 20**).
266. The sites included 55 artefact scatters and 36 isolated finds. The test excavations identified a very low and sparse density of artefacts.
267. Overall, the scientific (archaeological) significance of the sites and the area was found to be low, due to the:
- widespread soil loss within the area;
 - disturbance from agricultural land use and mining activity;
 - fragmented nature of the archaeological landscape; and
 - previous archaeological salvage.
268. Of the 91 individual Aboriginal sites that may be affected:
- 77 were assessed as having low archaeological significance;
 - 9 were assessed as having low-moderate significance; and
 - 5 were assessed as having moderate significance.

269. No sites were assessed as having high archaeological significance. Two higher significance sites were identified in the broader area outside the disturbance area, including a scarred tree and an engraving site, both of which are located near Bowmans Creek. Neither of these sites would be impacted by the Project.
270. In terms of cultural significance, the Aboriginal groups did not identify any particularly significant cultural values within the Project area, however most groups consider the whole region to have high cultural significance, and identify a connection to the land.
271. Some groups also identified an attachment to the Ravensworth Homestead, mainly associated with Wonnarua people who may have lived and worked on the property.
272. The PCWP has raised concerns about the colonial frontier violence and claims of a massacre of Aboriginal people in the area. This issue is addressed in the preceding section, and the Department is satisfied that the available evidence suggests that the Ravensworth Estate was not the location of the reported massacre and nor was the Homestead used as a staging post.
273. PCWP has also made applications under Section 9/10 of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) to seek to protect the area as a significant Aboriginal area. The Department understands that the area subject to the application covers a large portion of the Hunter Valley coalfield, and is not specific to the Glendell mine area. The application under the ATSIHP Act is outside and separate to the consideration of the proposal under the NSW planning system.
274. The Department and Heritage NSW are satisfied that Glencore has explored and identified reasonable and feasible measures to minimise the Project's impacts on Aboriginal heritage value, and that the Project's residual impacts are unlikely to have a significant incremental or cumulative impact on the Aboriginal heritage values of the region.
275. The Department acknowledges that some groups identify the area as having high cultural significance, however the disturbance area itself has relatively low tangible archaeological significance.
276. To ensure that the residual impacts are minimised as far as practicable, the Department has recommended conditions consistent with the recommendations of Heritage NSW and the ACHA, including requiring Glencore to:
- update and implement the Aboriginal Cultural Heritage Management Plan for the mine, in consultation with Aboriginal stakeholders;
 - salvage Aboriginal sites within the additional disturbance area;
 - undertake additional archaeological excavations in 4 areas (GN OS6, GN OS34, Bowmans Creek 7 and Bowmans/Swamp Creek Trench 1);
 - protect sites outside the disturbance area, including sites within the 200 metre buffer to Bowmans Creek;
 - continue to involve Aboriginal stakeholders in the management of Aboriginal cultural heritage issues on site; and
 - implement measures to assist with Aboriginal projects in the area (including Glencore's proposed funding for projects associated with caring for land, bringing people together and cultural awareness/education).

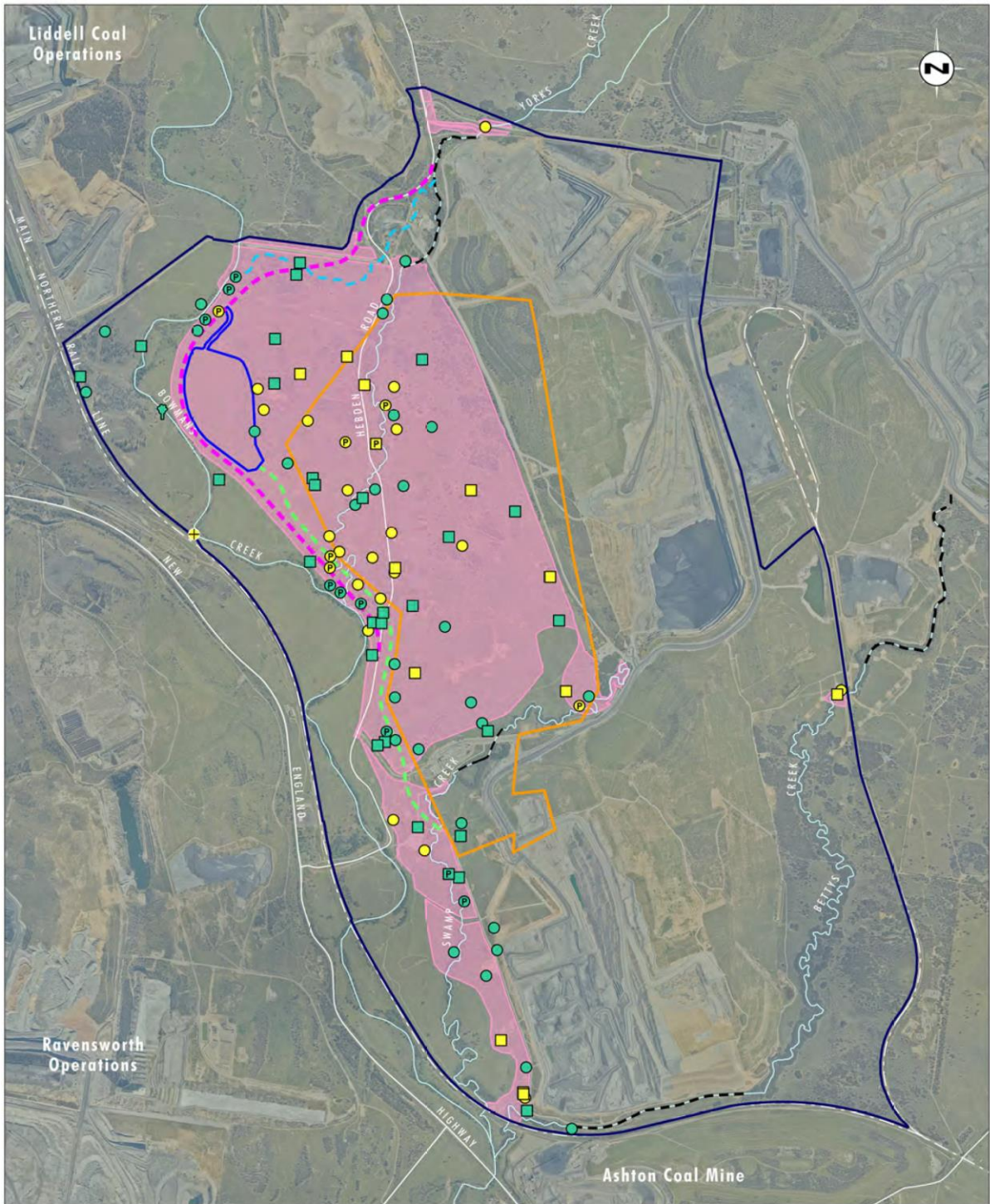


Image Source: Glencore (Dec 2018)
 Data Source: Glencore (2019), OzArk (2019)

0 0.5 1.0 2.0km

- Legend**
- Project Area
 - Additional Disturbance Area
 - Glendell Pit Extension
 - Existing Creek Diversion
 - Project Features:
 - MIA
 - Heavy Vehicle Access Road
 - Yorks Creek Realignment
 - Hebden Road Realignment
 - Previous Sites Recorded in the Additional Disturbance Area:
 - Artefact Scatter
 - Artefact Scatter with PAD
 - Isolated Find
 - Isolated Find with PAD
 - Engraving
 - OzArk Recorded Sites:
 - Artefact Scatter
 - Artefact Scatter with PAD
 - Isolated Find
 - Isolated Find with PAD
 - Scared Tree

FIGURE 7.7.1
 Aboriginal Archaeology

Figure 20 | Aboriginal Heritage Sites

6.4 Air Quality

Introduction

277. Open cut coal mining has the potential to lead to a decrease in air quality by exacerbating the levels of dust and other particulate matter which become airborne and lead to potential impacts on the health of nearby residents and the amenity of the local area. Potential impacts on air quality in the Hunter Valley is known to be a contentious issue with the nearby residents and has been raised in the vast majority of submissions regarding this Project (see **Section 5.4**).
278. The key air quality issues for the Project are associated with dust from general mining activities, fume from blasting activities and emissions of substances from machinery exhausts.
279. The EIS includes an Air Quality Impact Assessment (AQIA), prepared by Jacobs Group in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods). The AQIA was accompanied by a peer review undertaken by ERM Australia.
280. The EPA initially sought additional information regarding the proposed mitigation measures, and recommended further investigation into cumulative PM₁₀ concentrations in accordance with the Approved Methods.
281. Following provision of additional information on these matters from Glencore, the EPA and the Department are satisfied that the AQIA is adequate for assessing the air quality impacts of the Project.

Existing Operations

282. Air quality was one of the key issues raised in public submissions for the Project, with submitters concerned that the Project would exacerbate existing poor air quality in the locality and region.
283. The EIS includes a review of local and regional air quality around the Mount Owen Complex, based on Glencore's monitoring data and the State Government's Upper Hunter Air Quality Monitoring Network.
284. The data indicates that air quality generally complies with applicable criteria, however, there have been some exceedances during the review period (generally between 2012 and 2018), including:
- PM₁₀ – exceeded the annual average criterion (25 µg/m³) at 3 monitoring locations in the vicinity of the Project, and the 24-hour average criterion (50 µg/m³) at several locations surrounding the complex;
 - PM_{2.5} – exceeded the annual average criterion (8 µg/m³) at 2 locations in the vicinity of the Project, and the 24-hour average criterion (25 µg/m³) on one occasion in Singleton; and
 - Deposited dust – exceeded applicable criteria on two occasions.
285. The data indicates that exceedances typically occur during regional events (such as regional dust storms and bushfires), or during winter associated with woodburning. However, it is recognised that open cut mining operations and agricultural activity would have likely contributed to the overall levels.

Management and Monitoring

286. Glencore is proposing to continue and expand its existing air quality mitigation measures, which are managed under its approved Air Quality and Greenhouse Gas Management Plan. The measures include:
- minimising the area of land disturbed at any one time, and undertaking progressive rehabilitation;
 - using water sprays and water carts on haul roads and coal stockpile areas, and dust curtains when drilling;
 - minimising fall distance during loading and unloading;
 - maintaining covered conveyors and belt cleaning;
 - maintaining and servicing machinery, exhaust systems and equipment;
 - using dust cameras to assist in monitoring dust levels; and
 - implementing proactive and reactive dust control strategies informed by real-time air quality monitoring systems.
287. Glencore has also committed to reviewing the existing air quality monitoring network for the mine to ensure that the monitoring network adequately covers the areas potentially impacted by dust generated from the Project area.
288. Glencore also implements a Blast Management Plan which identifies specific control measures for blast fume management, such as defining the potential risk zone based upon weather patterns and obtaining permission to fire based on an assessment of real-time weather conditions.

Air Quality Impacts

289. The AQIA included dispersion modelling to predict the incremental and cumulative dust impacts of the Project under both neutral and adverse weather conditions for four representative operational years (Years 1, 6, 13 and 18), as well as an assessment of the impacts associated with blast fumes and diesel use.
290. The modelling indicates that, in general, air emissions from the Project would be similar to those of the existing Glendell mine, with impacts reducing over time as mining moves away from the urban areas of Camberwell and Middle Falbrook.
291. With the proposed mitigation measures, the worst case emissions from the Project are predicted to meet applicable criteria for total suspended particulates (TSP) and dust deposition at all privately-owned receivers. Emissions related to blast fumes and diesel emissions are also predicted to comply with applicable criteria. Emissions associated with construction works are not expected to significantly increase the total dust emissions from the Project.
292. However, fine particulate matter emissions (PM₁₀ and PM_{2.5}) are predicted to exceed applicable criteria at some privately-owned receivers during some operational scenarios. All of these receivers are already affected by existing mines in the locality, and already have acquisition rights under existing development consents.
293. A summary of the findings for these exceedances is provided below.

Annual Average Particulate Matter Impacts

294. The modelling indicates that up to 13 privately-owned residences (on 10 properties) would experience exceedances of cumulative annual average PM₁₀ and/or PM_{2.5} criteria at some stage during the Project. Most of these residences are located in and around Camberwell, while one is located in Middle Falbrook.
295. As outlined above, all of the residences already have acquisition rights for air quality and/or noise impacts from the existing Glendell mine or other mines in the area (including Mount Owen, Rix's Creek and/or Ashton mines).
296. A summary of the affected residences, and the Project's worst-case contribution toward the exceedance, is provided in **Table 5** below. The receiver locations are shown on **Figure 5**, and the relative contributions from each source for a representative receiver in Camberwell are illustrated in **Figure 21**. As indicated in the table and figures, the Project would contribute between approximately 5% and 30% of the applicable cumulative criteria at surrounding receivers where an exceedance is predicted, with most of this contribution occurring in the early years of the Project before the mining progresses further away from Camberwell and Middle Falbrook.
297. In accordance with the Department's *Voluntary Land Acquisition and Mitigation Policy* (VLAMP), the affected receivers would be entitled to acquisition rights and/or mitigation rights, which would give the landowners the right to require Glencore to acquire the affected properties and/or to implement additional air quality mitigation measures at the residence.

Table 5 | Summary of Cumulative Annual Average Dust Criteria Exceedances (worst case, all years)

Receiver ID	Location	PM ₁₀ (µg/m ³)		PM _{2.5} (µg/m ³)	
		Cumulative	Project Contribution	Cumulative	Project Contribution
Criteria		25		8	
111	Middle Falbrook	44	3.0	13	0.9
114	Middle Falbrook	26	2.1	No exceedance predicted	No exceedance predicted
127a		35	2.4	11	0.8
127b	Camberwell	37	5.0	11	1.4
127c		38	7.7	12	2.2
127d		38	7.2	12	2.0
143		Camberwell	33	3.8	10
147	Camberwell	41	1.3	13	0.5
150	Camberwell	35	2.9	11	1.0
152	Camberwell	35	3.4	11	1.1
154	Camberwell	35	3.8	11	1.2
155	Camberwell	34	4.1	11	1.2
156	Camberwell	34	5.0	11	1.5

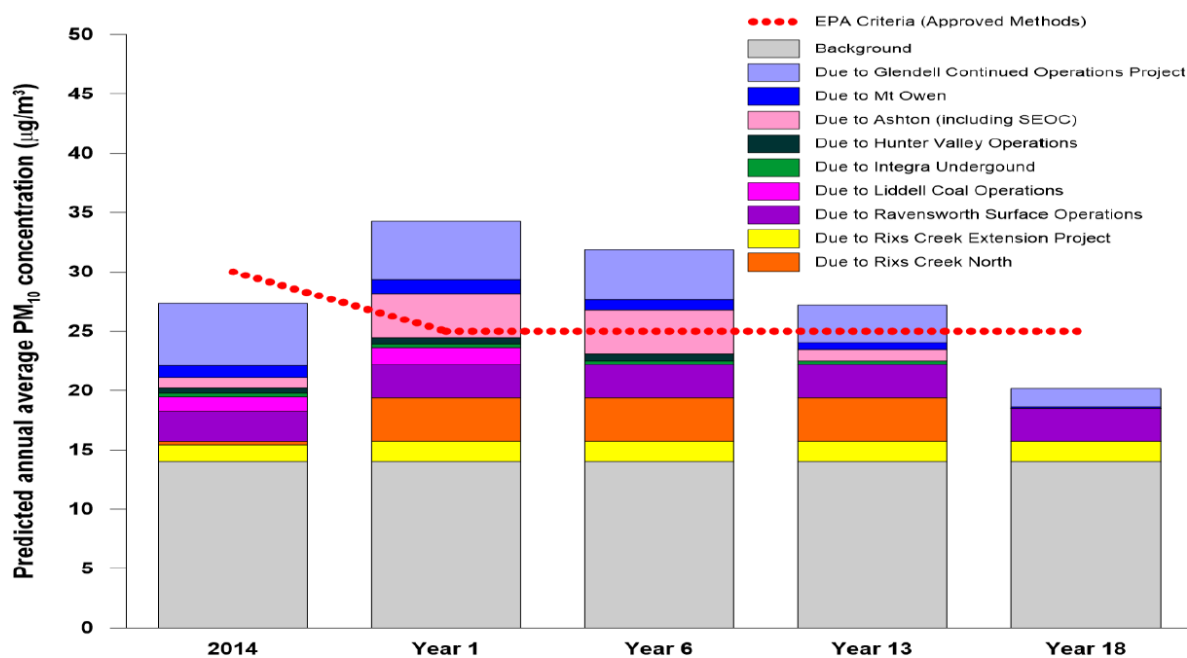


Figure 21 | Annual Average PM10 Concentrations in Camberwell (Receiver 156)

298. In addition to these affected receivers, there is also a small number of additional receivers in the wider area (including Receivers 144a-c and 145) that are predicted to exceed the relevant cumulative criteria. These receivers are primarily affected by other mines, and the project's contribution to the exceedance would be small. These receivers are within the acquisition areas for these other mines.

24-Hour Average Particulate Matter Impacts

299. Project-only PM₁₀ and PM_{2.5} concentrations are predicted to comply with applicable criteria (i.e. 50 µg/m³ and 25 µg/m³ respectively) at all privately-owned receivers, with the exception of an industrial facility owned by Daracon (Receiver 342), which is not considered to be a sensitive receiver due to the nature of its operations (see **Figure 22**).

300. However, when considered on a cumulative basis, Glencore's analysis does indicate that cumulative 24-hour PM₁₀ and PM_{2.5} concentrations are likely to exceed the applicable criteria at a large number of privately-owned receivers in the surrounding area.

301. For most privately-owned receivers, the Project is predicted to result in only a small number of additional days⁶ where the cumulative criteria are exceeded (generally between zero and three additional days). A small number of receivers are predicted to experience a significantly greater number of additional days where the cumulative criteria are exceeded, however these are the same receivers predicted to exceed annual average criteria, and already have acquisition rights.

⁶ Relative to the base case (2014).

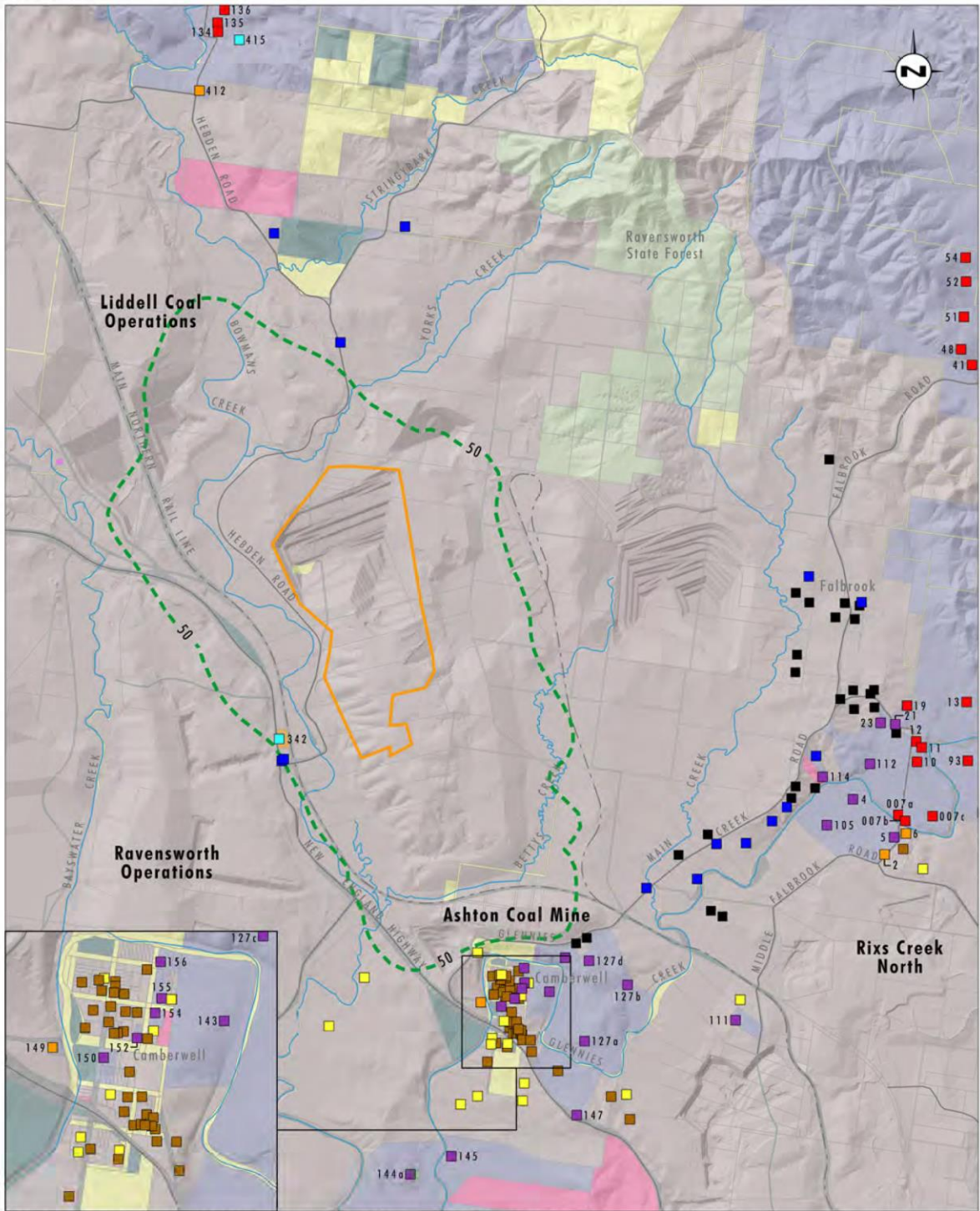


Image Source: Glencore (2019), Data Source: Glencore (2019), Department of Finance, Services & Innovation (2019), Jacobs (2019)
 Note: Year 18 landform used on Figure

Legend

- Glendell Pit Extension
- Maximum 24-hour Average PM₁₀ (50µg/m³)
- Private
- Private Vacant Land (Acquisition Rights)
- Mine Owned
- State Forest
- Crown Land
- Government Authority
- Ausgrid
- Telstra
- Daracon
- Receptor (Private)
- Receptor (Private - Acquisition Rights)
- Receptor (Private Infrastructure)
- Receptor (Community Infrastructure)
- Receptor (Glencore Owned)
- Receptor (Glencore Owned - Vacant)
- Receptor (Other Mine Owned)
- Receptor (Other Mine Owned - Vacant)

FIGURE 7.2.2

Predicted Maximum 24-hour Average PM₁₀ Concentrations (Project only) - Composite of All Modelled Years

Figure 22 | Predicted Maximum 24-hour Average PM10 Concentrations (Project only)

302. While the VLAMP only applies to incremental (or Project-only) 24-hour PM₁₀ and PM_{2.5} emissions, the EPA did note the large number of receivers predicted to exceed the criteria when considered on a cumulative basis, and requested that Glencore provides further consideration of these impacts and whether additional mitigation measures can be implemented to reduce the predicted impacts.
303. Glencore noted that its modelling did not include the benefits provided by its proactive and reactive dust management system, which uses a combination of meteorological forecasting and real-time monitoring to guide day-to-day mining operations. These measures are particularly useful for managing short term spikes during dusty conditions, reducing the potential for exceedances of the 24-hour criteria.
304. The modelling also included all approved and proposed mining operations in the area, including those not currently operating, with all mines operating at their maximum production rates. As such, the modelling can be seen as a conservative prediction of the cumulative air quality impacts.
305. Notwithstanding, the modelling does indicate that the Project would increase the risk of exceedances of the short term criteria, and the Department believes that Glencore should be required to implement all reasonable and feasible measures to reduce these cumulative impacts.

Vacant Land

306. In addition to the impacts on privately-owned residences, the AQIA indicates that an additional 7 landholdings would exceed the applicable PM₁₀ and/or PM_{2.5} criteria over more than 25% of the land area. All of these landholdings already have acquisition rights for air quality and/or noise impacts under existing development consents for other mines in the locality (including Mount Owen, Rix's Creek and/or Ashton mines).

Conclusion

307. The Department and the EPA are satisfied that Glencore has appropriately assessed the potential air quality impacts associated with the Project.
308. This assessment indicates that the applicable air quality criteria may be exceeded at up to 13 privately-owned residences (on 10 properties) and 7 additional privately-owned landholdings in and around Camberwell and Middle Falbrook, as a result of the Project.
309. All of these properties are already within the affectation zone for the existing Glendell mine and/or other mines in the locality, and already have acquisition and/or mitigation rights under one or more existing development consents.
310. The Department has carefully considered these residual air quality impacts, paying particular attention to cumulative air quality issues in the locality.
311. While the Department recognises that these issues are of concern to the broader community, the detailed assessment indicates that the air emissions associated with the proposed mine extension would be similar to those for the existing mine for most receivers, with dust levels reducing over time as mining moves away from Camberwell and Middle Falbrook.
312. The Department acknowledges that the Project would continue and/or increase the impacts on some receivers that are already affected by mining operations, but is satisfied that Glencore has proposed all reasonable and feasible measures to reduce these impacts as far as practicable, including a comprehensive proactive and reactive dust monitoring and management system.

313. The Department also recognises that the site is located in an area of longstanding and intensive mining operations, with mining companies now owning most of the affected receivers in the locality following decades of mining and acquisition programs.
314. On balance, the Department is satisfied that the air quality impacts of the Project can be adequately minimised, managed or at least compensated for to achieve an acceptable level of environmental performance. To ensure this occurs, the Department has recommended conditions requiring Glencore to:
- acquire the properties predicted to be significantly affected, if requested by the landowner (if they are no longer subject to acquisition under existing consents);
 - manage affected receivers (including mine-owned receivers) to minimise dust-related health risks, including providing mitigation measures, information and monitoring;
 - comply with contemporary air quality criteria for all other receivers;
 - implement all reasonable and feasible measures to minimise air emissions;
 - develop a comprehensive Air Quality Management Plan, including a real-time dust monitoring program and an active management system;
 - independently investigate air quality complaints and undertake applicable management measures;
 - respond effectively to enquiries or complaints; and
 - publicly report on its environmental performance.

6.5 Greenhouse Gas Emissions

Introduction

315. All coal seams contain some level of gas as a consequence of how the coal is formed. These gases escape (i.e. become 'fugitive') during both open-cut and underground mining operations. However, open cut mines are typically shallower than underground mines, which generally produces lower quality coal that results in lower emissions per unit of coal.
316. Fugitive emissions from mining are a significant component of GHG emissions and account for approximately 9-10% of NSW emissions. Emission of greenhouse gases, and the associated contribution to climate change was raised in the vast majority of submissions objecting to the Project (see **Section 5.4**).
317. GHG emissions are divided into three categories:
- Scope 1: emissions released to the atmosphere as a direct result of an activity;
 - Scope 2: emissions released to the atmosphere from the indirect consumption of energy; and
 - Scope 3: indirect emissions (other than Scope 2 emissions) generated in the wider economy, which occur as a consequence of the activities of a facility, but from sources not controlled by that facility.
318. The EIS includes a Greenhouse Gas and Energy Assessment (GHGEA), prepared by Umwelt in accordance with applicable guidelines including the *National Greenhouse Accounts (NGA) Factors 2018*, the *National Greenhouse an Energy Report Act 2007* and the principles of *The Greenhouse Gas Protocol 2004*.

319. The EIS also included consideration of the NSW Government's *NSW Climate Change Policy Framework (CCPF)* and the Commonwealth Government's commitments to the *United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement 2015* (Paris Agreement).
320. In considering the greenhouse gas (GHG) impacts of the Project, the Department recognises that this is a matter of interest to many members of the broader community and was raised in the majority of public objections on the Project.

Mitigation and Management

321. Mitigation of fugitive emissions from open cut coal mines is inherently difficult given the nature of the mining method and exposure of the coal seam to the environment. It is recognised that pre-draining of coal seam is commonly used in underground mines to mitigate impacts from fugitive emissions. However, these projects also typically have high gas contents and undertake gas drainage as a safety imperative to mitigate the risk of outbursts and to allow the mines to operate at safe gas levels as required by relevant legislation.
322. In its additional information, Glencore confirmed that pre-draining the coal seam gas to reduce fugitive emissions is not considered to be practical or feasible given the structurally complex (faulted) domain, the overall nature of the geology (thin coal plies, geological structure) and low gas content over the majority of the proposed mining area,
323. Despite this, the EIS proposes a range of management and mitigation measures for Scope 1 and Scope 2 GHG emissions that seek to minimise emissions as far as possible, including:
- limiting the length of material haulage routes, thereby minimising transport distances and fuel consumption;
 - optimising haul road ramp gradients and payload to reduce diesel use;
 - selecting equipment and vehicles that have high energy efficiency;
 - scheduling activities so that equipment and vehicle operation is optimised (e.g. minimising idle times and in-pit servicing);
 - improving extraction and processing energy use through implementation of through seam blasting;
 - energy efficiency initiatives to reduce indirect electricity consumption Scope 2 emissions;
 - implementing the existing emissions cap for the mine in accordance with the Safeguard Mechanism under the Australian national greenhouse gas mitigation policy framework; and
 - participation, monitoring and reporting within the Commonwealth Government's NGERs, which includes ongoing review of technologies and measures to further minimise GHG emissions.
324. Glencore has recently announced that it will limit coal production to 150 Mtpa across its global operations in order to limit its total GHG emissions. The Project fits within this coal production cap commitment as it is focused on sustaining current coal production.
325. The Department considers that given the constraints, Glencore has applied reasonable and feasible measures to reduce its Scope 1 and 2 emissions through the design and operation of the Project.

Impact Assessment

326. The GHG emissions generated over the life of the Project are summarised in **Table 6** below.

Table 6 | Estimated Project Greenhouse Gas Emissions (Mt CO₂-e)

GHGs	Sources	Estimated Emissions	Percentage of Total Emissions (%)
Scope 1	Fugitive emissions from exposed coal seams	3.4	2.60
	On-site diesel consumption	2.6	
Scope 2	On-site electricity consumption	0.45	0.2
Scope 3	Downstream burning of product coal, downstream transport and electricity	220.4	97.2
Total		226.9	100

Note: Mt CO₂-e = million tonnes carbon dioxide equivalent.

327. As identified in **Table 6**, the vast majority (>97%) of emissions generated by the Project comprise Scope 3 emissions that arise from the consumption of coal by end users. Under the Paris Agreement accounting rules and Australian legislation, Scope 3 emissions are not included in Project emission reporting, to avoid double counting.
328. Further to this, the majority (approximately 56%) of Scope 1 and 2 GHGs would be associated with fugitive gas emissions due to exposure of the seams during open cut mining operations.
329. Glencore has reviewed the feasibility of pre-draining coal seam gas to reduce these emissions, however this option is not considered to be practical or feasible.
330. The Project is forecast to produce on average 253,000 t CO₂-e per annum of Scope 1 emissions, which equates to around 0.3% of the NSW Government's 2030 emissions target as outlined in the NSW Government's Net Zero Plan.
331. The GHGEA predicts that the Project would generate approximately 10 Mt CO₂-e of Scope 3 emissions each year. Compared with 2019 global greenhouse emissions (approximately 33,000 Mt), the Scope 3 emissions from the Project represent a very small proportion of global emissions levels (approximately 0.03%).

Consideration of Climate Change Policy Framework

332. The Department has considered the predicted GHG emissions (including Scope 3 emissions), having regard to both national and State-level commitments made under the 2016 Paris Agreement and *NSW Climate Change Policy Framework (CCPF)*.
333. The EIS includes consideration of climate change projections and the principles of ecologically sustainable development (ESD), including inter-generational and intra-generational equity. The environmental, social and economic costs of GHG emissions generated by the Project have been considered in the cost benefit analysis in the EIS. Glencore has also proposed a range of mitigation measures to manage the residual costs of the Project. The proposed measures have been reflected, and in some cases strengthened, in the Department's recommended conditions.

334. The Department also recognises that as a major brownfield extension, the Project would be able to recover a significant coal resource with relatively fewer emissions than a similar scale greenfield project. This is largely due to the connection with the existing Mount Owen processing and transport infrastructure and rail loadout facilities, which allow for a reduced environmental footprint compared with the construction of new facilities for a greenfield project located elsewhere in NSW, other States or Territories in Australia or internationally.
335. The Department also sought advice from the Climate and Atmospheric Science (CAS) Branch within the Environment, Energy and Science Division, and despite identifying that the emissions projections were slightly higher than the values used in the Net Zero Emissions Modelling, it confirmed that the methodology used by Glencore to calculate its emissions was more robust and will be adopted by the CAS Branch in future projection updates. The CAS Branch also provided advice regarding the proposed mitigation measures being applied by Glencore and concluded that additional measures could be considered to reduce diesel consumption and offsetting of residual emissions should be considered. This advice has assisted the Department in its recommended Conditions.

Climate Policy and Coal Demand

336. The majority of key consumer countries identified by Glencore are signatories to the Paris Agreement. The GHGEA includes a review of the current NDC's for each of the signatory countries.
337. While it is not a signatory to Paris Agreement, Taiwan has committed to reduce GHG emissions by 50 percent by 2050. Taiwan has also established a GHG reporting scheme and a Greenhouse Gas Reduction Accreditation System in preparation for a future cap-and-trade program.
338. The Department recognises that recent years have seen an increased demand for renewable energy sources and that these sources are playing an increasing role in the overall energy mix.
339. This view is supported by *Australia's Long-Term Emissions Reduction Plan*, the NSW Government's Net Zero Plan and its *Strategic Statement on Coal Exploration and Mining in NSW* (2020), which all recognise that in the medium term there will still be a strong global demand for thermal coal for power generation for at least the duration of the Project.

Conclusion

340. The Department considers that the GHG emissions associated with the Project are relatively modest for a coal mine of this scale, and represent a small proportion of Australia's NDC. The Department has considered these emissions relative to the global impacts that would arise from the recovery of alternative coal resources for power generation, and weighed the impacts against the potential economic and social benefits of the Project.
341. On balance, the Department considers that the residual impacts of the Project are acceptable, particularly as the Project represents a continuation of existing mining activities, and would make use of considerable existing infrastructure.

342. To ensure that GHG emissions are minimised to the greatest extent practicable, the Department has proposed a comprehensive suite of conditions that limit the emissions to no greater than predicted in the EIS through strict Scope 1 and Scope 2 performance measures, while also ensuring that new technologies and other options to further mitigate Scope 1 and Scope 2 GHG emissions would be regularly reviewed and implemented where feasible, through the preparation and implementation of an Air Quality Greenhouse Gas Management Plan in consultation with the EPA and the Department's CAS Branch. The plan includes 3 yearly review of abatement technologies, preparation of action plans and review of the performance measures to assist in reducing emissions through the life of the Project.

6.6 Noise

Introduction

343. The Project has the potential to lead to increased noise impacts and disturbances associated with the proposed mining activities, including via general vehicle/equipment noise, alarms, construction activities, blasting and use of the Mount Owen rail line. Potential noise impacts have been assessed to determine the level of impact relative to the existing operations.

344. The EIS includes a Noise Impact Assessment (NIA), prepared by Umwelt in accordance with applicable guidelines including the *NSW Noise Policy for Industry (NPfI)*, *Interim Construction Noise Guideline (ICNG)*, *NSW Road Noise Policy*, *Rail Infrastructure Noise Guideline* and the VLAMP. The NIA was accompanied by a peer review undertaken by Wilkinson Murray.

345. The assessment included iterative noise modelling to identify and minimise noise impacts, through implementation of appropriate noise controls. This process resulted in revisions to the mine plan progression including:

- optimisation to enable placement of mining equipment lower in the pit and emplacements during adverse meteorological conditions;
- design of haul roads to maximise shielding from the pit crest and surrounding topography, and avoid prevailing winds;
- noise bunds in strategic locations along haul roads and ramps; and
- planning and mine sequencing to enable operational controls (e.g. slow-down in mine progression and selective mining equipment shutdowns), particularly in the early years.

346. The EPA did not raise any issues in relation to the NIA or Glencore's proposed mitigation measures, and the Department is satisfied that the NIA is adequate for assessing the noise impacts of the Project.

Existing Operations

347. Noise emissions from the existing mine are regulated in accordance with the noise criteria set in the Glendell consent (DA 80/952), while emissions associated with the transport and processing of coal mined from Glendell at the Mount Owen CHPP are regulated in accordance with the noise criteria set in the Mount Owen consent (SSD 5850).

348. As the Glendell and Mount Owen mines are now operated as a complex, the NIA has adopted the receiver area identification numbers used in the Mount Owen mine consent, to align and simplify the noise assessment locations across the complex.

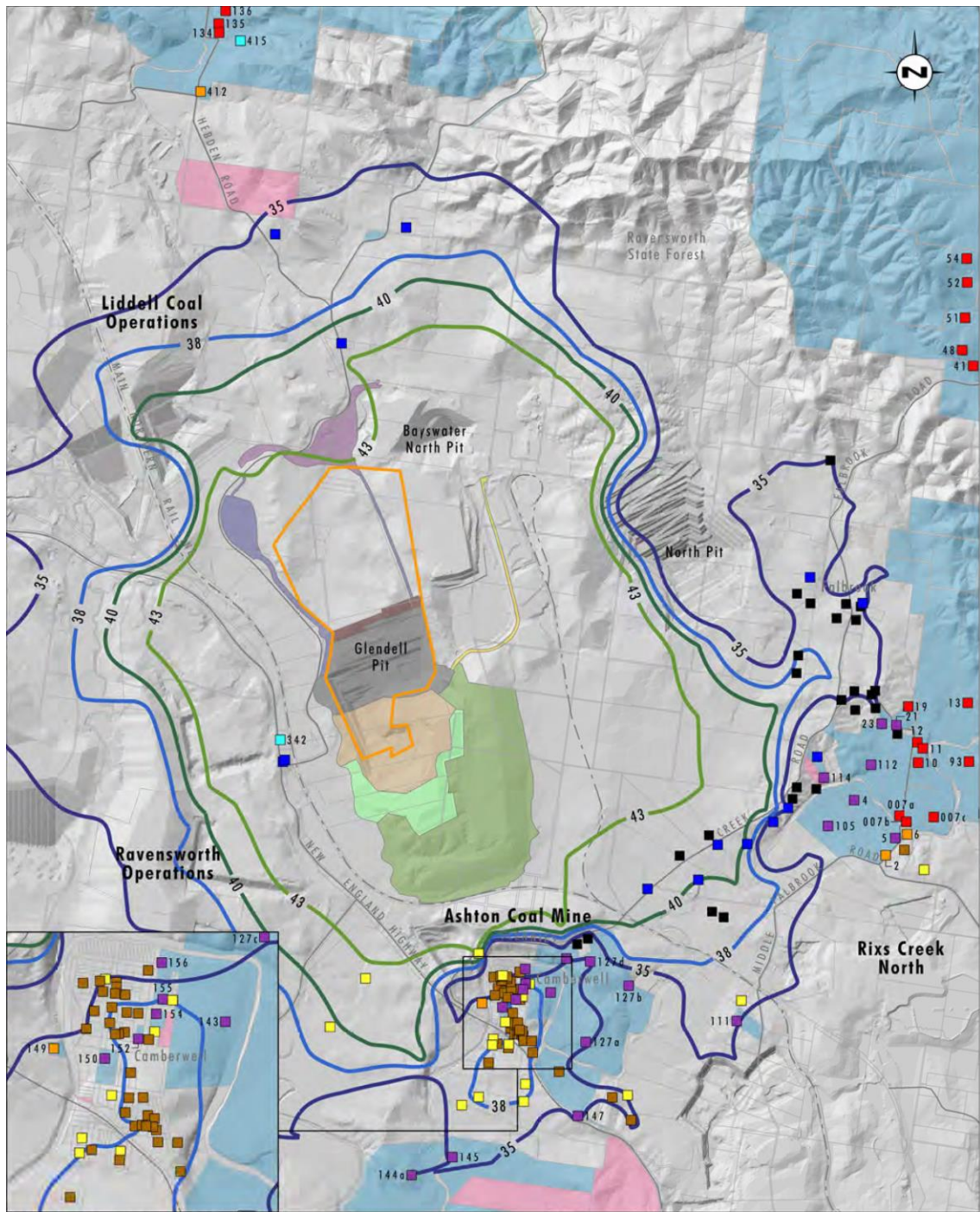
349. In this regard, Glencore currently implements a Noise Management Plan (NMP) which outlines its procedures to manage and mitigate noise impacts from the Mount Owen Complex.
350. Glencore is proposing to manage the Project in accordance with the NMP, which would be updated to reflect the Project, including the additional mitigation measures described above.
351. In addition to these measures, Glencore also implements an active noise management system, which uses predictive meteorological forecasting and real-time noise monitoring to identify potential noise-enhancing conditions and guide day-to-day operations and noise management measures.

Operational Noise

352. The NIA modelled worst case operational noise levels for four representative operational years (Years 1, 6, 13 and 18) under both neutral and noise-enhancing weather conditions.
353. With the implementation of the mitigation measures described above, the NIA predicts that the worst-case noise emissions from the mining operations would comply with applicable noise criteria at all privately-owned receivers throughout the Project, including under noise-enhancing meteorological conditions, and including both residential and non-residential receivers, and vacant landholdings.

In general, noise levels in Camberwell and Middle Falbrook would gradually reduce as mining progresses away from these areas. Representative noise contours during the early years (Year 6) are shown on **Figure 23**.

354. The NIA also included probabilistic modelling to help design the operating measures described above, and to examine how often operational measures might need to be implemented during standard and noise-enhancing conditions, as well as during very noise-enhancing conditions when the NPfI noise criteria do not apply.
355. The probabilistic modelling indicates that such additional noise mitigation measures would not be required for many receiver areas, but that they would be required to avoid exceedances in and around Middle Falbrook and Camberwell on some occasions, particularly during winter evenings and nights, and particularly during the early years of mining. During such stages, such measures may be required on up to approximately 50% of nights.
356. The NIA also includes consideration of noise impacts associated with the processing of ROM coal at the Mount Owen mine, including operation of the CHPP, loading/unloading of trains, and rail traffic movements along the Mount Owen Rail Loop.
357. The assessment confirmed that the noise emissions would be consistent with those previously modelled for the Mount Owen consent. Accordingly, the Project would not increase noise impacts associated with the Mount Owen CHPP in any year relative to the impacts previously assessed and approved.
358. Notwithstanding, as the Project would extend the life of the Mount Owen CHPP to 2045, it would therefore extend the duration of these noise emissions. Glencore would continue to manage these emissions to ensure compliance with the existing noise criteria in the Mount Owen consent, for the duration of the Project.



Data Source: Glencore (2019), Department of Finance, Services & Innovation (2019), Umwelt (2019)

Legend

- Glendell Pit Extension
- 35 dB(A) Noise Contour
- 38 dB(A) Noise Contour
- 40 dB(A) Noise Contour
- 43 dB(A) Noise Contour
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Removal Strip
- Shaping for Final Landform
- Rehabilitation
- Creek Realignment (Construction)
- Infrastructure/Internal Access
- Haul Road
- Receptor (Private)
- Receptor (Private - Acquisition Rights)
- Receptor (Private Infrastructure)
- Receptor (Community Infrastructure)
- Receptor (Glencore Owned)
- Receptor (Glencore Owned - Vacant)
- Receptor (Other Mine Owned)
- Receptor (Other Mine Owned - Vacant)
- Private Land
- Private Vacant Land (Acquisition Rights)

FIGURE 7.3.3

Predicted Noise Impacts - Year 6

Figure 23 | Worst-case noise impacts – Year 6

359. The Department is satisfied that operational noise emissions from the Project can be managed to comply with applicable noise criteria, and are unlikely to result in any significant impacts. Noise emissions do not appear to be a significant issue associated with the existing mine, given that noise impacts were only raised in two of the 340 public submissions received on the Project.

Cumulative Noise

360. The NIA also included assessment of cumulative noise impacts associated with the Project and nearby existing and approved but not operating developments. The NIA also assessed the cumulative noise impacts of the existing Mount Owen Complex and the Project during the two years when both operations would be in full production.

361. The assessment indicates that the concurrent operations of the approved mining operations, and the combined operations of the Mount Owen Complex, would comply with the applicable amenity noise criteria at all privately-owned receiver locations.

362. Consequently, the Department is satisfied that the Project would not result in significant cumulative impacts on any privately-owned receivers.

Sleep Disturbance

363. The NIA includes consideration of potential sleep disturbance impacts that can arise from the operation of equipment that generate high volume, short-term noise. The modelling predicts that no receivers would experience exceedances of the applicable sleep disturbance criteria.

364. The Department is satisfied that night-time noise emissions and sleep disturbance impacts can be effectively managed and mitigated as part of the NMP.

365. Following further consultation with the EPA and clarification on its advice on recommended noise limits for the Project, the Department has recommended sleep disturbance limits that are more conservative than the 52 LA_{max} screening level set in the NpFI, based on the EIS predictions and consideration of existing noise limits and protection afforded to existing receivers. Glencore has provided a response to the recommended sleep disturbance conditions (see **Appendix F**).

Low Frequency Noise

366. The NPFI identifies low frequency noise as an annoying noise characteristic that may be experienced at receivers. The modelling predicts that low frequency noise from the Project would remain below the applicable thresholds at all receivers.

367. While the Department is satisfied that low frequency noise is unlikely to impact sensitive receivers, the Department has recommended noise conditions that include a requirement for Glencore to continue to manage low frequency noise through the NMP.

Construction Noise

368. The NIA includes consideration of construction noise impacts. While the Department generally considers that some of the activities included in the construction noise assessment should be considered as part of the operational noise assessment (e.g. MIA relocation, Yorks Creek realignment, heavy vehicle access road), the assessment indicates that the construction works are unlikely to be audible at the nearest sensitive receivers.

369. As such, the construction works associated with the Project are unlikely to result in any significant noise impacts.

Road Traffic Noise

370. The Project would not result in significant changes to operational traffic volumes relative to the existing Glendell mine, and as such the traffic noise levels would remain similar to the existing mine complex.

371. While there would be some increase in traffic during the peak construction period, the NIA indicates that the additional traffic noise at the nearest receivers in Camberwell would remain below the 2dB increase threshold in the *Road Noise Policy*. Noise increases of 2dB or less are unlikely to be discernible by most people.

372. The Department is satisfied that traffic noise associated with the Project is unlikely to result in any significant impacts, and can be managed in accordance with the NMP.

Rail Noise

373. Glencore proposes to continue transporting product coal from the Mount Owen CHPP within the current approved limit of 17 Mtpa. Therefore, rail noise would not change relative to currently approved operations, however it would continue for an additional 8 years beyond the currently approved timeframe.

374. The Department is satisfied that the rail noise impacts would not result in any significant additional impacts to receivers and could continue to be managed through the existing mitigation measures.

Conclusion

375. The Department is satisfied that the noise impacts of the Project would be similar to those of the existing mine, and can be managed to ensure compliance with applicable noise criteria at all privately-owned receivers, including under noise-enhancing meteorological conditions.

376. To ensure this occurs, the Department has recommended conditions requiring Glencore to:

- comply with contemporary operational noise limits;
- update and implement the mine complex's comprehensive Noise Management Plan, including real-time noise monitoring and an active management system which includes an early warning alert system to identify and manage potential exceedances;
- independently investigate noise complaints and undertake applicable management measures; and
- communicate mining operations with the community, including publicly reporting all monitoring results, and effectively responding to enquiries and complaints.

6.7 Water Resources

Introduction

377. Open cut coal mining has the potential to have significant impacts on both the groundwater and surface water environments of the wider locality. All mining operations have some level of impact on groundwater resources as the extraction of the coal seam leads to depressurisation and fracturing of the overlying strata, which can affect surrounding aquifers. Similarly, mining operations can lead to loss of surface water from overland flow and diversion of existing watercourses (i.e. Yorks Creek).
378. In addition to impacts on water quantity, mining can result in decreased quality of the surrounding groundwater and surface water resources through seepage of poor quality water into the groundwater systems and/or uncontrolled releases to the local watercourses.
379. The EIS includes a number of water resource assessments to assess the incremental and cumulative effects of the Project, including a:
- surface water assessment, undertaken by GHD;
 - groundwater assessment, undertaken by AGE;
 - peer review of the groundwater assessment, undertaken by Dr Noel Merrick of HydroAlgorithms;
 - geochemical assessment, undertaken by Environmental Geochemistry International;
 - Yorks Creek realignment conceptual engineering design drawings, prepared by Jacobs; and
 - Yorks Creek diversion constraints analysis, undertaken by Fluvial Systems.
380. The Department and DPE-Water are satisfied that the assessments have been prepared in accordance with applicable guidelines and standards, and are 'fit-for-purpose' to assess the water-related impacts of the Project.

Catchment Context

381. The site is located in the Bowmans Creek catchment, which flows south to join the Hunter River about 5 kilometres from the Project area.
382. The proposed mine extension has been designed to maintain an offset of at least 200 metres to the top of the bank of Bowmans Creek.
383. Two ephemeral tributaries of Bowmans Creek are located in the proposed extension area and would be directly affected by the Project (see **Figure 24**). These include Yorks Creek in the northern part of the extension area, and Swamp Creek in the southern part of the extension area, both of which drain in a south-west direction to Bowmans Creek.
384. Glencore proposes to realign a 2 km section of Yorks Creek to the western side of the extension area, including part of the creek that was previously realigned as part of the Ravensworth East Project. The realigned Yorks Creek would re-enter Bowmans Creek about 4 km upstream of the existing confluence (see **Figure 25**).

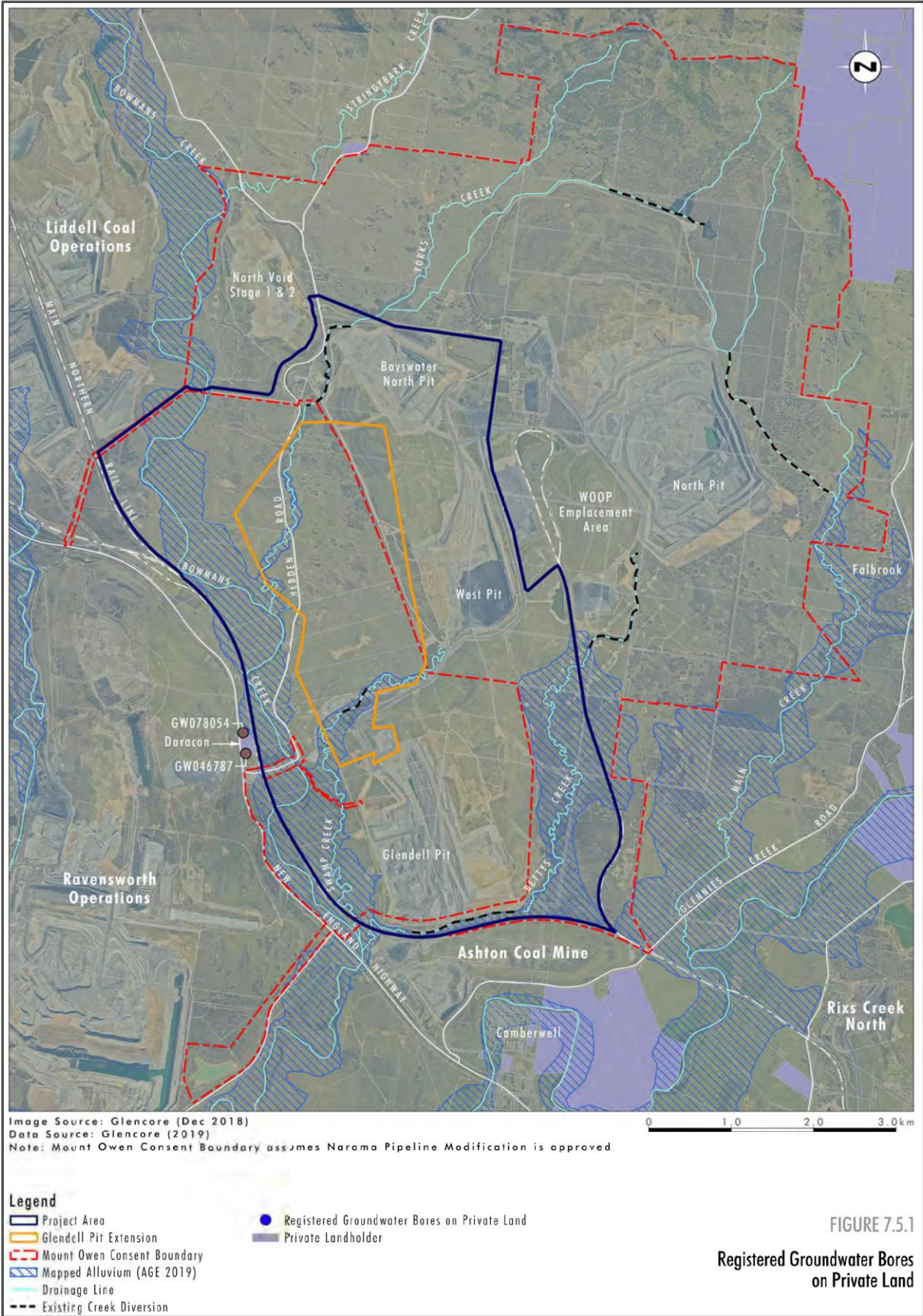


Figure 24 | Hydrology and Hydrogeology Context

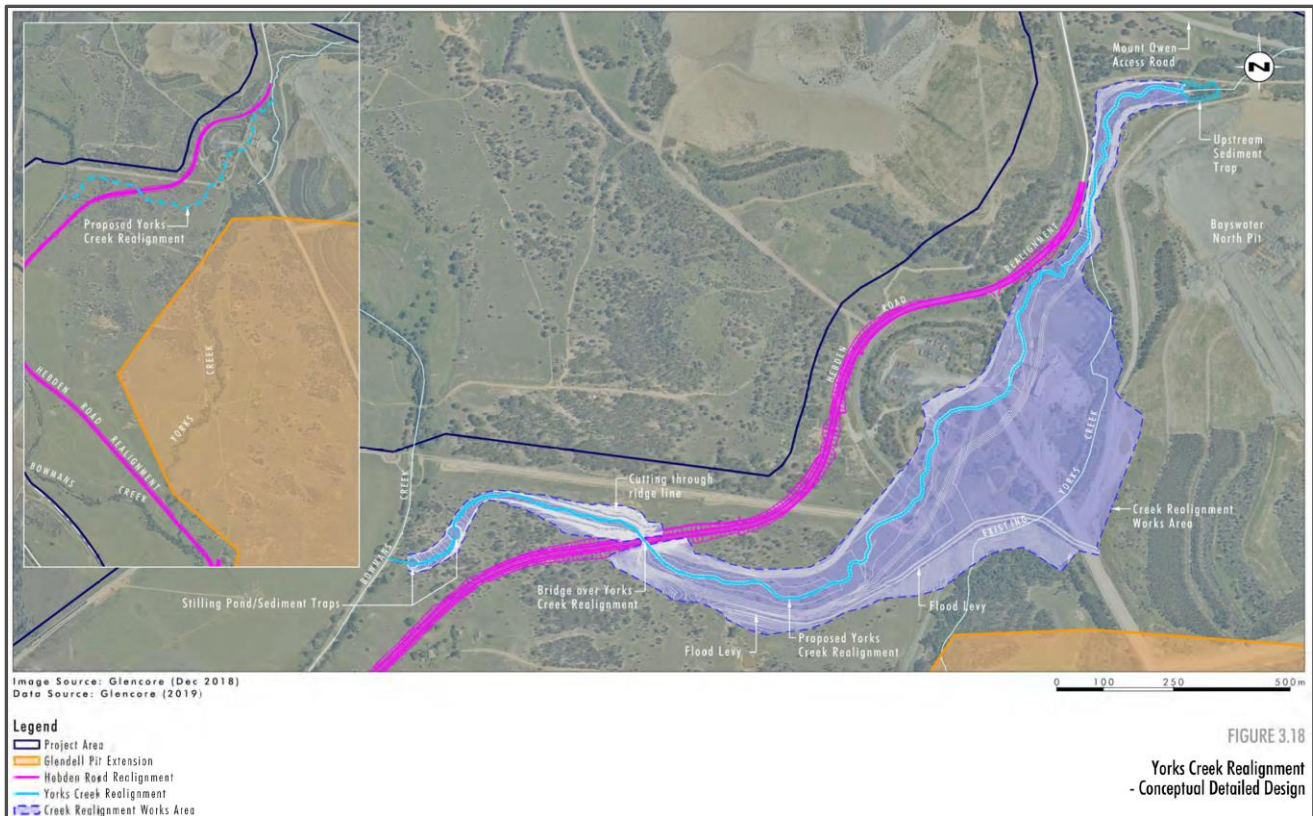


Figure 25 | Yorks Creek Realignment Concept Plan

385. The upper reaches of Swamp Creek would also be removed to facilitate the mine extension. The small section of the creek upstream of the extension area would be managed within the water management system for the wider Mount Owen Complex, with this area generally directed to Bettys Creek under the final landform drainage. As such, Swamp Creek is not proposed or required to be realigned for the Project.

386. The affected area of Swamp Creek also includes a section that has previously been realigned as part of the existing mining operations.

Groundwater Aquifer Context

387. There are two main aquifer systems in the vicinity of the Project area, including the:

- Quaternary Alluvium – a relatively thin aquifer along major creeks and rivers; and
- Permian Sediments – including weathered rock (regolith), interburden and the coal seams.

388. The alluvium is the more highly valued aquifer unit, containing fresh to brackish water, with parts of the Bowmans Creek alluvium classified as 'highly productive' under the *NSW Aquifer Interference Policy (AIP)*. The proposed pit extension would not directly impact the Bowmans Creek alluvium.

389. The alluvium associated with Yorks Creek and Swamp Creek that would be directly affected by the Project is relatively shallow and largely unsaturated, as it is located above the watertable. Groundwater in this alluvium is generally more saline, and is not classified as highly productive.

390. The Permian groundwater system is not considered a highly productive aquifer, with generally poor water quality (i.e. TDS ranging from 500 mg/L to 15,000 mg/L) and low yields that preclude beneficial use.

Water Management System and Water Balance

391. The Project would be integrated with Glencore's existing Mount Owen Complex Water Management System (WMS). Through the WMS, the Project would also link with Glencore's Greater Ravensworth Area Water and Tailings Scheme (GRAWTS), which enables transfer of water and tailings between a number of mines in the wider area including the Mount Owen Complex, Integra Underground, Liddell Coal Operations and Ravensworth Coal Operations.
392. The WMS includes a clean water diversion system, dirty water (sediment-laden) system, and mine water (water in contact with coal) system. The conceptual WMS at Year 18 of the Project is shown on **Figure 26**.
393. Water balance modelling indicates that the Project is not expected to have any significant impact on the overall water balance for the Mount Owen Complex.
394. No discharge of dirty water or mine water would be required from the Glendell operations, with water from all events captured and used as part of the GRAWTS.
395. Up to 412 ML/year of clean water may be required to be extracted from Glennies Creek to supplement supply. This water is well within Glencore's existing high security water licence entitlements for the Mount Owen Complex (see below).
396. Salt balance modelling indicates that the Project would not increase average salinity across the Mount Owen Complex.

Surface Water Impacts

397. As outlined above, the Project would directly impact parts of Yorks Creek and Swamp Creek.
398. Glencore has prepared detailed concept plans for the Yorks Creek realignment, with the realignment designed to meet the following key objectives:
 - minimise erosion risk;
 - maintain hydrological integrity;
 - maintain pre-existing sediment transport; and
 - provide equivalent habitat value.
399. As shown on **Figure 24**, a number of creeks have been realigned in the locality in the past, including portions of the affected parts of Yorks Creek and Swamp Creek.
400. The Department and DPE-Water are satisfied that the realignment of the creek (and its associated riparian area) can be undertaken in a manner that would ensure the long-term integrity of the creek, subject to implementation of best practice design, management and monitoring measures. To ensure this occurs, the Department has recommended conditions requiring Glencore to:
 - achieve a number of performance objectives for the creek diversion aimed at ensuring the long term stability and environmental sustainability of the creek system;
 - design the realignment to the satisfaction of DPE-Water and the Department, including provision of detailed design, construction and engineering specifications, and demonstration that the design would achieve relevant performance objectives;

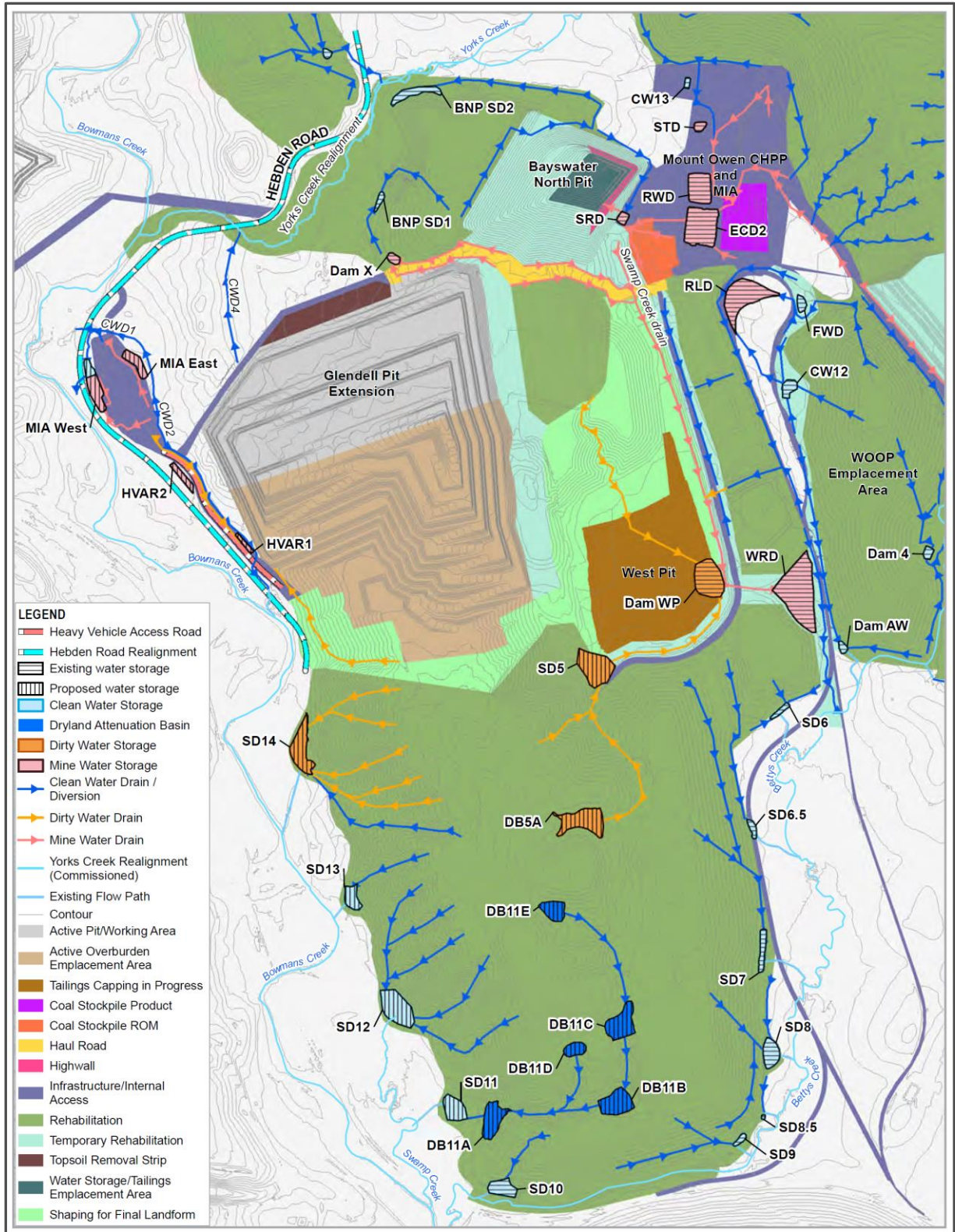


Figure 26 | Water Management System (Year 18)

- undertake the realignment works before the advancing mining operations (i.e. at least 12 months prior to disturbing the creek), to allow adequate time for performance monitoring and remediation (if necessary);
 - certify that the realignment has been designed and constructed to the approved standards; and
 - prepare and implement a comprehensive Yorks Creek Diversion Management Plan, which amongst other things includes detailed monitoring and maintenance procedures for the creek diversion.
401. The Project also has the potential to result in indirect impacts on surrounding creeks, through changes to stream flow, baseflow (groundwater contribution to stream flow) and surface water quality.
402. The assessments indicate that while the Project would result in some changes to the catchment areas for surrounding creeks during and after the Project, this is not predicted to result in any significant change to flows in Bowmans Creek, Glennies Creek or the Hunter River, and no significant impacts on the ephemeral creeks that feed into these creeks.
403. Baseflow reduction in Bowmans Creek is predicted to peak at 21 ML/year cumulatively, of which 2.5 ML/year is attributed to the Project. This baseflow reduction is not expected to result in a measurable change to overall flows in Bowmans Creek, Glennies Creek or the Hunter River. Surface water quality in these creeks is also not predicted to be significantly affected by the Project.
404. There are no privately-owned properties along Bowmans Creek downstream of the Project area that would be impacted by changes to flows.
405. The Department and DPE-Water are satisfied that the surface water impacts of the Project can be appropriately managed, subject to standard best practice conditions.

Flooding

406. The Yorks Creek realignment would include a flood levee to exclude floodwaters from entering the pit extension (see **Figure 25**). The levee has been designed to exclude all floodwaters up to the 0.1% AEP (1 in 1,000 year event).
407. Floodwaters would overtop the levee (and from Bowmans Creek) in the Probable Maximum Flood (PMF) event. Glencore's flood modelling indicates that any such floodwaters entering the pit would remain well below the spill level of the pit (by at least 100 metres), and is seen as a positive in it would supplement the pit with freshwater.
408. The flood modelling indicates that the realigned Yorks Creek would slightly increase flood depths and velocities in the section of Bowmans Creek between the proposed and existing confluences with Yorks Creek, but the changes are predicted to be minor (i.e. increased velocity of approximately 0.1 m/s), and are not expected to result in any significant impact on privately-owned land or the stability of the creek.
409. No significant flood-related impacts are predicted for other creeks, including Betty's Creek which would have an expanded catchment as a result of the landform changes resulting from the Project.

Groundwater Impacts

410. Groundwater modelling for the Project was based on the existing Greater Ravensworth Area Groundwater Model, which includes a number of mines in the surrounding area including Mount Owen, Integra Underground, Rix's Creek North, Liddell, Ravensworth, Ashton and Hunter Valley Operations, and includes detailed modelling of both historical mining and approved mining which is yet to be commenced.
411. The modelling found that drawdown from the Project would extend to about 2 to 2.5 kilometres from the pit extension, although this area is already affected by existing mining operations.
412. Inflows into the pit from the Permian coal measures would average 111 ML/year over the life of the Project, peaking in Year 17 at 249 ML/year.
413. The Project would not directly impact the alluvial aquifer, apart from where mining removes Swamp Creek and Yorks Creek. Very low seepage is expected in these areas due to the limited saturated thickness of the alluvium in these areas, which are above the water table.
414. The Project would result in some indirect impacts to the Bowmans Creek alluvium through drawdown, although this is predicted to be restricted to a number of localised areas, with drawdown generally less than 1 metre.
415. Two privately-owned registered bores are located on Bowmans Creek in the vicinity of the Project area (both of which are owned by industrial company Daracon). The cumulative drawdown on these bores is predicted to be less than 0.5 metres, with the Project's contribution less than 0.2 metres. This is well within the minimal harm threshold of 2 metres under the AIP. No other privately-owned bores are located in the affectation area.
416. As indicated in the table, predicted groundwater take from all water sources is only a small component of the total entitlements in each source. The Department and DPE-Water are satisfied that the Project is unlikely to have any significant impact on these water sources, and that there is adequate depth in the water market for Glencore to obtain the required licences, or to satisfy the requirements through its existing entitlements.
417. In this regard, Glencore already has an entitlement of 1,160 ML/year for the most affected water source (the North Coast Fractured and Porous Rock water source), which is predicted to satisfy the cumulative water take of the Mount Owen complex and the Project.
418. The Department has recommended conditions requiring Glencore to obtain the necessary water licences for the Project, prior to the commencement of mining operations.

Groundwater Licencing

419. A summary of the peak water take from the applicable water sources is provided in **Table 7**.

Table 7 | Peak Water Take and Licence Requirements

Water Sharing Plan (WSP)	Water Source / Management Zone	Type	Total Units (ML/year at 1 ML/unit)	Peak Water Take from Approved Glendell Operations and Project (ML/year)	
				During Project	Post Closure
North Coast Fractured and Porous Rock WSP	Sydney Basin North Coast (Permian)	Permian Aquifer	63,375.5	249	<249
Hunter Unregulated WSP	Jerrys	Alluvial Aquifer	1,246	10	4
		River	2,097	177	57
	Glennies	Alluvial Aquifer	10	0	1
		River	446	0	0
	Hunter	Alluvial Aquifer	24,118	1	13
Hunter Regulated WSP	Management Zone 3a	River	150,284	0 ¹	14

¹ Plus the 412 ML/year to supplement the water supply. As outlined above, this would be sourced from existing entitlements for the Mount Owen Complex.

Final Void

420. As with the existing mine, the final void would act as a long-term groundwater sink. The final void would be larger and deeper than the existing approved void, but has been designed to minimise the contributing catchment area, and would have similar characteristics in terms of long-term groundwater quality, as shown in the following table (see **Table 8**).

421. Glencore considered the option of filling the final void, however its analysis found that this would not be reasonable or feasible, as it would:

- require re-disturbance of around 255 Mbcm and 355 hectares of existing rehabilitated land;
- continue the operations for approximately 12 years with a mining fleet of comparable size to the existing mine;
- extend noise and air quality impacts during this time;
- delay rehabilitation and final land use; and
- cost approximately \$1.6 billion from the end of mining until the void is filled.

422. The Department accepts that complete backfilling of the void is not reasonable and feasible. Nevertheless, the Department has recommended conditions requiring Glencore to minimise the size and catchment of the final void as far as practicable, and to minimise any ongoing environmental impacts.

Table 8 | Final Void Details

Aspect	Approved Final Void	Proposed Final Void
Final void catchment (ha)	339	321
Completion of mining	2,025	2,045
Maximum available storage (GL)	50	250
Equilibrium water level (m AHD)	29	-60
Freeboard at equilibrium water level (m)	41	140
Time to reach equilibrium water level (years)	450	450
TDS of void water at equilibrium water level (mg/L)	5,700	6,500

Conclusion

423. The Department, DPE-Water and other agencies are satisfied that the Project can be managed such that it would not result in a significant impact to its surface water and groundwater resources, subject to implementation of best practice mitigation measures including the early and best practice diversion of Yorks Creek.

424. To ensure that these measures are implemented appropriately, and to minimise impacts to water resources and water users, the Department has recommended conditions requiring Glencore to:

- ensure that it has sufficient water for all stages of the Project, and if necessary, adjust the scale of mining operations on site to match its available water supply;
- ensure that all necessary water licences are obtained to account for any water take from mining activities, including post-mining;
- not discharge any mine water from the Glendell mine, noting that water could be transferred via the GRAWTS and discharged at Liddell or Ravensworth operations in accordance with relevant licenses for those sites;
- provide compensatory water supplies to any private landowner whose water supply is adversely affected by the Project (although it is predicted that this is unlikely to occur);
- comply with a range of water management performance objectives and rehabilitation objectives;
- design and construct the Yorks Creek diversion to agreed best practice standards;
- prepare and implement a comprehensive Yorks Creek Diversion Management Plan; and
- prepare and implement a comprehensive Water Management Plan for the Project, including a:
 - water balance;
 - surface water management plan and monitoring program;
 - ground water management plan and monitoring program;
 - program to regularly (every 3 years) validate the water balance and groundwater model; and
 - protocol for minimising cumulative water-related impacts.

6.8 Biodiversity

Introduction

425. Extensions to coal mining operations almost always require the clearing of native vegetation in order to access the proposed operational footprint. This Project is no exception, with the requirement to clear approximately 750 ha of additional land. This includes the clearance of native vegetation and associated impacts to biodiversity, including the potential for impacts to threatened flora and fauna species and communities.
426. The EIS includes a Biodiversity Development Assessment Report (BDAR), prepared by Umwelt in accordance with the *Biodiversity Conservation Act 2016* (BC Act), *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Biodiversity Assessment Method* (BAM) and the *NSW Biodiversity Offsets Scheme*.
427. BCD initially raised some issues regarding the assessment of biodiversity impacts and requested further information regarding the BDAR. Glencore provided a response to BCD's requests in the RTS and additional information (see **Appendices C** and **F**). BCD subsequently confirmed that its comments on biodiversity issues have been adequately addressed.
428. The Department and BCD are both satisfied that the BDAR has been prepared in accordance with relevant guidelines and policies, and is adequate for assessing the biodiversity impacts and offsetting requirements for the Project.

Existing Environment

429. Much of the land in the vicinity of the Project area has been historically cleared of native vegetation, primarily for agricultural and mining land uses. The Project area predominantly comprises regrowth vegetation, with the exception of some small patches of older remnant Eucalyptus and Angophora trees.
430. Umwelt's surveys identified five Plant Community Types (PCTs) in the proposed disturbance area (see **Figure 27**), which are in varying condition. These vegetation communities were identified as conforming to a range of listed Threatened Ecological Communities (TECs), including two TECs listed under the BC Act and one TEC listed under the EPBC Act as follows (see **Figure 28**):
- Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions Endangered Ecological Community (EEC) (BC Act);
 - Central Hunter Ironbark – Spotted Gum – Grey Gum Forest in the NSW North Coast and Sydney Basin Bioregion EEC (BC Act); and
 - Central Hunter Valley Eucalypt Forest and Woodland Grassland Critically Endangered Ecological Community (CEEC) (EPBC Act).
431. Targeted fauna surveys identified 10 ecosystem-credit species in the Project area, comprising Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Speckled Warbler (*Chthonicola sagittate*), Spotted Harrier (*Circus assimilis*), Spotted-tailed Quoll (*Dasyurus maculatus*), White-bellied Sea-eagle (*Haliaeetus leucogaster*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Scarlet Robin (*Petroica boodang*), Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) and Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*).

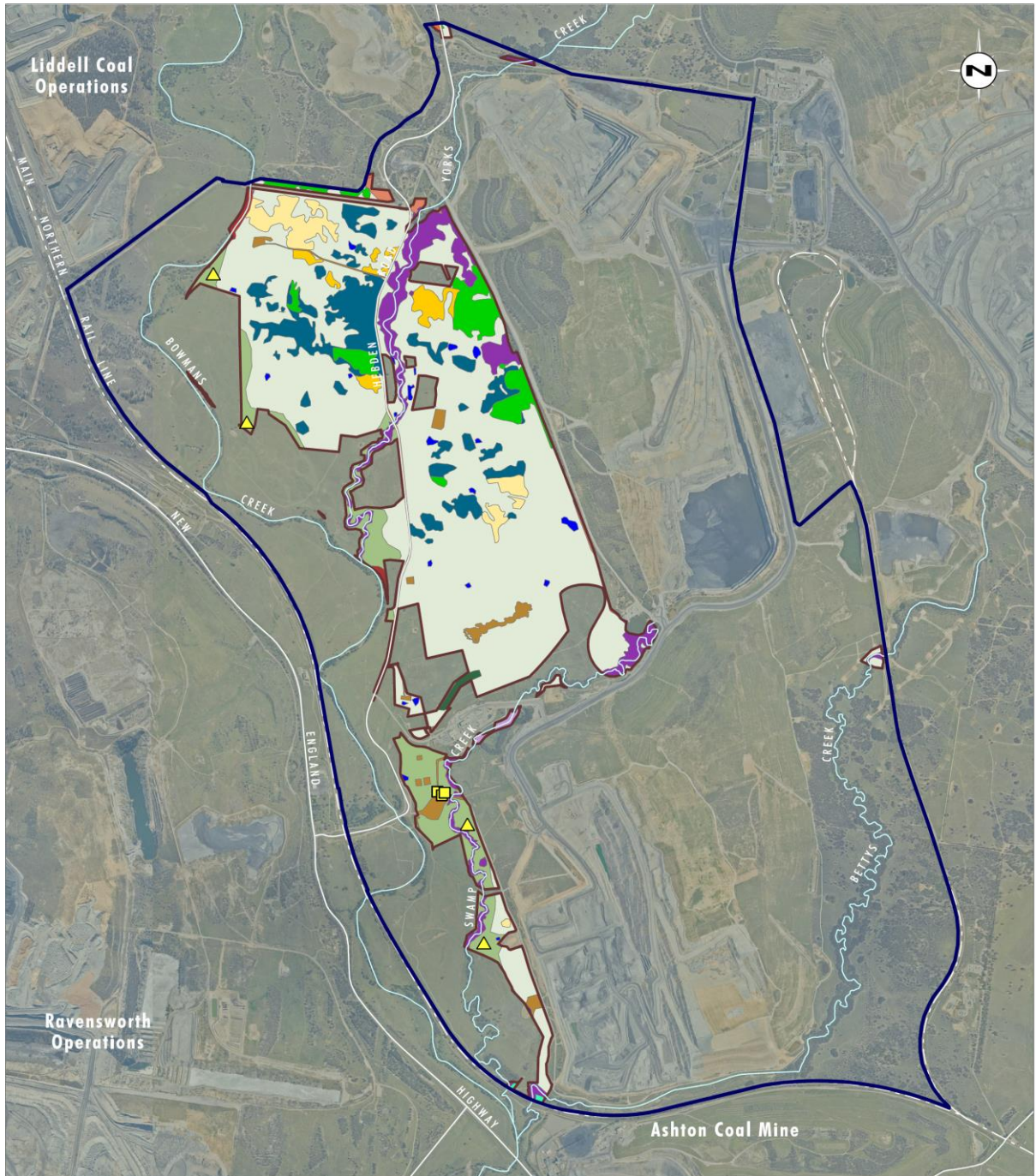


Image Source: Glencore (Dec 2018), Data Source: Glencore (2019), Umwelt (2020)

0 0.5 1.0 2.0 km
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Legend

- Project Area
- Biodiversity Assessment Area (Development Footprint)
- ▲ Additional Floristic Plots
- Additional Rapid Floristic Sampling Point
- 485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley - Moderate to Good Condition
- 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter - Moderate to Good Condition
- 1603 - Plantation
- 1603 - Regeneration
- 1603 - Derived Native Grassland
- 1603 - Modified Derived Native Grassland
- 1603 - Exotic Grassland
- 1604 - Narrow-Leaved Ironbark - Grey Box - Spotted Gum Shrub - Grass Woodland of the Central And Lower Hunter - Woody Rehab
- 1604 - Derived Native Grassland
- 1604 - Exotic Grassland Rehab
- 1692 - Bull Oak Grassy Woodland of the Central Hunter Valley - Moderate to Good Condition
- 1692 - Regeneration
- 1731 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley - Moderate to Good Condition
- 1731 - Plantation
- Dam
- Disturbed Land

FIGURE 4.6

Revised Vegetation Community Map

Figure 27 | Plant Community Types in the Project Area

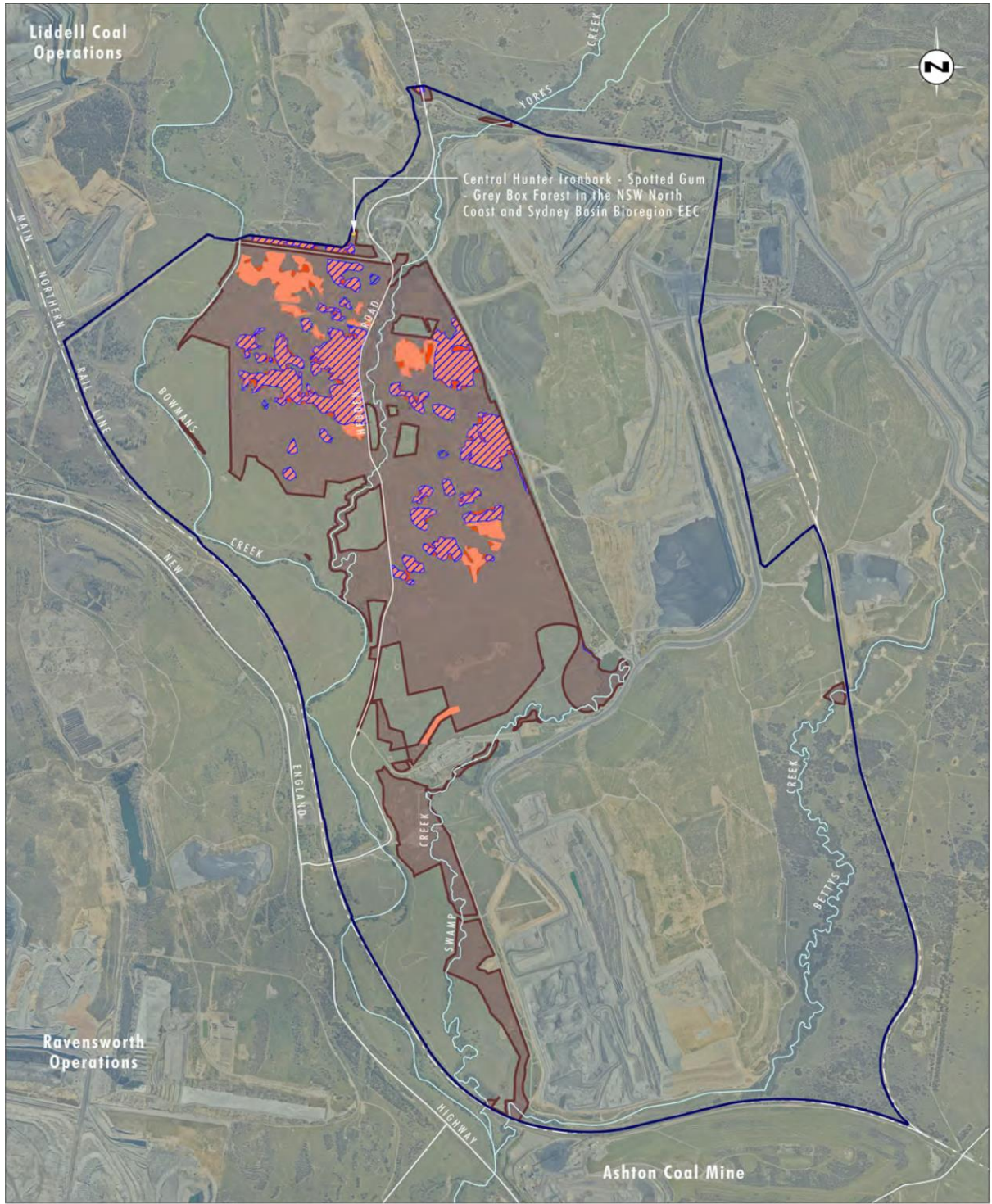


Image Source: Glencore (Dec 2018)
 Data Source: Glencore (2019), Umwelt (2019)

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Legend

- Project Area
- Biodiversity Assessment Area (Development Footprint)
- EPBC Act:
- Central Hunter Valley Eucalypt Forest and Woodland CEEC
- Central Hunter Valley Eucalypt Forest and Woodland CEEC - Derived Native Grassland
- BC Act:
- Central Hunter Grey Box Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions EEC
- Central Hunter Ironbark - Spotted Gum - Grey Box Forest in the NSW North Coast and Sydney Basin Bioregion EEC

FIGURE 7.6.4

EPBC and BC Act Listed Threatened Ecological Communities in the Development Footprint

Figure 28 | Threatened Ecological Communities in the Project Area

432. Umwelt also identified four species credit species within the Project area, including a single Tiger Orchid (*Cymbidium canaliculatum*), the Southern Myotis (*Myotis macropus*), the Brush-tailed Phascogale (*Phascogale tapoatafa*) and the Eastern Cave Bat (*Vespadelus troughtoni*) (see **Figure 29**).
433. In addition, 13 individual *Acacia pendula* were recorded during flora surveys in the planted zone of PCT 1603 (see **Figure 27**). In the RTS, Umwelt confirmed that while these plants likely classify as part of the *Endangered Population of Acacia pendula in the Hunter Catchment*, they do not generate species credits under the BAM as they were not planted as part of a Threatened Species Recovery Project.
434. Notwithstanding, the proposed clearing of these individuals would be compensated for through the requirement to provide ecosystem credits for impacts to PCT 1603 (plantation). The BCD and the Department agree with this approach.
435. No threatened flora or fauna species listed under the EPBC Act were recorded despite targeted surveys.
436. Detailed aquatic habitat assessments were undertaken along Bowmans Creek, Swamp Creek, Yorks Creek and Bettys Creek. All four creeks were found to be predominantly dry during the survey period, however pool and run habitats were common in Bowmans Creek and Swamp Creek.
437. All of the creeks are classified as having “minimal key fish habitat” with the exception of Bowmans Creek which is classed as having “moderate” fish habitat.
438. Targeted aquatic habitat assessments and qualitative sampling did not identify any threatened aquatic flora or fauna species listed under either the *Fisheries Management Act 1994* or the EPBC Act.

Avoidance and Mitigation Measures

439. Glencore’s mine plan seeks to maximise the use of existing disturbed areas, and avoid higher quality remnant woodland and aquatic habitat (including Bowman Creek). This has led to refinements to the Project, including the proposed diversion of Hebden Road and Yorks Creek.
440. As a result, the majority of the Project area (approximately 75%) comprises heavily modified vegetation in the form of derived native grasslands (DNG), exotic grasslands and existing disturbed areas.
441. The Department is satisfied that Glencore has taken reasonable and feasible measures to avoid impacts to biodiversity, where practical, given the location of the coal resource.
442. Glencore has also committed to implementing a range of mitigation measures to minimise the residual biodiversity impacts of the Project, including:
- salvage of biodiversity features, including habitat resources (e.g. hollow logs, tree hollows, fallen timber and rocks/boulders) and material for rehabilitation (e.g. seed collection, and topsoil);
 - comprehensive vegetation and habitat clearing protocols;
 - weed and feral animal control;
 - fencing and access restrictions;
 - bushfire management;

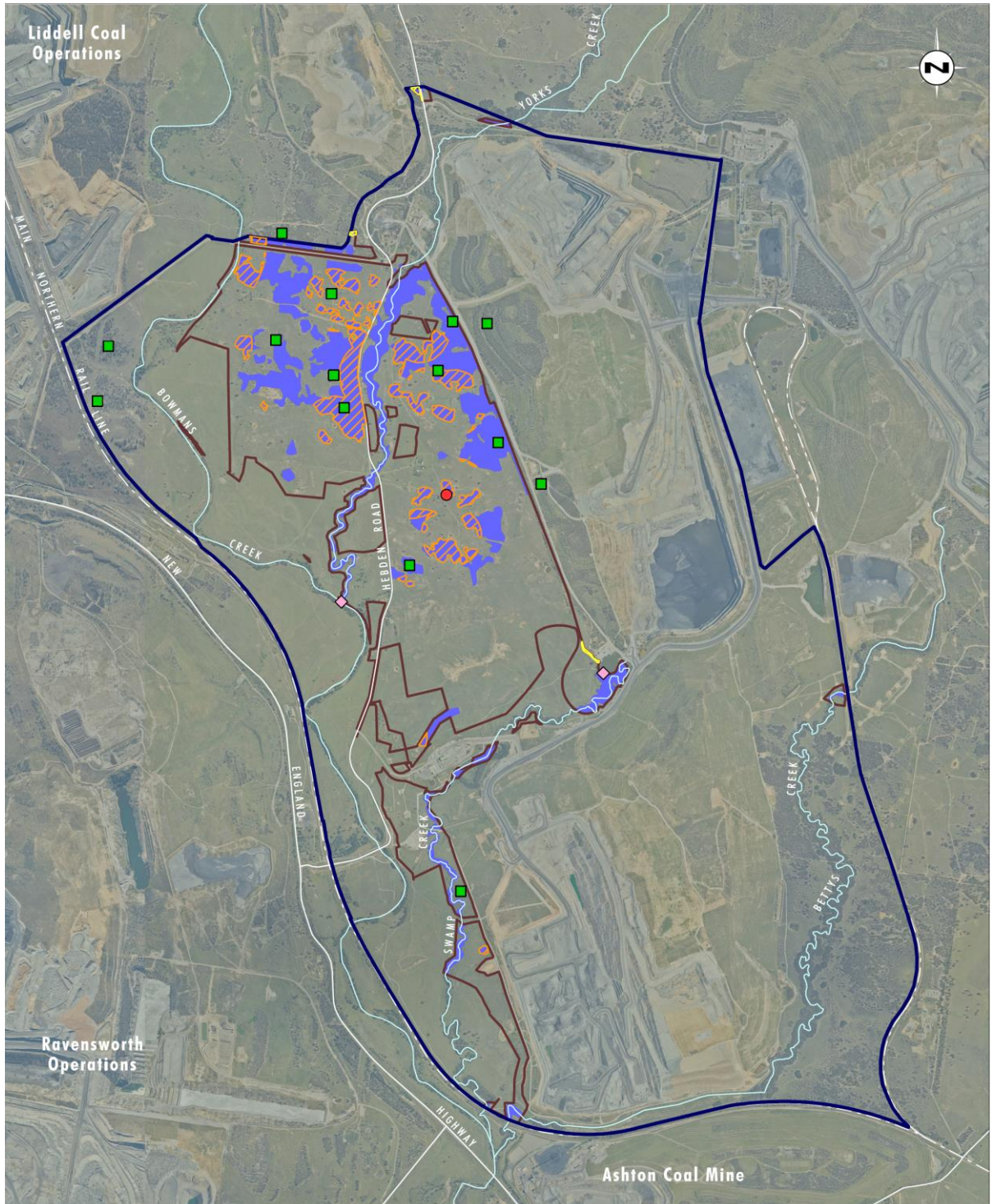


Image Source: Glencore (Dec 2018)
 Data Source: Glencore (2019), Umwelt (2019)

0 0.5 1.0 2.0 km

Legend

- Project Area
- Biodiversity Assessment Area (Development Footprint)
- Tiger Orchid Species Polygon
- Brush-tailed Phascogale
- Brush-tailed Phascogale Suitable Habitat
- ◇ Southern Myotis
- Southern Myotis Suitable Habitat
- Eastern Cave Bat Suitable Habitat

FIGURE 4.7

Species-credit Flora/Fauna
 Species Locations

Figure 29 | Species Credit Species Identified in the Project Area

- riparian zone management;
- dust, noise, lighting, blasting and erosion and sediment controls;
- workforce education and training; and
- progressive rehabilitation and landform establishment.

443. Many of these mitigation measures are already described in the mine’s existing approved Biodiversity Management Plan, and Glencore has committed to revising and updating this plan to reflect the Project.

Predicted Biodiversity Impacts

444. The Project would clear a total of 590⁷ ha of native vegetation, consisting of 154.5 ha of woodland or open forest, 435.5 ha of derived native grassland and 1 ha of exotic grassland.

445. **Table 9** summarises the direct biodiversity impacts of the Project on vegetation communities and the biodiversity credits required to compensate for this loss. **Table 10** summarises the impacts on threatened ecological communities.

446. In addition to these direct biodiversity impacts, the Project is also likely to result in minor indirect impacts associated with habitat connectivity, fugitive light emissions, dust, noise, blasting, groundwater changes, weeds and feral animals. These indirect impacts would be similar to those currently experienced at the Glendell mine and could be appropriately managed and minimised through the continued imposition of existing mitigation measures described in the management plans for the site.

Table 9 | Direct Biodiversity Impacts and Associated Biodiversity Credit Requirements

Ecological Feature	Area of Impact (ha)	Number of Impact Credits Generated
<i>Ecosystem Credits</i>		
485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley <i>Moderate to Good Condition</i>	2.4	43
1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter <i>Moderate to Good Condition</i> ^{#^}	26.7	502
1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter <i>Regeneration / Derived Native Grassland</i> ^{#^}	53.1	4,363
1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter <i>Plantation</i> ^{#^}	1.8	33

⁷ Includes 49.5 ha of PCT 1603 - Narrow-leaved Ironbark - Bull Oak – Grey Box shrub - grass open forest of the central and lower Hunter (modified derived native grassland) originally mapped as ‘exotic vegetation’ and reclassified as part of Glencore’s RTS in response to advice from BCD.

Ecological Feature	Area of Impact (ha)	Number of Impact Credits Generated
1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter <i>Modified derived native grassland</i> ⁻	49.5	404
1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter <i>Exotic</i> ⁻	1.0	0
1692 - Bull Oak Grassy Woodland of the Central Hunter Valley <i>Moderate to Good Condition</i> [^]	18.0	207
1692 - Bull Oak Grassy Woodland of the Central Hunter Valley <i>Regeneration</i>	10.2	115
1604 - Narrow-Leaved Ironbark - Grey Box - Spotted Gum Shrub – Grass Woodland of the Central and Lower Hunter <i>Woodland Rehabilitation</i> ^{*^}	0.5	11
1731 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley <i>Moderate to Good Condition</i>	40.0	679
1731 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley <i>Plantation</i>	1.8	28
TOTAL	591	6,385
<i>Species-credit Species</i>		
Tiger Orchid (<i>Cymbidium canaliculatum</i>)	1 individual	2
Southern myotis (<i>Myotis macropus</i>)	46.6	732
Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>)	152.1	2,559
Eastern Cave Bat (<i>Vespadelus troughtoni</i>)	0.5	17

Portions of this PCT conform to *Central Hunter Grey Box - Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions* EEC (BC Act).

* Portions of this PCT conform to *Central Hunter Ironbark - Spotted Gum - Grey Box Forest in NSW North Coast and Sydney Basin Bioregion* EEC (BC Act).

[^] Portions of this PCT conform to *Central Hunter Eucalypt Forest and Woodland* CEEC (EPBC Act).

⁻ Originally mapped as 'exotic vegetation' and reclassified as part of Glencore's RTS in response to advice from BCD.

Table 10 | Direct Impacts to Threatened Ecological Communities

Threatened Ecological Community	Area of Impact (ha)
<i>BC Act</i>	
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions (Endangered)	81.6
Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregion (Endangered)	0.3
<i>EPBC Act</i>	
Central Hunter Valley Eucalypt Forest and Woodland (Critically Endangered)	122.9

Aquatic Biodiversity

447. The Project would mine through and remove existing aquatic habitat in Yorks Creek and Swamp Creek, however aquatic habitat within Yorks Creek would be replaced through the proposed Yorks Creek Diversion (see **Section 6.7**). Given the ephemeral nature of both creeks, Umwelt concluded that aquatic habitat along these creeks is typically temporary and the direct removal of these habitats is not considered to result in a significant impact to aquatic biodiversity.
448. As part of the realignment of Hebden Road, Glencore proposes to construct a bridge over the realigned section of Yorks Creek. Glencore has committed to ensure that the design of the crossing would provide for the retention of natural functions and maintenance of fish passage in accordance with relevant guidelines⁸.
449. The IESC noted that the design of the Yorks Creek realignment presents challenges with recreating existing aquatic habitats, and recommended that monitoring of aquatic biota and riparian vegetation be undertaken along the diversion and in suitable reference sites.
450. Glencore considers that re-creation of equivalent aquatic habitats within the realigned section of Yorks Creek is readily achievable given that the existing Yorks Creek alignment has limited floodplain terraces or refugial pools. The conceptual design for the realignment includes the use of woody debris in the channel (where practicable) and the creation of riffle areas and ponds to create instream habitat values when the creek is flowing.
451. Glencore has committed to preparing a monitoring program as part of the detailed design for the proposed realignment, and updating the Mount Owen Complex Surface Water Management and Monitoring Program to reflect the Project and realignment, including flow monitoring within the realigned creek.
452. Given that no measurable change to the water quality or flow in surface water systems is predicted as a result of the Project (see **Section 6.7**), no significant impacts to aquatic ecosystems, including those potentially reliant on groundwater, are expected to occur.
453. Overall, the Department considers that the impacts of the Project on aquatic biodiversity are unlikely to be significant and can be adequately managed. The Department has recommended conditions requiring Glencore to prepare and implement a detailed Yorks Creek Realignment Plan, including provisions for construction and monitoring of aquatic habitat.

Groundwater Dependiant Ecosystems

454. Groundwater dependent ecosystems (GDEs) are ecosystems which require access to groundwater (beyond soil-based groundwater from rainfall) to meet all or some of their water requirements. The EIS includes an Ecohydrological Assessment prepared by Umwelt which assessed potential impacts on GDEs.
455. The assessment identified five plant community types (PCTs) in the Project area that have the potential to be at least partially dependent on groundwater, including:
- PCT 485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley (highly groundwater dependent);
 - PCT 1731 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley (moderately groundwater dependent);
 - PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box Shrub - Grass Open Forest of the Central and Lower Hunter (low likelihood of dependence);
 - PCT 1692 - Bull Oak Grassy Woodland of the Central Hunter Valley (low likelihood of dependence); and
 - PCT 1604 - Narrow-Leaved Ironbark - Grey Box - Spotted Gum Shrub – Grass Woodland of the Central and Lower Hunter (low likelihood of dependence).
456. The Project would directly impact approximately 154.5 ha of potential GDEs through clearing for mining operations, although only a small proportion of this vegetation (around 44.2 ha) is considered to have a moderate or high likelihood of groundwater dependence. This 44.2 ha of vegetation comprises 2.4 ha of PCT 485 and 41.8 ha of PCT 1731.
457. The clearing of these GDE vegetation types has been appropriately captured in the predicted impacts shown in **Table 9**, and factored into the proposed biodiversity offsets for the Project.
458. The Project's indirect impacts on GDEs (through groundwater drawdown) are limited to a small area of PCT 485 along Bowmans Creek to the west of the mining area, as well as a small area of PCT 1731 located along the lower reaches of Yorks Creek.
459. Predicted drawdown in the water table in this area (both cumulatively and attributable to the Project) would not result in desaturation of the alluvium, and is within the natural variability in the water table.
460. As such, the Project is not expected to significantly affect these GDEs.
461. In its advice, the IESC commented that potential cumulative drawdown beneath terrestrial GDEs immediately north of the Project area should be investigated to determine the Project's contribution.
462. Glencore's response confirmed that drawdown in this area is associated with the Hunter Thrust, mining in the Bayswater North Pit and historical mining at Ravensworth East. Modelling indicates that the Project would have little to no impact on the water table in this area.
463. The Department is satisfied that the Ecohydrological Assessment and groundwater assessments indicate that the Project is unlikely to result in significant indirect impacts to GDEs in the locality, and that the direct impacts can be appropriately compensated through biodiversity offsetting. The Department has recommended conditions requiring offsetting in accordance with the BC Act, as well as conditions requiring Glencore to protect and monitor GDEs outside the disturbance area.

Stygofauna

464. The EIS includes a Stygofauna Assessment, prepared by Eco Logical, that assesses the potential presence and risk of impact to stygofauna (subterranean fauna) in the vicinity of the Project area.
465. Five stygofauna taxa were identified within the alluvial aquifers. No stygofauna were identified from the shallow hard rock aquifers, interburden, or the coal seam aquifer.
466. All taxa recorded during the surveys have a broad distribution in the Hunter Valley and are widespread along the Hunter River, Dart Brook, Kingdon Ponds and Pages River alluvial aquifers.
467. While groundwater modelling indicates that there would be some drawdown in the alluvial aquifers (see **Section 6.7**), this is predicted to be similar to existing mining operations and natural variation in the locality, and is not expected to result in any significant impacts on stygofauna in the region.
468. The Department accepts that the Project is unlikely to adversely impact stygofauna communities. In its advice on the EIS, the IESC also confirmed that it “*considers that this [regional stygofauna] community and the potential impact of the project has been adequately described and assessed*”.
469. Nonetheless, the Department has recommended conditions requiring Glencore to monitor impacts on local stygofauna, as part of its Water Management Plan.

Impacts on Matters of National Environmental Significance (MNES)

470. The EIS includes an Assessment of Commonwealth Matters (ACM), prepared by Umwelt, that considers the Project’s impacts on the relevant MNES (as identified in **Section 4.9**). The ACM confirms that the information contained in the BDAR in relation to biodiversity surveys, quantification and mapping of habitat, impact descriptions and avoidance and mitigation measures, have been undertaken in accordance with the DAWE’s assessment requirements relating to biodiversity.
471. The Department has reviewed the Project’s impacts on MNES, in consultation with BCD and in accordance with the requirements of the Bilateral Agreement between the NSW and Commonwealth Governments. The conclusions of this assessment are provided in **Appendix H**, and a summary of the direct impacts of the Project on MNES is provided in **Table 11**.
472. It is noted that the Bilateral Agreement endorses the BAM and NSW Biodiversity Offsets Scheme, including the Biodiversity Conservation Fund (BCF). As such, the impacts of the Project on MNES are able to offset as part of the NSW offsets scheme.

Biodiversity Offset Strategy

473. The Department is satisfied that the Project’s biodiversity impacts are able to be appropriately offset by requiring Glencore to obtain and retire the required ecosystem and species credits in accordance with the BAM and the Biodiversity Offsets Scheme. The applicable credit requirements for the Project are outlined in **Table 9** above and further broken down in **Appendix H**.

Table 11 | Direct Impacts on MNES

EPBC Act Species / Community	Direct Impact Area (ha)	Credits Required [^]
Central Hunter Valley Eucalypt Forest and Woodland ecological community	122.9	1,810
Regent Honeyeater (<i>Anthochaera Phrygia</i>)	81.3	1,369
Swift Parrot (<i>Lathamus discolor</i>)	81.3	1,369
Green and Golden Bell Frog (<i>Litoria aurea</i>)	2.0	0
Spotted-tailed Quoll (<i>Dasyurus maculatus maculatus</i>)	154.5	2,445
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	154.5	2,445
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	83.9	1,410
New Holland Mouse (<i>Pseudomys novaehollandiae</i>)	4.1	72
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	154.5	2,445
Trailing Woodruff (<i>Asperula asthenes</i>)	0*	0

* Determined not to occur in the Project area. The nearest record is more than 50 km away from the Project area and the species was not recorded by targeted surveys (see **Appendix A**).

[^] A breakdown of the relevant PCTs which provide habitat for each species and community (including the associated credit requirements) is provided in **Appendix H**.

474. Glencore is seeking flexibility to retire the credits using one or a combination of mechanisms available under the Biodiversity Offsets Scheme. This could include the establishment of a Biodiversity Stewardship Site, purchasing the credits from the market, making a payment into the Biodiversity Credit Fund or mine site ecological rehabilitation. The Department understands that the necessary retirement of credits is likely to involve land-based offsets, either through securing land or purchasing credits on nearby properties.
475. The Department accepts that the offsets may be procured via various approved mechanisms, and has recommended conditions requiring Glencore to obtain and retire the credits, prior to undertaking mining operations in the expansion area.

Conclusion

476. Subject to the implementation of the recommended conditions, the Department is satisfied that the Project would avoid, minimise and mitigate impacts on threatened species and communities, including MNES, to the greatest extent practicable. The Department is also satisfied that the residual biodiversity impacts of the Project can be appropriately offset in accordance with the Biodiversity Offsets Scheme. As such, the Department considers that the predicted impacts to MNES are acceptable.

477. To this end, the Department has recommended conditions requiring Glencore to:
- offset the biodiversity impacts of the Project by obtaining and retiring the necessary ecosystem and species credits, prior to undertaking mining operations in the expansion area;
 - prepare and implement a detailed Yorks Creek Realignment Plan, including provisions for creation and monitoring of aquatic habitat;
 - prepare and implement a comprehensive Biodiversity Management Plan, including measures for protecting flora and fauna outside the disturbance area, and managing clearing within the disturbance area; and
 - monitor and manage impacts on GDEs and stygofauna, as part of the Water Management Plan.

6.9 Traffic and Transport

Introduction

478. Proposed mining extensions have the potential to result in impacts on the local traffic network, including impacts to traffic movements (e.g. delays), impacts on the road pavement and infrastructure and safety issues associated with a larger number of vehicles on the road, often including additional heavy vehicles. In the case of the Project, it also requires the realignment of a portion of the existing Hebden Road.
479. The EIS includes a Traffic and Transport Impact Assessment prepared by Puliypang in accordance with applicable guidelines including the TfNSW's *Guide to Traffic Generating Developments*, Austroad's *Guide to Road Design* and *Guide to Traffic Management*.

Existing Road Network

480. Access to the Project area is via Hebden Road, a local road located to the west of the Mount Owen Complex. Hebden Road connects to the New England Highway both to the south and north of the Project area.
481. Most of the traffic using Hebden Road is associated with the Mount Owen Complex, however there are also two quarries and a relatively small number of private properties upstream of the complex which are accessed via the road.
482. All ROM coal extracted from the Glendell mine is transported via internal haul roads to the Mount Owen CHPP for processing. Product coal is transported from the CHPP by rail via the Mount Owen Rail Loop, or by conveyor to the Bayswater and/or Liddell Power Stations. Coal processing and transport is regulated under the Mount Owen mine consent.
483. The current approval permits up to 17 Mtpa of product coal to be transported by rail to the Port of Newcastle for export. This would remain unchanged under the proposal.
484. In accordance with its existing development consents, Glencore has previously upgraded Hebden Road, including upgrades to the (southern) intersection with the New England Highway, construction of an overpass for the Main Northern Rail Line and upgrades to the bridge crossing over Bowmans Creek.
485. In addition, part of Glencore's existing development contributions with Council includes monetary contributions towards the costs for maintenance of Council roads affected by the Glendell Mine, including Hebden Road.

Road Traffic Impacts

486. The traffic assessment found that all relevant intersections in the area currently operate with a Level of Service (LoS) of A (the top performance level indicating free flowing traffic conditions) during peak periods, and that existing traffic volumes along the road network are within acceptable operating capacity. This includes the intersections of Hebden Road with the New England Highway, and the accesses to the Mount Owen, Ravensworth East and Glendell mines.
487. As outlined in **Section 2.1**, the Project would increase the operational workforce at the Glendell Mine from 300 to 690 FTE employees, however this would coincide with a proportionate decrease in production and workforce numbers at the Mount Owen mine. The Project is also not seeking to change the maximum approved production rate for the complex (i.e. 17 Mtpa).
488. As such, the Project would not result in any significant change to total traffic volumes on Hebden Road, apart from a short term spike during construction. It would also increase the duration of mine-related traffic volumes, associated with the extended life of the mine.
489. Traffic modelling indicates that construction and operational traffic associated with the Project would be adequately accommodated on the road network, with intersections predicted to operate with adequate capacity and a LoS of A.
490. The new intersections proposed to be constructed as part of the Hebden Road realignment (see below) would be designed to accommodate the anticipated traffic volumes associated with the Project.
491. With regard to road safety, the traffic assessment does recommend that the existing Hebden Road / Glendell Access Road intersection be upgraded as it does not currently meet the minimum Stopping Sight Distance and Safe Intersection Sight Distance (SISD) recommended in the Austroad's *Guide to Road Design*. To this end, Glencore has committed to upgrade the intersection to provide a Channelised Right Hand Short Turn to replace the existing Auxillary Right Turn treatment.
492. The assessment also indicated that the existing Hebden Road / Ravensworth East Mine Access Road does not meet the minimum SISD. However, this intersection would not be used during the construction phase of the Project and it would be decommissioned once Hebden Road is realigned.
493. TfNSW did not raise any significant issues regarding the traffic or road safety impacts of the Project, and the Department is satisfied that the Project is unlikely to result in any significant traffic impacts, subject to the identified intersection upgrade, and the realignment of Hebden Road (see below).

Hebden Road Realignment

494. Glencore is proposing to realign Hebden Road around the western boundary of the Project area, and to close and remove the 5.3 km redundant section of the road within the proposed mining area (see **Figure 30**).
495. The realigned Hebden Road would be designed in accordance with relevant Austroads guidelines and is proposed to be constructed to a design speed of 80 km per hour, consistent with current road conditions. Glencore proposes to improve delineation along the realigned section of the road by incorporating lane edge marking and guideposts in the final road design.

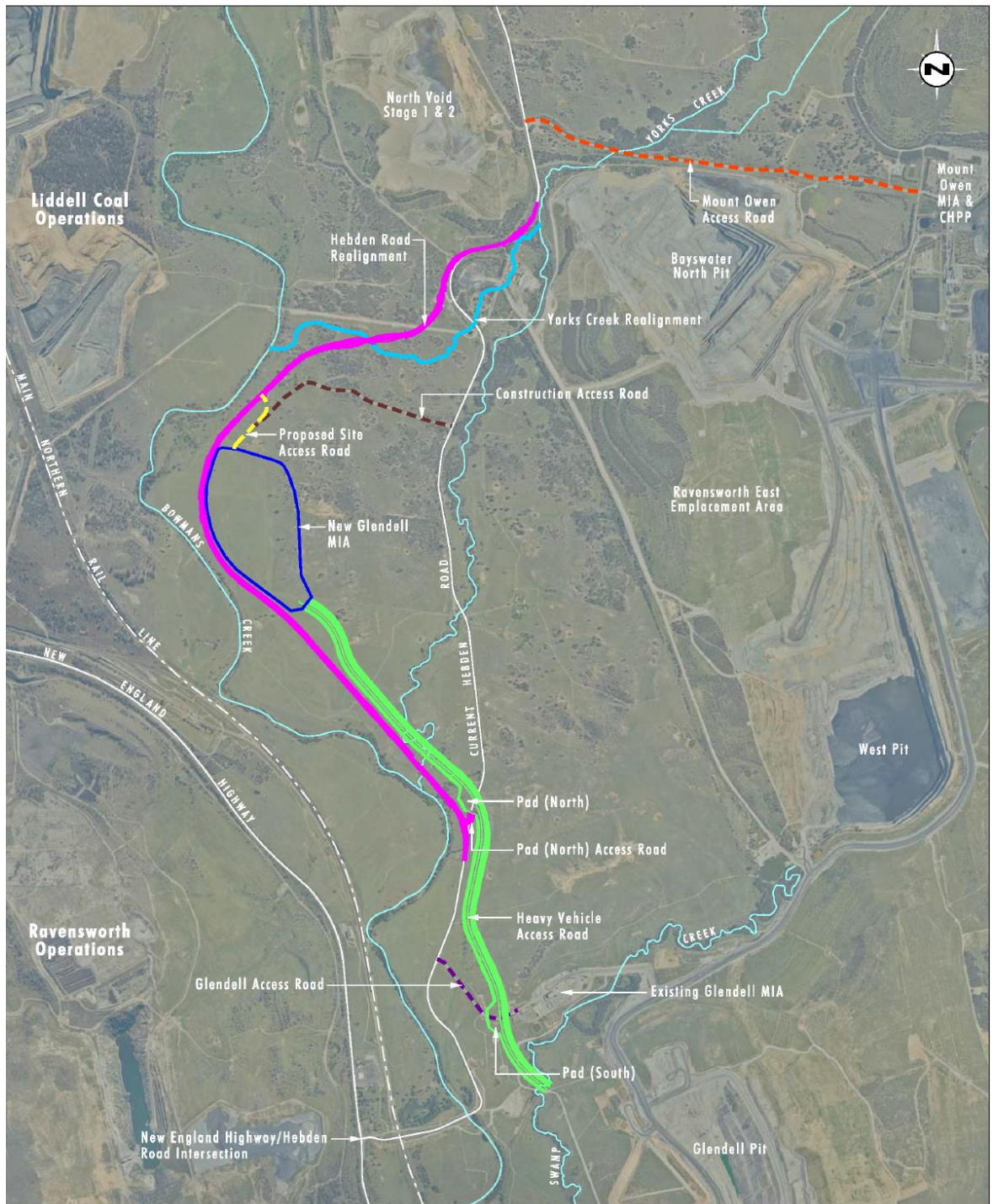


Image Source: Glendell (Dec 2018)
 Data Source: Glendell (2019)

0 0.5 1.0 1.5 km
 1:30 000

Legend

- █ MIA
- █ Heavy Vehicle Access Road
- █ Yorks Creek Realignment
- █ Hebden Road Realignment
- █ Proposed Site Access Road
- █ Construction Access Road
- █ Mount Owen Access Road
- █ Glendell Access Road

Figure 30 | Proposed Road Network

496. The road realignment would include intersections for the new Glendell MIA and for the ancillary pad areas (north and south) along the proposed Heavy Vehicle Access Road (see **Figure 30**). The realigned road would also require the construction of a dual-lane bridge over the proposed York's Creek realignment.
497. In order to minimise disruptions to traffic flow, the realigned section would be fully constructed prior to decommissioning of the existing alignment. This is anticipated to be completed by Year 2 of the Project.
498. The realigned road would marginally increase travel distance by 1.2 km, or an additional travel duration of less than 1 minute.
499. Council raised concerns regarding these potential delays, particularly when considered in conjunction with temporary road closures due to blasting activities. However, the Department notes that the realignment would significantly improve the current condition of the road, and no concerns were raised in public submissions about the proposed realignment.
500. As such, and given that the majority of traffic on this section of Hebden Road is mining and extractive industry-related, the Department does not believe that the additional delays would result in any significant impacts.
501. Council also raised concerns regarding the ongoing cost of maintenance of the longer road (and the bridge over Yorks Creek), given these costs would need to be covered by Council. It also questioned the justification for the road relocation.
502. The Department acknowledges that not relocating the road would result in the sterilisation of a large quantity of coal resource, and does not believe that the relatively minor impacts associated with the road relocation would outweigh the socio-economic benefits associated with the coal resource.
503. With regard to ongoing maintenance, the Department acknowledges that the realigned road would provide a new section of road to replace the existing road which is in variable condition. Notwithstanding, the marginally longer section of road would generate some additional long term maintenance costs, including a crossing over the realigned Yorks Creek.

Rail Network Impacts

504. While the Project would not result in any changes to the existing approved processing capacity of the Mount Owen CHPP (i.e. up to 17 Mtpa), the processing and transport of product coal would continue for an additional 8 years beyond the current Mount Owen consent (i.e. to 2045).
505. ARTC's 2019 Hunter Valley Corridor Capacity Strategy indicates that the Hunter Valley Rail Network has ample capacity to accommodate the forecast demand on the system.
506. It is expected that by 2037, when Mount Owen North Pit ceases mining operations, a number of other currently approved mining operations using the rail network would have also stopped operating. As such, it is likely that there would be an overall reduction in train movements along the Hunter Valley Rail Network after 2037.

Conclusion

507. The Department is satisfied that the Project is unlikely to result in any significant traffic or transport-related impacts, subject to the proposed road works and mitigation measures.

508. In this regard, the Department has recommended conditions requiring Glencore to:
- realign Hebden Road (including the related intersections) in accordance with applicable standards to the satisfaction of Council;
 - close the relocated section of Hebden Road in consultation with Council;
 - upgrade the existing Hebden Road / Glendell Mine Access Road as recommended in the road safety audit, to the satisfaction of Council;
 - undertake a road safety audit for the realigned Hebden Road, and implement any required improvements;
 - monitor coal transport from the site; and
 - undertake a pre-dilapidation survey of the realigned Hebden Road (once commissioned) and make good any development-related damage identified in regular post-dilapidation surveys.

6.10 Rehabilitation and Final Landform

509. The EIS includes a Rehabilitation and Mine Closure Strategy, prepared by Umwelt. The strategy seeks to integrate rehabilitation across the Mount Owen Complex, given the related nature of mining across the complex. In this regard, rehabilitation for the Glendell extension has been designed to integrate with the currently approved rehabilitation and final land use of the Mount Owen and Ravensworth mines.
510. The final landform concept is shown on **Figure 31**, and **Figure 32** provides a comparison between the proposed final landform and the approved final landform for the complex.
511. The rehabilitation strategy seeks to create an undulating landform with micro-relief and adequate surface water drainage to mimic the surrounding landscape. The final landform replaces the former approved final landform for the Glendell mine, which was based on the traditional 'bread basket' type landform typical of older mines in the valley, which were designed without particular emphasis on creating natural looking landforms.
512. The rehabilitated in-pit emplacement would have a maximum height of generally 185 mAHD, with localised areas up to 200 mAHD. This represents an increase from the 160 mAHD height for the approved Glendell mine, however it is lower than the approved maximum landform height of the Mount Owen Complex of 230 mAHD (North Pit).
513. The final land use would comprise a combination of native vegetation and open grassland areas, which would be able to be used for agriculture and/or a range of other future land uses. The native vegetation would provide corridors to link with broader habitat corridors in the valley.
514. The Project would disturb 34 hectares of alluvial flats in the western area of the site for development of the new MIA and other infrastructure (including the Hebden Road realignment).
515. This area is classified as Biophysical Strategic Agricultural Land (BSAL), and comprises 13 hectares of Class 3 capability land (i.e. suitable for long term cropping) and 21 hectares of Class 4 land (i.e. suitable for grazing and some cropping). Approximately 21 hectares would be reinstated back to at least Class 4 land following decommissioning and rehabilitation of temporary infrastructure (e.g. the MIA).
516. The Resources Regulator did not raise any concerns or comments in relation to the rehabilitation strategy.

- 517. MEG recommended that an independent expert be engaged to review the proposed final landform to determine whether it is the best option.
- 518. Council raised concerns that Glencore has not commenced rehabilitation of the existing Glendell mine, which is due to close within 5 years, and that reliance on the Project should not be adequate justification to delay mine closure planning.
- 519. In response to these and other comments, the Department engaged MineCraft to undertake an independent review of the mine plan, including the rehabilitation strategy and final landform (see **Appendix F**).

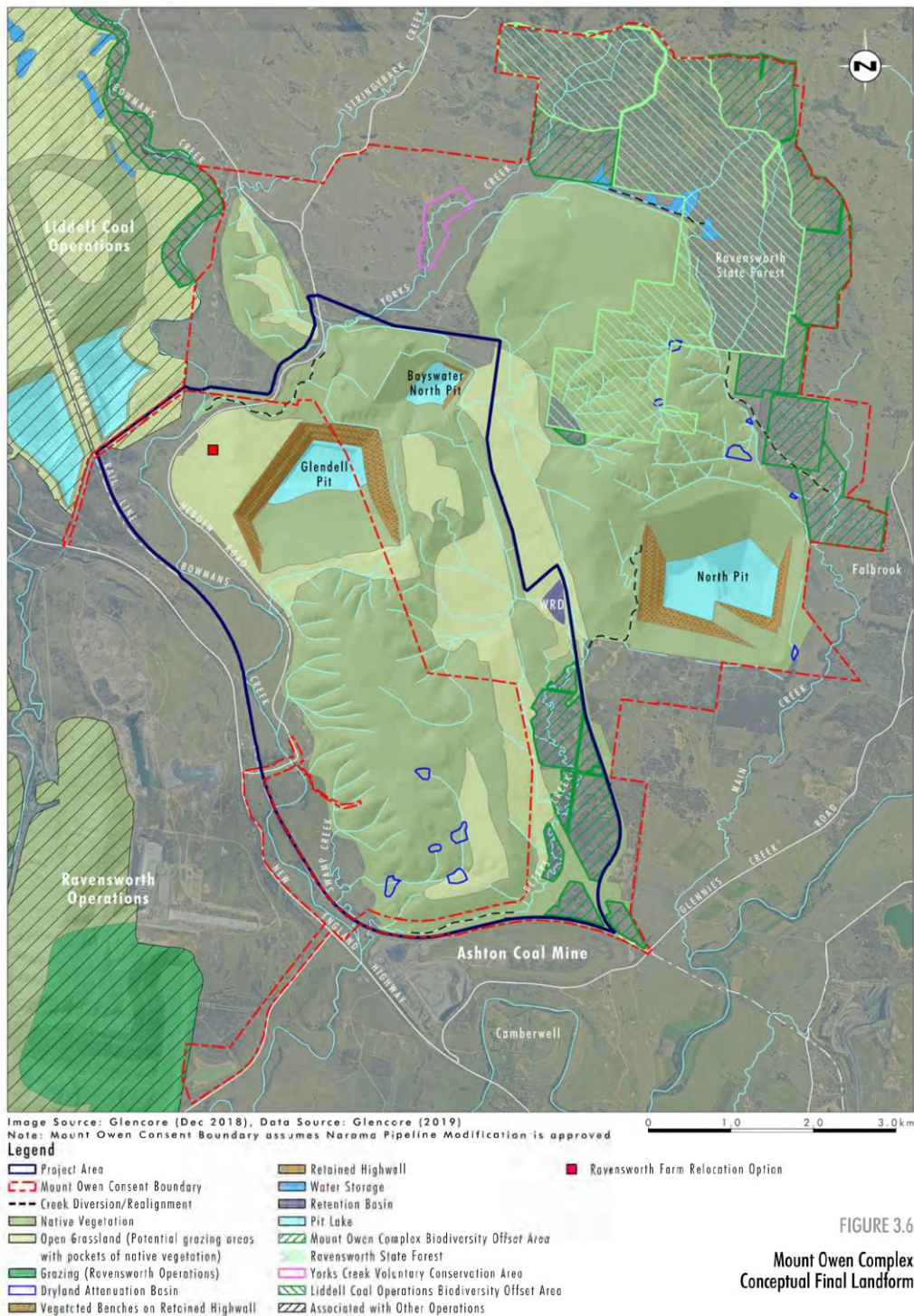


FIGURE 3.6
 Mount Owen Complex
 Conceptual Final Landform

Figure 31 | Final Landform Concept

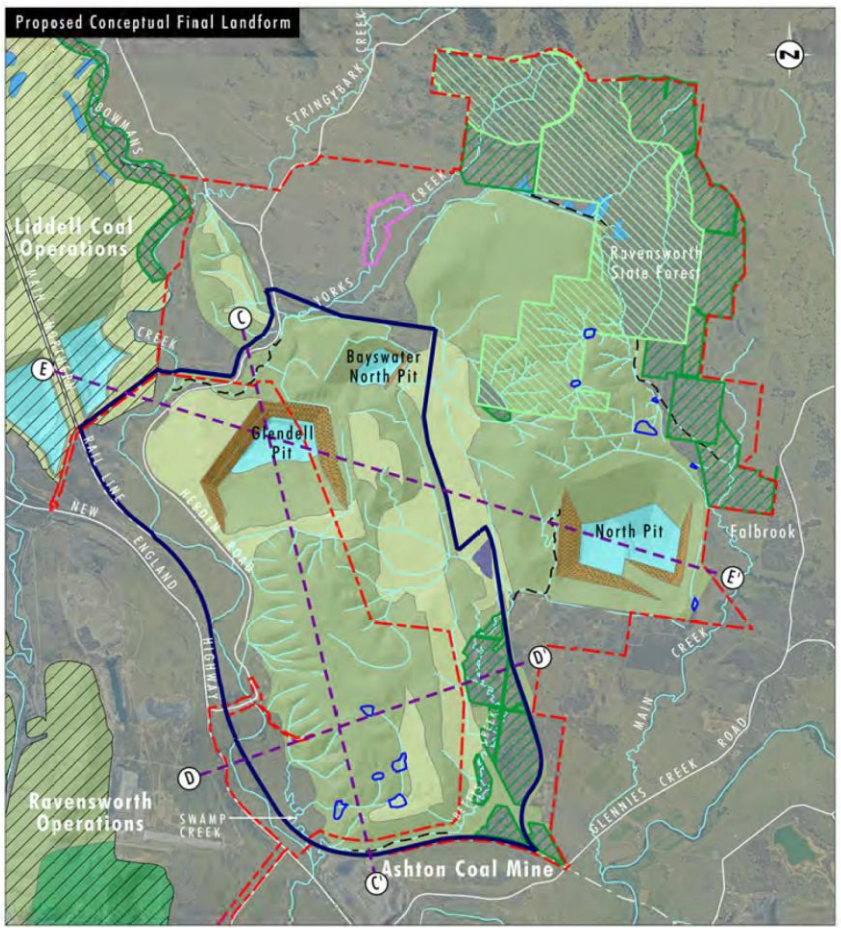
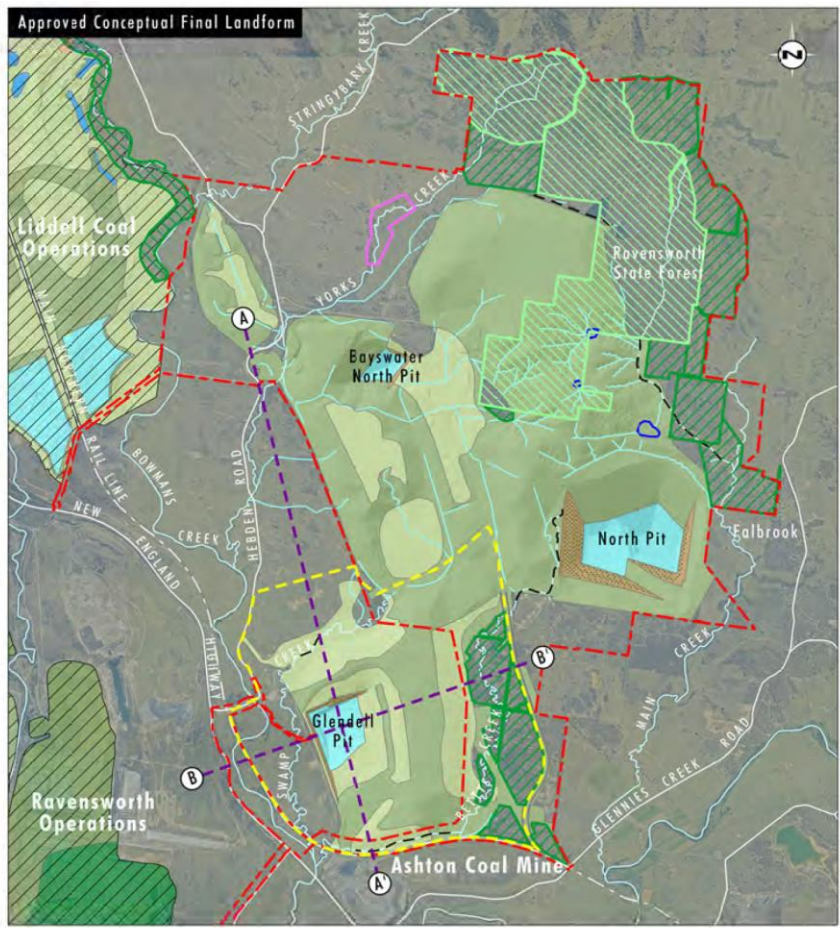


Image Source: Glencore (Dec 2018), Data Source: Glencore (2019), Ravensworth Operation Vegetation: Umwelt (2010), Liddell Coal Operations Vegetation: Umwelt (2016)
 Note: Equilibrium pit lake water level shown in voids, Mount Owen Consent Boundary assumes Narama Pipeline Modification is approved



- Legend**
- Project Area
 - Glandell Consent Boundary
 - Mount Owen Consent Boundary
 - Creek Diversion/Realignment
 - Native Vegetation
 - Open Grassland (Potential Grazing Area with pockets of Native Vegetation)
 - Grazing (Ravensworth Operations)
 - Vegetated benches on Retained Highwall
 - Retained Highwall
 - Dryland Attenuation Basin
 - Water Storage
 - Retention Basin
 - Pit Lake
 - Mount Owen Complex Biodiversity Offset Area
 - Liddell Coal Operations Biodiversity Offset Area
 - Ravensworth State Forest
 - Yorks Creek Voluntary Conservation Area
 - Associated with Other Operations
 - Transect

FIGURE 7.9.1

Approved Conceptual Final Landform vs Proposed Conceptual Final landform

Figure 32 | Approved and Proposed Final Landform Concept

520. As part of the review, the Department also asked MineCraft to consider the opportunity to fill other voids in the wider Mount Owen Complex to reduce the number of final voids and reduce the height of the proposed overburden emplacements, with particular focus on the existing West Pit (already required to be backfilled to ground level) (see **Figure 3**) and Bayswater North Pit final void. These existing voids are located relatively close to the proposed Glendell pit extension, and could conceivably be filled during the Project, although they are being used for other purposes (including tailings and water storage).
521. MineCraft's review concluded that Glencore has identified the feasible alternatives for the Project, and that its reasons for deciding on the final preferred mine plan are sufficiently justified.
522. It noted that the nearby West Pit is currently being used for tailings storage, and the Bayswater North Pit is being used as a water storage as part of the GRAWTS.
523. MineCraft suggests that this arrangement, and final landform planning for the complex, could be reviewed at the end of mining at Mount Owen to ensure that the most appropriate integrated final landform is achieved.
524. The Department accepts that the proposed final landform has been designed following detailed consideration of available alternatives, and that it presents an appropriate final landform and final land use. As outlined in **Section 6.7**, the Department is also satisfied that complete backfilling of the Glendell void is not reasonable or feasible.
525. The Department also acknowledges that the Project would significantly improve the final landform for the approved Glendell mine, which was approved before contemporary rehabilitation techniques incorporating micro-relief were introduced.
526. To ensure that rehabilitation is undertaken in accordance with best practice, the Department has recommended conditions requiring Glencore to:
- comply with a number best practice rehabilitation performance objectives;
 - integrate rehabilitation planning for the Project with the wider Mount Owen Complex;
 - prepare and implement a Rehabilitation Strategy to the satisfaction of the Planning Secretary, including consultation with Council, BCS and Resources Regulator;
 - prepare and implement a comprehensive Rehabilitation Management Plan for the Project (and Mount Owen Complex) in accordance with requirements under the *Mining Act 1992* and Mining Regulation;
 - review the final landform and final voids following completion of mining operations at the Mount Owen mine; and
 - reinstate at least 21 hectares of LSC Class 4 land in rehabilitation for the Project.

6.11 Economic and Social Impacts

Introduction

527. The EIS includes a detailed Economic Assessment, undertaken by Ernst & Young (EY) in accordance with applicable guidelines including the NSW *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*.

528. The EIS also includes a detailed Social Impact Assessment, undertaken by Umwelt in accordance with the Department's *Social Impact Assessment Guideline for State Significant Mining, Petroleum Production and Extractive Industry Development*.
529. The Department engaged The Centre for International Economics (CIE) to undertake an independent review of Glencore's Economic Assessment. CIE's review is attached in **Appendix F**.

Economic Impacts

530. The Economic Assessment includes a cost-benefit analysis to evaluate the net benefit/cost of the Project to NSW, and a local effects analysis to assess the net effects in the region.
531. The cost-benefit analysis, which includes estimated costs from all environmental externalities, indicates that the Project would have a net benefit of \$1.1 billion to the NSW economy in net present value (NPV) terms. The benefits include royalties and payroll tax of \$333 million and company tax of \$65 million for NSW.
532. Sensitivity analysis indicates that the Project would have a net positive benefit to NSW under a range of variables, with a lower bound estimate (i.e. worst case) net benefit of \$951 million NPV, and an upper bound estimate (best case) of \$1.28 billion NPV.
533. The Department's independent economic expert disagreed with some aspects of Glencore's assessment, including the values attributed to coal price, company and payroll tax, worker and supplier benefits, and greenhouse gas emissions. While still representing a net benefit, the independent expert's analysis indicates that the Project is more likely to deliver a net benefit of around \$151 million.
534. The local effects analysis indicates that the Project would have a net benefit in the Lower Hunter SA3 region (i.e. Singleton, Cessnock and Dungog LGAs) of approximately \$447 million NPV.
535. The assessment also indicates that the Project would have a range of major flow on economic benefits for the local area and region, including approximately:
- 404 direct and indirect FTE jobs/year in the SA3 region, and 488 FTE jobs/year in NSW; and
 - \$2.5 billion NPV in Gross Regional Product in the SA3 region, and \$3 billion NPV Gross State Product in NSW.
536. MEG considers that the Project's benefits represent an appropriate return to NSW, and an effective use of the State's resources.
537. The Department acknowledges that cost-benefit analyses are commonly criticised, with reasonable people differing on the value that should be placed on various costs and benefits, particularly the externalities. The Department also recognises that both the assessment prepared by Glencore for the EIS, and the independent review undertaken by CIE contain relatively conservative assumptions and are likely to represent the two extremes when it comes to the realised benefit to NSW (i.e. they are likely the best and worst case scenarios).
538. In particular, the Department notes that the approach to allocating costs associated with GHG emissions varies significantly between the assessment undertaken by Glencore and the review undertaken by CIE. While Glencore has apportioned a component of the total global costs to NSW, CIE consider that the full cost of Scope 1 and 2 emissions should be attributed to NSW.

539. The Department recognises the approaches taken by both Glencore and CIE and notes that allocation of the full cost of Scope 1 and 2 emissions to Australia and apportionment of the relevant percentage to NSW (i.e. approximately 32% of the total GHG costs) is also a further approach that could be applied, noting that the Commonwealth government is the entity responsible for ensuring Australia's NDC would be met.
540. The Department notes this approach was taken on the recent Maxwell Underground Coal Mine Project and was not disputed by the Commission in its Statement of Reasons for approving the project.
541. This approach would result in a cost of approximately \$20.7 million (based on the EU carbon price) being attributed to NSW, resulting in an NPV of between \$195 million and \$350 million (excluding benefits to workers and suppliers). Alternatively, should the full cost of greenhouse gas emissions (\$64.8 million) be attributed solely to NSW, this would result in an NPV of between \$150 million and \$305 million.
542. Nonetheless, based on the analysis undertaken for the Project and the independent review, the Department is satisfied that the Project's benefits to society (especially to the region and State) would outweigh its costs, including externalities.

Social Impacts

543. The Glendell mine is a longstanding Hunter mine, with a predominately local workforce. Some 95% of the workforce resides in the Hunter region, with 35% residing in the Singleton LGA, and another 40% in the surrounding LGAs of Maitland, Cessnock and Muswellbrook.
544. The social impacts of the Project are essentially a continuation of the existing social impacts associated with the approved mine, including both positive and negative impacts.
545. Negative social impacts are generally focused on those people who reside close to the mine (through amenity impacts such as noise and dust), while positive impacts are experienced by a wider geographic spread of residents (particularly by way of increased employment and economic opportunities).
546. The Project would provide increased (and continued) direct employment at the mine, increasing (by 390) to a peak of 690 full time personnel. The increase would coincide with a commensurate decrease in the workforce at the Mount Owen North Pit. As such, total employment numbers across the mine complex would remain steady, with the Project assisting in maintaining continued employment at the mine complex for an additional 8 years (to 2045).
547. The Social Impact Assessment indicates that the Project would continue to have similar social impacts as the existing mine, including impacts on social amenity, community and culture, economic contribution, health and wellbeing, and access to infrastructure and services.
548. Glencore proposes to continue to implement a number of measures to mitigate negative social impacts, including stakeholder engagement, working with industry groups, targeting local employment and training, and contributing to local community enhancement projects.

549. In addition, Glencore has commenced negotiations for a voluntary planning agreement (VPA) with Singleton Council. Glencore's original offer of \$2.24 million (made in June 2020) was rejected by Council, who asserted that the project's CIV excluded costs which would be required over the life of the Project (e.g. cost of replacing mobile fleet) and that the VPA offer should be in the order of \$5.15 million.
550. Until very recently, Glencore had not wavered on its VPA offer on the basis that it considers the \$2.24 million to be sufficient given the Project is a continuation of existing operations, which effectively maintain the current Mount Owen Complex workforce, and would have little to no impact on current and planned infrastructure costs for Council.
551. The Department has undertaken its own assessment of the CIV and agrees with Council in that the calculations of CIV should include all costs required to operate the project, regardless of whether they are up-front costs or not in accordance with the definition provided in accordance with Clause 3(1) of the EP&A Regulation and as further clarified in a recent update to a Planning Circular on CIV estimation.
552. In addition, the Department considers that given the Project would extend the operations at the Glendell Mine to 2045 (i.e. an additional 21 years) that \$2.24 million, or approximately \$106,000 per annum, would not adequately cover the additional demand on Council infrastructure. The Department also considers that the \$2.24 million is substantially less than has been offered in other contemporary VPAs in NSW.
553. In light of this information, Glencore provided a revised VPA offer of \$5.15 million in December 2021, noting that the terms of the offer included costs associated with road maintenance and the sale and closure of the existing alignment of Hebden Road. Although Council was satisfied with the dollar value, it did not agree to the terms, asserting that road maintenance and the costs associated with the closure of the existing Hebden Road alignment should not be part of the VPA.
554. The Department agrees with Council, and in particular considers that costs associated with the sale and closure of Hebden Road is a separate issue which should be dealt with under the *Roads Act 1993*, and should not form a component of the \$5.15 million VPA offer. Glencore has provided a further response reiterating its position (see **Appendix F**).

Conclusion

555. The Department is satisfied that the Project would have major economic benefits for the region and NSW, even following subtraction of costs for all environmental, social and economic externalities that may be associated with the Project.
556. In addition to the wider economic benefits, the Project would also have significant socio-economic benefits through the continuation of some 690 jobs at the Mount Owen Complex until around 2045, as well as a significant capital investment in the mine complex.
557. Further, as the Project represents a brownfields extension to an existing mine, the Project would make use of existing infrastructure established for the mine, including the wider Hunter Valley coal chain.
558. The Department acknowledges that the Project would have some significant amenity and heritage impacts, and as outlined in this assessment report, has recommended conditions to manage and/or compensate for these impacts.

559. To manage other socio-economic impacts, the Department has also recommended conditions requiring Glencore to:

- use its best endeavours to enter into a VPA with Singleton Council, on terms agreeable to both Glencore and Council;
- if a VPA cannot be agreed upon and finalised, provide a contribution of \$5.15 million under Section 7.11 of the EP&A Act, in accordance with Council's *Singleton Community and Economic Development Fund, 2021*;
- maintain a Community Consultative Committee;
- establish and implement a complaints handling protocol; and
- ensure public access to Project-related information including approvals, monitoring results, annual reviews and audit reports.

6.12 Other issues

560. The Department is satisfied that the other impacts associated with the Project can be effectively managed and/or are minor in nature. Consideration of these issues is summarised in **Table 12** below.

Table 12 | Other Issues

Issue	Findings	Recommend Conditions
Blasting and Vibration	<ul style="list-style-type: none"> • The existing Glendell mine is approved to undertake up to 2 blasts per day or 5 blasts per week (averaged over a calendar year), between 9 am to 5 pm Monday to Saturday. • Glencore is proposing to increase blasting frequency marginally, to allow up to 8 blasts per week, with blasting hours similar to the approved mine. • Blast modelling indicates that the Project can be readily managed to comply with applicable ground vibration and overpressure criteria at all surrounding privately-owned receivers, the closest of which are located approximately 3.5 kilometres from the Project area, in Camberwell. • The modelling also indicates that blasting would comply with applicable criteria at all surrounding heritage sites, which include St Clements Church, Chain of Ponds Inn, Former Hebden Public School, John Winter Memorial, Camberwell Community Hall, Ravensworth Public School, Camberwell Glennies Creek Underbridge, Aboriginal sites including an engraving site, as well as Ravensworth Homestead. • With regard to Ravensworth Homestead, the assessment indicates that the heritage item would need to be relocated by the end of Year 5 of the Project (when mining at a distance of approximately 1,100 m) to avoid potential impacts from blasting activities, if blasting is undertaken at the maximum instantaneous charge (MIC) size. • If the homestead is relocated to the Ravensworth Farm option site (located approximately 630 metres from the proposed pit), modelling indicates that the relocated structure could be effectively managed to maintain the ground vibration levels below the vibration limit of 5 mm/s, subject to reducing the MICs and other standard 	<ul style="list-style-type: none"> • The Department has recommended conditions requiring Glencore to: <ul style="list-style-type: none"> – manage blasting to comply with all relevant criteria at private properties, public infrastructure and heritage items; – limit blast frequency and hours; – keep the public notified and up-to-date regarding blasting operations, and facilitate feedback and complaint management; – provide for structural property inspections and investigations on request; – repair any structural damage to buildings or infrastructure caused by the Project; – implement measures to protect heritage items from damage (in accordance with the Heritage Management Plan); – manage blasting operations to avoid flyrock-related safety risks, including a road closure management plan; and – update and implement a comprehensive Blast Management Plan, including a detailed monitoring program.

Issue	Findings	Recommend Conditions
	<p>blast management measures when blasting approaches the structure. Glencore proposes to implement a detailed monitoring strategy for the relocated structure if this option is implemented.</p> <ul style="list-style-type: none"> The blast assessment also included consideration of blast-related impacts on infrastructure (including powerlines and telecommunications, dams, railway lines and roads) and natural features (including Bowmans Creek and the Yorks Creek realignment), which found that blasts can be readily managed to comply with applicable criteria, subject to standard measures such as reducing MICs when blasting near some features, and temporary road closures (for Hebden Road). With the implementation of appropriate site rules and other standard best practice blast management measures, the Department is satisfied that the Project can be managed such that blasts would meet applicable amenity and structural damage blast criteria at all sensitive receiver locations. 	
<p>Visual Amenity</p>	<ul style="list-style-type: none"> The Glendell mine is located in an intensive mining area, with the visual landscape affected by existing mining and industrial operations, including the Mount Owen, Ravensworth, Ashton and Rixs Creek mines, and the Liddell and Bayswater Power Stations. The key visual impact associated with the Project would be the overburden emplacement area, which is proposed to increase in height from 160 metres to 185 metres AHD, with localised areas up to 200 metres AHD. The MIA and heavy vehicle access roads would also be visible from some locations to the west of the mine. The main affected visual receivers would be commuters on the realigned section of Hebden Road, and to a lesser extent on the New England Highway, to the west of the mine. These visual receivers would have close range views to the emplacement, MIA and heavy vehicle access roads. There are no private residences to the west of the mine that would be impacted. Areas to the south and east of the mine would also have some views to the high points of the emplacement area, and there are some private residences in these locations, including residents of Camberwell. However, views from these locations are at a distance (>3km), and obscured by intervening topography, vegetation and/or approved mining operations. Consequently, visual impacts from these locations would not be significant. To mitigate the visual and lighting impacts of the Project, particularly those on receivers to the west, Glencore proposes to: <ul style="list-style-type: none"> construct a visual bund and planting corridor along the realigned Hebden Road (on Glencore-owned land) adjacent to the MIA; plant tree screens adjacent to the heavy vehicle access road; undertake additional tree plantings on Glencore-owned land to mitigate visual impacts from the New England Highway; undertake progressive rehabilitation, and rehabilitate the emplacement to provide a natural-looking final landform; and 	<ul style="list-style-type: none"> The Department has recommended conditions requiring Glencore to: <ul style="list-style-type: none"> rehabilitate the emplacement and mining areas as soon as practicable, and comply with a number of other best practice rehabilitation objectives; implement the bunds and tree screens as soon as possible, in accordance with a detailed visual impact landscape plan; and ensure outdoor lights do not shine above the horizontal and complies with applicable standards.

Issue	Findings	Recommend Conditions
	<ul style="list-style-type: none"> - minimise light spill in accordance with applicable standards. • Glencore would remove the bund and tree screen adjacent to the MIA at the end of mining, to allow views to the relocated Ravensworth Homestead. • The Department accepts that visual impacts would be generally consistent with the existing visual landscape, and that the Project would not result in significant visual impacts on sensitive receivers (residences). • The Department acknowledges that the Project would be highly visible from some areas to the west, particularly from the realigned Hebden Road. However, this road section is predominantly used by mining and industrial traffic, and the Department is satisfied that Glencore's proposed mitigation measures would reduce these impacts to an acceptable level. 	
Land-use and Agriculture	<ul style="list-style-type: none"> • The EIS includes an agricultural impact assessment, as well as a range of other studies (e.g. noise, air quality and water) to assess the impacts of the Project on other land uses in the locality and region. • Agricultural land use in the locality generally comprises low intensity grazing. • The majority (approximately 687 hectares) of land within the additional disturbance area comprises low quality agricultural land with a Land and Soil Capability (LSC) of Class 5 to 8 (i.e. suitable only for light grazing). • There are some better quality soils in the disturbance area around the alluvial flats of Bowmans Creek, with 13 hectares of LSC Class 3 land, and 50 hectares of Class 4 land. This area is outside the proposed pit extension, but would be disturbed for ancillary works including the Hebden Road realignment, drainage and infrastructure works, and final landform shaping. • As outlined in Section 6.10, approximately 34 hectares of this Class 3/4 land constitutes verified Biophysical Strategic Agricultural Land (BSAL). There is no BSAL within the proposed pit extension. The BSAL in the Project area constitutes approximately 1% of the mapped BSAL in the locality (i.e. within 5km of the disturbance area). • There is no viticulture or equine Critical Industry Cluster (CIC) land within the Project locality, and no operating vineyards or studs. • Of the 34 hectares of BSAL in the disturbance area, 13 hectares would be permanently lost (predominantly for Hebden Road). Glencore would rehabilitate the remaining 21 hectares to at least LSC Class 4 land. • The Department is satisfied that the Project's impacts on BSAL would be minor, and that the Project is unlikely to have any significant direct impacts on agriculture and other land uses in the locality. The Department is also satisfied that indirect impacts can be appropriately managed. 	<ul style="list-style-type: none"> • The Department has recommended conditions requiring Glencore to: <ul style="list-style-type: none"> - re-establish agricultural land areas as shown on the final landform plan (see Figure 31); - implement reasonable and feasible measures to rehabilitate agricultural land areas to LSC Class 3 and 4, including at least 21 hectares of LSC Class 4; and - maintain the agricultural productivity and production of non-operational Project-related land.

Issue	Findings	Recommend Conditions
Hazards and Waste	<ul style="list-style-type: none"> • The EIS includes assessment of hazards and risks associated with the Project, including dangerous goods storage, bushfire, declared dams and waste. • The assessments indicate that these and other hazards would not present significant risk, subject to continued implementation of standard best practice risk and waste management measures. • RFS recommended that Glencore prepares a Fire Management Plan for the Project in consultation with RFS. • The Department is satisfied that hazards and waste associated with the Project can be effectively managed. 	<ul style="list-style-type: none"> • The Department has recommended conditions requiring Glencore to ensure the development is suitably equipped to respond to fires, and assist the RFS and emergency services if there is a fire in the vicinity of the site.

7 Evaluation

561. The Department has assessed Glencore's development application, EIS, RTS and additional information provided and has carefully considered:
- submissions received from members of the community and special interest groups;
 - advice received from State and local Government agencies; and
 - advice provided by the IESC and the Department's independent experts.
562. The Department has also considered the objectives of the EP&A Act, including the ESD principles, and relevant considerations under section 4.15(1) of the EP&A Act. The Department has given particular consideration to Glencore's evaluation of the Project's merits against applicable statutory and strategic planning requirements.
563. The information provided in the EIS, public submissions and agency advice highlighted that the potential impacts on heritage values was the key and most contentious issue associated with the Project.
564. The Department recognises and acknowledges that Aboriginal groups identify a connection to the land in the greater Ravensworth Area and consider the whole region to have high cultural significance. Further, some Aboriginal groups also identify an attachment to the Ravensworth Estate, in particular stemming from a belief that the Ravensworth Estate may have been the site of, or the staging post for, a massacre of Aboriginal people.
565. The Department notes the concerns that some Aboriginal groups and the Heritage Council have raised in regard to the impacts of the proposal on these cultural values and the request to take a precautionary approach, however detailed archaeological investigation demonstrates that the reported massacre did not occur at, nor was it staged from, the Ravensworth Homestead.
566. Nonetheless, the Ravensworth Estate and Homestead does have significant heritage significance associated with its early colonial links and a range of stakeholders, including the Heritage Council, do not support the removal of the homestead.
567. Given this significance, a key focus of the Department's assessment was to ensure that all Project alternatives had been thoroughly investigated to confirm that the relocation of the Ravensworth Homestead, and associated impacts on heritage values, was justified and could not be avoided.
568. The Department notes that while an EIS must include "*an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives*" under clause 7(1)(b) of Schedule 2 of the EP&A Regulations, it is not the role of the consent authority to consider all potential alternatives or to 'redesign' the proposed project.
569. Nevertheless, the Department investigated numerous alternative (i.e. smaller) mine designs that would avoid impacts on the Ravensworth Homestead, including the option of not proceeding with the Project, while having regard to the Project Objectives identified by Glencore.
570. While this investigation was very thorough, the Department did not go to the extent of fully assessing a completely revised project (e.g. smaller footprint, lower extraction rate, smaller fleet, etc) as this was not considered to be consistent with the project objectives identified by Glencore in accordance with clause 7(1)(b) of Schedule 2 of the EP&A Regulations.

571. To inform its investigation of alternatives, the Department sought independent advice from experts in the fields of mine design and economics. The experts concluded that there are some alternative mine plan options that leave the Ravensworth Homestead in place and have a theoretical economic benefit to the State, however these options are considered too risky from an investment perspective (given the extremely low internal rate of return) and are not considered viable alternatives.
572. Consequently, the Department considers that there are no alternative mine plan designs available to Glencore, and the only option that would leave the Ravensworth Homestead in-situ would be to refuse the Project in its entirety.
573. The Department also recognises that it is highly unlikely that any other mining company would consider an alternative option to recover the resources given it would require a substantially higher capital investment as it would not benefit from the operational efficiencies and synergies with existing operations at Mount Owen which Glencore is able to rely on to minimise these costs.
574. The Department also considered the advice of an independent expert in the field of heritage architecture, who confirmed that the relocation of the Ravensworth Homestead, although reducing the heritage significance of the site, would allow for the retention of many aspects of its heritage value. The advice also concluded that the Ravensworth Farm relocation option “*better preserves many more aspects of significance than the rebuilding at Broke*”.
575. The Department has carefully considered the option of refusing the Project and the associated implications of such a decision. The benefits of refusing the project would include preserving the heritage values that would otherwise be reduced through the relocation process, avoiding any impacts associated with the realignment of Yorks Creek and relocation of Hebden Road, and reducing biodiversity impacts.
576. However, importantly, all socio-economic benefits associated with the Project would be lost. As is common with coal mining projects, this Project would have major economic and social benefits to the region and to NSW, including:
- continuation of an existing 690 jobs at the Mount Owen Complex, together with 350 new construction jobs during Project development phases;
 - direct capital investment of \$515 million (NPV) in the Project;
 - over 400 direct and indirect jobs/year and \$2.5 billion in Gross Regional Product for the Lower Hunter region; and
 - contributions to Singleton Council, to provide approximately \$5.15 million towards community enhancement projects.
577. In addition to the impacts on heritage values, the public submissions highlighted that potential impacts on air quality and climate change (via GHG emissions) were of high concern. In that regard, the Department considers the site to be well-suited for the Project as it is located in an area that is dominated by mining and industrial operations, and would be a logical ‘brownfield’ extension of open cut mining at the Glendell Mine, consistent with the NSW Government’s *Strategic Statement on Coal Exploration and Mining in NSW*.
578. Further to this, the Department considers that the Project is not inconsistent with the objectives of *Australia’s Long-Term Emissions Reduction Plan* and the *Net Zero Plan Stage 1: 2020-2030 Implementation Update* which all recognise that coal mining is expected to continue to have an important role to play in the short to medium term.

579. The Department has carefully weighed the heritage and environmental impacts of the Project against the significance of the Project's identified coal resources and the socio-economic benefits associated with continued operation of the Glendell Mine until 2044. Notwithstanding the Project's unavoidable impacts to the Ravensworth Homestead, the Department considers that the benefits of the Project outweigh its costs, and that the Project is approvable, subject to stringent conditions.
580. The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the Project (if approved) would comply with acceptable criteria and standards, that the impacts would be consistent with those predicted by Glencore in its documentation, and that residual impacts would be effectively minimised, managed and/or compensated.
581. The recommended suite of conditions was provided to key NSW Government agencies and their comments taken into account. The Department considers that the conditions reflect current best practice for the regulation of open cut coal mining projects in NSW.
582. This assessment report is hereby presented to the Commission to determine the application, and the associated modification. Recommended conditions of approval are included in **Appendices I and J**.

Prepared by:

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Recommended by:



21/02/2022
Stephen O'Donoghue
Director
Resource Assessments



21/02/2022
Clay Preshaw
Executive Director
Energy, Resources and Industry

Appendices

Appendix A – Environmental Impact Statement

Refer to “EIS” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Appendix B – Submissions

Refer to “Submissions” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Appendix C – Response to Submissions

Refer to “Response to Submissions” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Appendix D – IESC Advice and Glencore’s Response

Refer to “IESC” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Appendix E – Agency Advice on Assessment

Refer to “Agency Advice” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Agency	Type of Advice	Date of Advice	Link
Biodiversity Conservation Division	Advice on EIS	20/02/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1491%2120200220T234629.546%20GMT
	Advice on RTS	11/06/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3373%2120200611T054212.542%20GMT
	Advice following review of additional information	9/12/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-11551233%2120201209T005907.544%20GMT
	EPBC Act Bilateral Assessment	July 2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120220220T225246.934%20GMT
Climate and Atmospheric Science (CAS) Branch within the Environment, Energy and Science Division	Advice on GHG Assessment	10/12/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120220126T223619.881%20GMT
Dams Safety NSW	Advice on EIS	14/01/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-2641%2120201202T222641.570%20GMT
DAWE	Advice on EIS	14/02/2020	Refer to ‘Submissions’ tab on Major Projects Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/glendell-continued-operations-project-2
Department of Primary Industries	Advice on EIS	14/02/2020	Refer to ‘Submissions’ tab on Major Projects Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/glendell-continued-operations-project-2
DPE Crown Lands	Advice on EIS	14/02/2020	Refer to ‘Submissions’ tab on Major Projects Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/glendell-continued-operations-project-2
DPE Water	Advice on EIS	14/02/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1487%2120200217T041948.602%20GMT
	Advice on RTS	24/06/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3374%2120200624T045700.678%20GMT
EPA	Advice on EIS	24/01/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1492%2120200124T055913.236%20GMT
	Advice on RTS	10/06/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3377%2120200610T060108.754%20GMT

Agency	Type of Advice	Date of Advice	Link
Heritage Council of NSW	Advice on EIS	11/02/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1495%2120200211T014457.152%20GMT
	Advice on RTS	9/12/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120201210T225225.303%20GMT https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120201210T225224.592%20GMT
	Advice following review of additional information	8/10/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120211116T010604.857%20GMT
Heritage NSW	Advice on RTS	30/10/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120201210T225315.374%20GMT
	Advice following review of additional information	19/04/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-17168252%2120210419T064055.053%20GMT
MEG	Advice on EIS	23/01/2020	Refer to 'Submissions' tab on Major Projects Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/glendell-continued-operations-project-2
	Advice on RTS	9/06/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3375%2120200609T012748.160%20GMT
NSW Health	Advice on EIS	31/01/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1493%2120200131T034725.656%20GMT
NSW Rural Fire Service	Advice on EIS	22/01/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-2641%2120200128T225728.508%20GMT
Singleton Council	Advice on EIS	12/02/2020	Refer to 'Submissions' tab on Major Projects Portal: https://www.planningportal.nsw.gov.au/major-projects/projects/glendell-continued-operations-project-2
	Advice on RTS	20/03/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3379%2120210421T000604.060%20GMT
Subsidence Advisory NSW	Advice on EIS	31/01/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-2641%2120200211T223039.367%20GMT
Resources Regulator	Advice on EIS	24/03/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1490%2120200324T015052.829%20GMT
	Advice on RTS	17/06/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3376%2120200617T060931.424%20GMT
Transport for NSW	Advice on EIS	4/03/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-1496%2120200309T011843.573%20GMT
	Advice on RTS	31/05/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PAE-3380%2120200531T052608.568%20GMT

Appendix F – Additional Information

Refer to “Additional Information” folder on the Department’s website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/10086>

Subject Matter	Type of Information	Date	Link
Additional advice from BCD dated 11/06/2020	Response to information request	7/08/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120201125T215720.696%20GMT
Heritage NSW recommendations dated 30 October 2020	Response to information request	1/04/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-16969098%2120210405T232151.121%20GMT
Typographical error identified in RfS	Glencore letter correcting error	15/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120211116T222330.929%20GMT
Addendum to Economic Assessment	Additional information from Ernst and Young	5/08/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120210815T233555.731%20GMT
Noise and biodiversity offsets	Request for additional information	27/05/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20457786%2120210527T013541.980%20GMT
	Response to information request	24/06/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20457786%2120210624T033400.165%20GMT
Impacts to MNES	Request for additional information	23/06/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-22788311%2120210623T033105.303%20GMT
	Response to information request	29/06/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-22788311%2120210629T042401.927%20GMT
Realignment of Hebden Road, relocation of homestead and status of VPA	Request for additional information	27/05/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20460811%2120210527T013455.397%20GMT
	Additional information regarding realignment of Hebden Road	30/07/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20460811%2120210820T055655.288%20GMT
	Additional information regarding status of VPA	30/07/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20460811%2120210820T055654.975%20GMT
	Additional information relocation of homestead	20/08/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-20460811%2120210820T055654.228%20GMT
Independent mine plan review	Independent mine plan review	28/10/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120210310T035040.946%20GMT
	Request for additional information	02/11/2020	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-10574010%2120201102T011438.982%20GMT
	Response to mine plan review	5/08/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-10574010%2120210806T043534.863%20GMT

Subject Matter	Type of Information	Date	Link
Independent advice on relocation of Ravensworth Homestead	Independent advice on homestead relocation	30/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759319%2120211130T215535.349%20GMT
	Request for additional information	30/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759319%2120211130T215806.454%20GMT
	Response to independent advice	16/12/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759319%2120211216T043837.357%20GMT
	Response to independent advice – LSJ Attachment	16/12/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759319%2120211216T043855.372%20GMT
Independent review of Economic Assessment	Independent review of economic assessment	30/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759324%2120211130T220241.473%20GMT
	Request for additional information	1/12/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759324%2120211130T220437.427%20GMT
	Response to independent review of economic assessment	20/12/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-32759324%2120211220T063354.992%20GMT
GHG Emissions	Request for additional information	20/10/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-30387563%2120211020T050545.193%20GMT
	Response to information request	11/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-30387563%2120211111T043245.438%20GMT
Additional advice from Heritage Council dated 8/10/2021	Request for additional information	20/10/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-30388865%2120211020T050221.370%20GMT
	Response to information request	3/11/2021	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-30388865%2120211103T010803.140%20GMT
Glencore comments on Recommended Conditions	Comments on VPA and road maintenance conditions	17/02/2022	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120220217T022957.392%20GMT
	Comments on noise criteria conditions	18/02/2022	https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9349%2120220218T032940.787%20GMT

Appendix G – Statutory Considerations

The Department’s assessment of the Project has given detailed consideration to a number of statutory requirements (see **Section 4** and **Section 6**). These include:

- the objects found in section 1.3 of the EP&A Act; and
- the matters listed under section 4.15(1) of the Act, including applicable environmental planning instruments and regulations.

A summary of these considerations is provided below. Reference should also be made to Sections 5, 8 and Appendix 8 of the EIS, where Glencore has also considered applicable legislation and environmental planning instruments in detail.

G.1 Objects of the EP&A Act

Table G1: Consideration of the proposal against the relevant objects of the EP&A Act

Objects of the EP&A Act	Consideration
<p>(a) <i>to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources,</i></p> <p>(c) <i>to promote the orderly and economic use and development of land,</i></p>	<ul style="list-style-type: none"> • The Project involves a permissible land use on the subject land; • the coal resource has been determined to be significant from a State and regional perspective; • the coal resource is located within existing coal exploration and mining lease areas, in a region that is dominated by coal mining operations; • the Project can be largely carried out using existing mine site and transport infrastructure; and • the Project would provide considerable socio-economic benefits.
<p>(b) <i>to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment</i></p>	<ul style="list-style-type: none"> • the proposal can be carried out in a manner that is consistent with the principles of ESD, which have been considered through the Project EIS and the Department’s assessment (see Section 4 and Appendix G.2) which has sought to integrate all significant environmental, social and economic considerations.
<p>(e) <i>to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,</i></p>	<ul style="list-style-type: none"> • the Project has been designed to minimise potential environmental impacts where practicable, including consideration of alternative mine design, use of existing infrastructure to minimise the clearance required; • Glencore would offset residual biodiversity impacts in accordance with the NSW and Commonwealth Government Policy; • the Project is able to be undertaken in a manner that would maintain or improve the biodiversity values of the region in the medium to long-term; and • both the <i>precautionary principle</i> and the <i>conservation of biological diversity and ecological integrity</i> has been applied in the assessment to avoid serious or irreversible damage to the environment wherever possible.
<p>(f) <i>to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),</i></p>	<ul style="list-style-type: none"> • Glencore has considered numerous mine designs that would avoid/minimise impacts to items of heritage significance, including the relocation of the Ravensworth Homestead; • The project management measures have been developed in consultation with a wide range of community stakeholders, including through the establishment of the Ravensworth Homestead Advisory Committee; and • Glencore’s proposed mitigation and management measures would ensure that the Project would have acceptable impacts on Aboriginal cultural heritage and historic heritage.

Objects of the EP&A Act	Consideration
(i) <i>to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,</i>	<ul style="list-style-type: none"> the Department has notified and consulted with the affected Council and other NSW government authorities over the Project and carefully considered all responses in its assessment
(j) <i>to provide increased opportunity for community participation in environmental planning and assessment.</i>	<ul style="list-style-type: none"> the Department publicly exhibited the proposal and requested community submissions which were all reviewed, considered and responded to by Glencore

G.2 Ecologically Sustainable Development

The EP&A Act adopts the definition of ecologically sustainable development (ESD) found in the *Protection of the Environment Administration Act 1991*, as follows:

“ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- (a) *the precautionary principle;*
- (b) *inter-generational equity;*
- (c) *conservation of biological diversity and ecological integrity; and*
- (d) *improved valuation, pricing and incentive mechanisms.”*

The Department has considered the principles and programs of ESD, as follows:

Precautionary Principle

The Department has assessed the Project’s threats of serious or irreversible environmental damage using reasonable worst case scenarios, and is satisfied that there is sufficient scientific certainty to enable the decision maker to weigh up the impacts of the Project and determine the development application. The Department has considered all the available information presented and consulted closely with independent experts and key Government agencies to obtain advice on various aspects of the Project.

While it is recognised the Project would result in a number of impacts of varying significance, the key matters that could cause serious or irreversible environmental damage relate to unmitigated impacts on biodiversity values (including threatened species and EECs), impacts on water resources and impacts to items of heritage significance.

The EIS and Department’s assessment have identified management and mitigation measures to address potential environmental impacts, and include commitments and requirements to implement monitoring, auditing and reporting mechanisms.

Overall, the Department has assessed these matters in detail (see **Section 6**) and considers that the recommended risk-based conditions and performance measures would provide appropriate protection for the environment and minimise the potential for any serious or irreversible environmental damage.

Intergenerational Equity

Intergenerational equity has been addressed through maximising efficiency and coal resource recovery and developing environmental management measures which are aimed at ensuring the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The Department acknowledges that coal and other fossil fuel combustion is a contributor to climate change, which has the potential to impact future generations. However, the Department also recognises that there remains a clear need to develop coal deposits to meet society's basic energy requirements for the foreseeable future. The proposal includes measures to mitigate potential GHGE's from the operation of the Project, which would be recommended as a requirement of the Project's operating conditions and detailed in an Air Quality and Greenhouse Gas Management Plan.

The Department's assessment of direct energy use and associated GHGE's (i.e. Scope 1, Scope 2 and Scope 3 emissions) has found that these emissions would be low and comprise a very small contribution towards climate change at both the national and global scale (see **Section 6.5**).

The Department considers that the socio-economic benefits and downstream energy generated by the Project would benefit future generations, particularly through the provision of national and international energy needs in the short to medium term.

Conservation of Biological Diversity and Ecological Integrity

The Project's potential impacts on biodiversity have been outlined in the Department's assessment of the Project (**Section 6.8**). The Department considers that the conservation of biological diversity and ecological integrity has been applied through avoiding and minimising biodiversity impacts. The Department considers that the Project's potential impacts would be reasonably mitigated and/or offset to enable the long-term biodiversity outcomes to be achieved for the region.

Improved Valuation, Pricing and Incentive Mechanisms

Valuation and pricing of resource has been considered through economic, social and cost-benefit analyses which have been completed as part of the EIS. The cost benefit analyses sought to weigh up the Project's costs and benefits based on its full range of environmental, social and economic impacts. The Department has carefully considered the costs and economic benefits of the Project and support the conclusion that it would deliver a significant net benefit to the local region and the State of NSW.

The Department has also recommended performance-based conditions, where possible, to provide incentive to Glencore to achieve environmental outcomes and objectives in the most cost-effective way.

G.3 Environmental Planning Instruments

Under Section 4.15 of the EP&A Act, the consent authority is required to consider, amongst other things, the provisions of the relevant EPI's, including any exhibited draft EPI⁹. Section 4 of the PIR provides a summary of the Department's consideration of the relevant EPI's and notes Glencore's consideration of applicable provisions of relevant EPIs in its EIS. Further consideration is provided in the Department's assessment (see **Section 6**) and below.

⁹ Note that due to the effect of clause 11 of the SRD SEPP, development control plans do not apply to SSD.

Singleton Local Environmental Plan 2013

The Project disturbance area is located in the Singleton local government area. All subject land within the proposed open cut mining areas is zoned RU1 (Primary Production) under the *Singleton Local Environmental Plan 2013* (Singleton LEP).

Open cut mining is permissible with consent in this zone.

SEPP No. 33 – Hazardous and Offensive Development

The Department acknowledges that mining operations at the Complex entail storage and use of hazardous substances, including Class 1 explosive materials. However, having consideration to the dangerous goods licences and management measures in place at the mine, the Department is satisfied the Project does not meet the definition of a potentially hazardous industry under SEPP 33.

While the Project could be characterised as a potentially offensive industry without the employment of appropriate mitigation measures, suitable mitigation measures have been incorporated into the design of the Project to ensure that it would meet relevant standards and be compatible with the existing or likely future use of the land surrounding the Project.

With the proposed measures in place, the Project is not considered to be potentially hazardous or offensive. Importantly, the Department is satisfied that the Project would not increase risks to public safety relative to the existing operations and would not alter the consequences or likelihood of a hazardous event on the site. Consequently, the Project is considered to be consistent with the aims, objectives and requirements of SEPP 33.

SEPP No. 44 – Koala Habitat Protection

A new *SEPP (Koala Habitat Protection) 2019* SEPP commenced on 1 March 2020, replacing the previous SEPP 44. However, clause 15 of the new SEPP provides that ‘a development application made, but not finally determined, before the commencement of this Policy in relation to land to which this Policy applies must be determined as if this Policy had not commenced.’ Consequently, the provisions of SEPP 44 continue to apply to the Project.

The Biodiversity Development Assessment Report concluded that the Project would not impact any areas of core Koala habitat, as defined under SEPP 44 given there is no resident population of koalas within the Project footprint and there have not been any recorded sightings of koalas within the Project Area. However, the assessment did acknowledge the potential for Koalas to be present within the disturbance area, primarily due to the presence of some feed trees and historical recordings of individual Koalas within the Complex and broader surrounds.

SEPP 44 aims to conserve and manage Koala habitat to reverse the current trend of Koala population decline. In this respect, the Department undertook detailed consideration of impacts of the Project on Koala populations, including the recovery of populations in the longer term (see **Section 6.8**).

This assessment concluded that the Project was unlikely to result in any significant impacts on Koala populations and would eventually lead to improved long-term habitat outcomes, following the establishment of woodland vegetation corridors under the proposed rehabilitation plan.

Overall, the Department is satisfied that the Project is generally consistent with the aims, objectives and requirements of SEPP 44.

SEPP No. 55 – Remediation of Land

A proportion of the proposed disturbance area is rural land, which is unlikely to be contaminated. The rest of the Project is located on land that is encompassed within the Complex.

As with all mining projects, some minor areas of the existing Glendell, Mount Owen and Ravensworth East mines would require management for the presence of hydrocarbons prior to mine closure (i.e. areas surrounding fuel storages). Nevertheless, the Department is satisfied that these matters would not constitute a significant or persistent contamination of the site and could be easily managed and/or remediated under the existing or updated conditions of consent and/or the EPL for the site. Accordingly, the Department is satisfied that the proposed Project could continue to be appropriately managed and remediated (if necessary) to ensure it is suitable for its existing or future use.

Overall, the Department is satisfied that there is limited risk of any material contamination of the land subject to the application and that the Project is generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (State and Regional Development) 2011

The proposed development is declared to be State significant development under Division 4.7 of the EP&A Act as it is 'development for the purposes of coal mining and mining related works', as specified in clause 5 of Schedule 1 to *State Environmental Planning Policy (State and Regional Development) 2011*.

In accordance with Section 4.5(a) of the EP&A Act and clause 8A of the SSD SEPP, the Independent Planning Commission is the consent authority for the proposal as there were more than 50 unique objections to the Project.

SEPP (Infrastructure) 2007

The Infrastructure SEPP requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. The Department notified Singleton Council, Transport for NSW, the ARTC, Ausgrid, Dams Safety Committee and Crown Lands about the proposed Project.

The Department has consulted with public authorities and considered the matters raised in its assessment of the Project (see **Section 6**). Where appropriate, the Department has also developed conditions of consent to address the recommendations and advice of these public authorities. The Department considers that such conditions would provide appropriate protection for public infrastructure. As such, the Department considers that the requirements of the Infrastructure SEPP have been satisfied.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Clause 7(1)(b) of the Mining SEPP identifies that mining is permissible with consent on any land where development for the purposes of agriculture or industry may be carried out (with or without development consent). Consequently, the proposed development is permissible with consent under the Mining SEPP, and the Commission may determine the application.

In addition, Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent to undertake development for the purposes of mining. The Department has considered these matters in its assessment of the proposed Project and has included a brief summary of these considerations below.

Non-discretionary development standards for mining (clause 12AB)

Clause 12AB identifies non-discretionary development standards for the purposes of section 4.15(2) of the EP&A Act in relation to the carrying out of development for the purposes of mining. Table 4.2 in the EIS's Appendix 8 sets out Glencore's consideration of the applicable standards and whether or not the Project meets them.

The Department agrees with the conclusions provided in this assessment.

Compatibility with other land uses (clause 12)

The Department's assessment has considered the potential impacts of the Project on other land uses in the area, including the adjacent Ravensworth State Forest and NSW Forestry Corporation land. In addition, it has considered the potential impacts on downstream water users and potential noise, air quality, transport and visual impacts at nearby private residences, especially in Falbrook and Camberwell. This assessment has been undertaken in consideration of the public benefits of the Project, surrounding land uses and measures to avoid, mitigate or minimise any land use incompatibility.

Overall, the Department is satisfied that with the implementation of the recommended conditions, including performance measures and adaptive management, the Project could be managed to minimise any potential land use conflicts and meet the aims, objectives, and provisions of clause 12.

Voluntary Land Acquisition and Mitigation Policy (VLAMP) (clause 12A)

The Department's assessment has considered the NSW Government's Voluntary Land Acquisition and Mitigation Policy (December 2014). With respect to air quality impacts, while relevant cumulative air quality assessment criteria would be exceeded at a number of private residences, all of these properties already have acquisition rights under either the existing Glendell and/or Mount Owen consents. No additional private residences are predicted to have acquisition rights as a result of the Project. The private properties with acquisition rights under the Glendell Consent and/or Mount Owen consents would also be provided with acquisition rights for the Project.

In summary, the Department is satisfied that the Project could be managed to minimise amenity impacts at surrounding private properties and that appropriate landowner rights could be offered through any recommended conditions of consent.

Compatibility with mining, petroleum and extractive industries (clause 13)

The Project would interact with the existing and proposed Mount Owen Mine operations, and it is located in proximity to Liddell Coal Operations, Ravensworth Operations, Ashton Coal Mine and Integra Underground.

Blasting associated with the Project would be managed by Glencore to avoid adverse interactions with its nearby Integra Underground Operations. Glencore would extend the existing protocol between the Complex and Integra Underground to manage potential blast impacts to incorporate the Project.

In addition, the Project would not have any direct impact on the two hard rock quarry operations located in the Hebden area. Glencore has identified that truck movements from these quarries along Hebden Road would be subject to slightly extended travel distances and blast related road closures may delay some truck movements. The Department is satisfied that these delays would be largely offset by the benefits from the previous Hebden Road upgrade works, already undertaken by Glencore, which included an overpass over the Main Northern Rail Line.

Given the above considerations, the Department is satisfied that the Project has been designed in a manner that is compatible with, and would not adversely affect, adjacent current or future mining-related activities.

Natural resource management and environmental management (clause 14)

The Department has recommended a number of conditions aimed at ensuring that the Project is undertaken in an environmentally responsible manner, including but not limited to, conditions in relation to water resources, threatened species and biodiversity and greenhouse gas emissions.

Resource recovery (clause 15)

The Department has considered resource recovery in its assessment of the Project and is satisfied that the Project can be carried out in an efficient manner that optimises resource recovery within environmental constraints.

The Department has recommended conditions requiring Glencore to implement reasonable and feasible measures to minimise waste and maximise the salvage and re-use of resources within the disturbance area (including water, soil and vegetative resources).

Transport (clause 16)

The Department notes that the off-site transport of coal would primarily involve the haulage of product coal on trains along the Main Northern Rail Line to the Port of Newcastle for export, as well as ROM coal on an overland conveyor to the Liddell Coal Mine for processing and onward transport to nearby power stations. The Department has consulted with the applicable roads authorities and the ARTC in relation to the Project and taken these submissions into consideration in its assessment of the Project.

Rehabilitation (clause 17)

Clause 17 outlines particular requirements relating to consideration of whether any consent granted should be subject to conditions aimed at ensuring rehabilitation of land disturbed by mining and, in particular, whether conditions should require preparation of a rehabilitation management plan, appropriate treatment of waste, remediation of soil contamination and the avoidance of public safety risks.

Glencore has provided a Rehabilitation and Mine Closure Strategy for the entire Complex in Appendix 24 of the EIS. The strategy seeks to maximise the benefits that rehabilitation can provide to the creation, recreation and enhancement of biodiversity linkages in the landscape.

The Department has considered the final landform proposed by Glencore (see **Section 6.10**) and considers that the proposed final landforms and rehabilitation plans could be achieved to meet contemporary best practice in the NSW mining industry, and has recommended a comprehensive suite of conditions relating to rehabilitation of land disturbed by the Project.

Summary of Mining SEPP

Based on its assessment of the Project, the Department considers that it can be managed in a manner that is generally consistent with the aims, objectives and provisions of the Mining SEPP.

Appendix H – Matters of National Environmental Significance

The Glendell Continued Operations Project (the Project) was declared to be a 'controlled action' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to its potential impacts on listed threatened species and communities 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 controlling provisions under the EPBC Act have been assessed under Part 4 of the EP&A Act.

The Department provides the following additional information for the Commonwealth Minister to take into account when deciding whether or not to approve the Project under the EPBC Act.

The Department's assessment has been prepared based on the information contained in:

- the Environmental Impact Statement (EIS) for the Project, particularly Appendices 10, 16, 17 and 20 (see **Appendix A**);
- the Applicant's Submissions Report (see **Appendix C**);
- advice provided by the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC) (see **Appendix D**);
- Glencore's Response to the IESC (see **Appendix D**);
- supplementary information provided by Glencore during the assessment process (see **Appendix F**);
- advice provided by the Water Group and the Biodiversity Conservation Division (BCD) within the Department (see **Appendices B** and **E**); and
- advice provided by the Commonwealth Department of Agriculture, Water and the Environment (DAWE).

This Appendix is supplementary to, and should be read in conjunction with, the main volume of the Department's Assessment Report which includes the Department's consideration of impacts on surface water, groundwater and listed threatened species and communities in **Section 6.7** and **Section 6.8**.

H.1 Impacts to Listed Threatened Species and Communities

The Project's direct impacts on EPBC-listed threatened species and communities are summarised in **Table H1** below.

In addition to proposed clearing and associated loss and/or fragmentation of habitat, the Project has the potential to result in indirect impacts on the threatened species and communities outlined in **Table H1**. Potential indirect impacts include dust and noise generation, erosion and sedimentation, lighting impacts and increased risk of bushfire and pest and weed infestation.

Glencore has proposed a range of management strategies to minimise the severity of these impacts. These strategies are discussed in **Section H3**.

Table H1 | Summary of likely impacts on threatened species listed under the EPBC Act

Ecological Feature	EPBC Listing Status	Direct Disturbance of Potential Habitat (Ha)	Ecosystem Credits Required [^]	Significant Impact Predicted in the EIS
Central Hunter Valley Eucalypt Forest and Woodland Critically Endangered Ecological Community	Critically Endangered	122.9	1,810	Yes
Regent Honeyeater (<i>Anthochaera phrygia</i>)	Critically Endangered	81.3	1,369	No ¹
Swift Parrot (<i>Lathamus discolor</i>)	Critically Endangered	81.3	1,369	No ¹
Green and Golden Bell Frog (<i>Litoria aurea</i>)	Vulnerable	2	0	No
Spotted-tailed Quoll (<i>Dasyurus maculatus maculatus</i>)	Vulnerable	154.5	2,445	No ¹
Koala (<i>Phascolarctos cinereus</i>)	Vulnerable	83.9	1,410	No ¹
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	Vulnerable	154.5	2,445	No ¹
New Holland Mouse (<i>Pseudomys novaehollandiae</i>)	Vulnerable	4.1	72	No
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable	154.5	2,445	No ¹
Trailing Woodruff (<i>Asperula asthenes</i>)	Vulnerable	0	0	No

[^] Further breakdown of credit requirements, including identification of relevant PCTs, is provided in Table H2.

¹ DAWE has indicated it does not agree with this conclusion and considers that an offset should be provided for this species. The Department notes that the relevant ecosystem credits (as identified in Table H2) would be retired by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

Central Hunter Valley Eucalypt Forest and Woodland Critically Endangered Ecological Community (Hunter Valley Eucalypt CEEC)

The Project involves the clearance of 122.9 ha of Hunter Valley Eucalypt CEEC, comprising 106.7 ha of woodland, 1.8 ha of plantation and 14.4 ha of derived native grassland (DNG). This equates to a total of 1,810 ecosystem credits.

While the clearance of approximately 123 ha of the Hunter Valley Eucalypt CEEC is likely to have a significant impact on this community, the Assessment of Commonwealth Matters (ACM) describes that a further 43 ha of Hunter Valley Eucalypt CEEC has been avoided through detailed project design.

Glencore has committed to a range of measures to manage indirect 'edge effects' of Hunter Valley Eucalypt CEEC, including the delineation of clearance areas to avoid unnecessary impacts and clearance of surrounding vegetation, progressive rehabilitation of the Project area and the ongoing management of dust, weeds and erosion and sedimentation (see **Section H3**).

Glencore also proposes rehabilitation of the Project area post mining to include habitat enhancement measures such as the installation of nest boxes, salvaged hollows, fallen timber, hollow logs and rocks.

The impacts of the Project on this CEEC have been calculated in accordance with the FBA. Glencore has committed to offset the residual impacts of the Project on Hunter Valley Eucalypt CEEC in accordance with the *NSW Biodiversity Offsets Scheme*.

The Department's recommended conditions require Glencore to secure the required biodiversity offsets for the Project, rehabilitate the Project disturbance areas and prepare a Biodiversity Management Plan, which must include a focus on the regeneration, enhancement and re-establishment of the EECs impacted by the Project, including Hunter Valley Eucalypt CEEC.

The Department is satisfied that impacts to the Hunter Valley Eucalypt CEEC are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Regent Honeyeater (*Anthochaera phrygia*)

The Regent Honeyeater was not recorded within the Project area, with the nearest recorded sighting of this species being approximately 16 km to the southwest near Warkworth. Additionally, no breeding habitat was identified within the disturbance footprint and the Project is not located within any areas of 'important habitat' mapped by the BCD.

The Referral Decision identified 166 ha of potential foraging or breeding habitat for the Regent Honeyeater. However, detailed vegetation mapping of the Project area undertaken to inform the EIS identified that only 81.3 hectares in the Project area would be potentially suitable habitat. Of the 81.3 ha of potentially suitable habitat, only approximately 2 ha contains key foraging species, as identified in the National Recovery Plan for the species (DoE 2016), namely Spotted Gum (*Corymbia maculata*). Further to this, the 2 ha of Spotted Gum was recorded in a rehabilitative state, having only been planted between 10 and 30 year ago.

Overall, the information presented in the ACM indicates that the Project is unlikely to result in a significant impact on this species. No breeding or nesting habitat has been identified within the proposed disturbance area and the Regent Honeyeater has not been recorded within the Project area in contemporary or historical surveys. Despite this, DAWE has indicated it does not agree with this conclusion and has indicated an offset should be provided for the Regent Honeyeater given the proposed clearance of potential foraging habitat.

The Department notes that the removal of 81.3 ha of potentially suitable habitat for the Regent Honeyeater generates 1,369 ecosystem-credits which would be retied by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

Glencore has also proposed a range of measures to minimise potential indirect impacts on the Regent Honeyeater including delineation of clearance areas to avoid unnecessary impacts and clearance of surrounding vegetation, pre-clearance surveys and progressive rehabilitation of the Project area (see **Section H3**).

The Department is satisfied that impacts to the Regent Honeyeater are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Swift Parrot (*Lathamus discolor*)

The Swift Parrot was not recorded within the Project area or surrounding area, no breeding habitat was identified within the disturbance footprint and the Project is not located within any areas of 'important habitat' mapped by the BCD. However, the ACM considered that the Swift Parrot may infrequently use seasonal forage habitat within the Project area and identified that 81.3 ha of potential foraging habitat would be cleared by the Project.

The species has been recorded on three occasions outside of the proposed surface disturbance area since 2005, with the most recent recording from 2014 in the Mount Owen Complex Southeast Offset Area. Additionally, as Swift Parrots only breed in Tasmania, there would be no breeding habitat within the proposed surface disturbance area. Given the Swift Parrot's mobility and the availability of similar foraging habitat in the surrounding locality, the ACM indicates that clearing associated with the Project is likely to have minimal impacts on the species. Despite this, DAWE has indicated it does not agree with this conclusion and has indicated an offset should be provided for the Swift Parrot given the proposed clearance of potential foraging habitat.

The Department notes that loss of potential foraging habitat for this species would generate 1,369 ecosystem credits (see **Table H2**), which would be retied by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

Glencore has also proposed measures to minimise potential indirect impacts on the Swift Parrot, including delineation of clearance areas to avoid unnecessary impacts and clearance of surrounding vegetation, pre-clearance surveys and progressive rehabilitation of the Project area (see **Section H3**).

The Department is satisfied that impacts to the Swift Parrot are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Green and Golden Bell Frog (*Litoria aurea*)

The Green and Golden Bell Frog was not recorded within the Project Area and it has not been recorded in the wider locality for over 20 years. Although the species was 'rediscovered' in the upper Hunter in 1994 at the nearby Mount Owen Mine, annual surveys undertaken by University of Newcastle within suitable habitat have not recorded the species since 1999.

Given the species has not been recorded in the wider locality since 1999, the aquatic habitats within the Project area only represent potential habitat. The Project would result in the clearance of nine farm dams with suitable fringing riparian vegetation and/or shelter habitat for the species, totalling approximately 2 ha of potential habitat. The ACM concludes that the Project would not result in a significant impact to the Green and Golden Bell Frog given the lack of recent records of the species in the wider locality and limited suitable potential habitat within the Project area.

Spotted-tailed Quoll (*Dasyurus maculatus maculatus*)

The Spotted-tailed Quoll was recorded within the Project Area on four occasions during the 2017 and 2018 surveys. The BDAR details that the Spotted-tailed Quoll has been recorded regularly at the Mount Owen Complex during fauna monitoring, with the species recorded annually between 1994 and 2014 (except 1998, 1999 and 2005) in Ravensworth State Forest and surrounding woodland and forest communities, including mine rehabilitation. Despite this, the species has not been recorded breeding within the Project Area, and potential den sites have not been recorded during surveys.

As such, known breeding habitat for the species would not be impacted by the Project. However, the ACM notes that all habitats within the species current distribution that are known to be occupied are considered important for the species.

The Project involves the clearance of approximately 154.5 ha of known and potential habitat for the Spotted-tailed Quoll. The ACM concludes that the Project would not result in a significant impact on this species given it would only remove 0.2% of available habitat for the regional 'Barrington Tops' population.

The Department does not agree with this conclusion and considers that the Project could have a significant impact on this species. The Department notes that only 0.2% of available habitat for the regional population would be removed, however if the area of habitat being removed was compared to the extent of known habitat for the species, this percentage would likely be significantly higher. In addition, dispersal of individuals into adjacent habitat could be made difficult by the presence of other Spotted-tailed Quolls already residing in these habitats given the large home ranges of the species.

Notwithstanding, the Department notes that Glencore proposes to offset the impacts of habitat clearance on this species using the relevant ecosystem credits as shown in **Table H2**, in accordance with the *NSW Biodiversity Offsets Scheme*. As such, the Department considers that impacts on the Spotted-tailed Quoll have been adequately assessed.

The Department is satisfied that impacts to the Spotted-tailed Quoll are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Koala (*Phascolarctos cinereus*)

The Koala was not recorded within the Project Area despite recent targeted surveys. The Koala has been recorded on numerous occasions within the wider locality, with most records occurring prior to 2006. The most recent record of this species is from the corner of Hebden Road and the New England Highway approximately 1 km west of the Project Area.

The Project involves the clearance of approximately 84 ha of potential suitable habitat for the Koala. The BDAR confirmed that the Project area contains one primary feed tree (namely Forest Red Gum [*Eucalyptus tereticornis*]) and one secondary food tree (namely Grey Box [*Eucalyptus moluccana*]), although mature individuals were only present in a low abundance. In addition, it was concluded that the Project Area contains habitat critical to the survival for the Koala in accordance with the EPBC Act Referral Guidelines for the Vulnerable Koala (DoE 2014), with a score of 5 out of 10.

In consideration of the records of the Koala in the wider locality and low abundance of mature primary and secondary feed trees, the ACM concluded that the potential habitat within the Project Area only comprised occasional foraging habitat for the species.

Given the availability of better quality foraging habitat in the wider locality, the ACM indicates that the proposed clearance of habitat within the Project Area is unlikely to significantly impact the species. Despite this, DAWE has indicated it does not agree with this conclusion and has indicated an offset should be provided for the Koala given the proposed clearance of potential foraging habitat.

The Department notes that the removal of 83.9 ha of potentially suitable habitat for the Koala generates 1,410 ecosystem-credits (see **Table H2**) which would be retied by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

The Department is satisfied that impacts to the Koala are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Large-eared Pied Bat (*Chalinolobus dwyeri*)

Possible calls of the Large-eared Pied Bat were recorded in 2014 at the intersection of Hebden Road and Bowmans Creek, within the Project Area, however the species was not captured to confirm the identification. Similarly, potential calls of this species have been recorded at the adjacent Mount Owen Complex in 1999, 2001, 2006, 2008, 2014 and 2015, however the species has never been positively identified. The ACM concludes that the Project Area does not contain habitat critical to the survival of the species given the lack of suitable cliffline or cave roosting habitat and the infrequency of unconfirmed records of the species within the wider locality.

The Project involves the clearance of up to 154.5 ha of Eucalypt-dominated vegetation communities, which provide potential foraging habitat for the Large-eared Pied Bat. DAWE has indicated it considers that an offset should be provided for the Large-eared Pied Bat given the proposed clearance of potential foraging habitat.

The Department notes that the removal of 154.5 ha of potentially suitable habitat for the Large-eared Pied Bat generates 2,445 ecosystem-credits (see **Table H2**) which would be retied by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

The Department is satisfied that impacts to the Large-eared Pied Bat are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

New Holland Mouse (*Pseudomys novaehollandiae*)

The New Holland Mouse was not recorded within the Project Area despite recent targeted surveys. However, it is noted that the species has been recorded during fauna monitoring at the adjoining Mount Owen Complex, with most captures of the species occurring between 2003 and 2007 (Forest Fauna Surveys 2019). The most recent record of the species was in 2016 where it was captured during fauna monitoring in the northern portion of Ravensworth State Forest.

The Project involves the clearance of approximately 4 ha of potential suitable habitat for the New Holland Mouse, comprising entirely of plantation and previously rehabilitated communities. Given the availability of better quality foraging habitat in the nearby Ravensworth State Forest and Mount Owen Mine rehabilitation areas, the ACM indicates that the proposed clearance of habitat within the Project Area is unlikely to significantly impact the species.

Nonetheless, Glencore has proposed a range of measures to minimise potential impacts on the New Holland Mouse, as outlined in **Section H3**. The residual impacts of the Project on the New Holland Mouse would also be offset under the relevant ecosystem credits as shown in **Table H1**, in accordance with the *NSW Biodiversity Offsets Scheme*.

Grey-headed Flying Fox (*Pteropus poliocephalus*)

The Grey-headed Flying Fox was not recorded within the Project Area or surrounding area and no breeding habitat was identified within the disturbance footprint. The closest known Grey-headed Flying Fox camp is in Singleton, about 16 km from the Project area. Species has been previously recorded at the nearby Mount Owen Complex, however no roosts sites have been located.

The Project involves the clearance of up to 154.5 ha of Eucalypt-dominated vegetation communities, which provide potential foraging habitat for the Grey-headed Flying Fox. Given the availability of equivalent foraging habitat in the nearby Ravensworth State Forest, the ACM indicates that the proposed clearance of habitat within the Project Area is unlikely to significantly impact the species.

Despite this, DAWE has indicated it does not agree with this conclusion and has indicated an offset should be provided for the Grey-headed Flying Fox given the proposed clearance of potential foraging habitat.

The Department notes that the removal of 154.5 ha of potentially suitable habitat for the Grey-headed Flying Fox generates 2,445 ecosystem-credits (see **Table H2**) which would be retied by Glencore in accordance with the *NSW Biodiversity Offsets Scheme*.

The Department is satisfied that impacts to the Grey-headed Flying Fox are acceptable and could be fully offset. The Department has recommended a Biodiversity Management Plan to ensure Glencore implements its proposed mitigation measures.

Trailing Woodruff (*Asperula asthenes*)

The Trailing Woodruff was not recorded within the Project Area or surrounding area despite targeted surveys for the species. The ACM describes that the closest confirmed record of this species occurs over 50 km to the north-east of the Project Area in the Barrington Tops.

Extensive targeted threatened flora surveys undertaken during the species' known detection period in 2017 and 2018 failed to record the Trailing Woodruff in the Project Area. Furthermore, floristic surveys undertaken to sample vegetation across the site did not record the species.

The ACM concludes that the Project would not result in the loss of habitat for the Trailing Woodruff as it does not occur in the Project Area. Given the lack of confirmed records within the Project Area and the wider region, it was determined that a significant impact on this species is highly unlikely to occur.

H.2 Impacts to Water Resources

A detailed assessment of the Project's potential impacts on water resources is provided in **Section 6.7** while impacts on Groundwater Dependent Ecosystems is provided in **Section 6.8** of the Department's Assessment Report.

The Department's assessment has considered predicted impacts on groundwater and surface water resources, including impacts on GDEs, water users and downstream environments, having regard to expert advice provided by the IESC, DPE Water, NRAR and the EPA.

The Department considers that the proposed action is unlikely to have significant impacts on regional groundwater and surface water resources. The Department is also of the view that the water-related impacts of the Project can be appropriately monitored, mitigated and managed under recommended conditions of consent. The Department has recommended conditions requiring Glencore to:

- ensure that it has sufficient water for all stages of the Project, and if necessary, adjust the scale of mining operations on site to match its available water supply;
- ensure that all necessary water licences are obtained to account for any water take from mining activities;
- not discharge any mine water or dirty water from the site;

- provide compensatory water supplies to any private landowner whose water supply is adversely affected by the Project (although it is predicted that this is unlikely to occur);
- comply with a range of water management performance objectives and rehabilitation objectives;
- design and construct the Yorks Creek diversion to agreed best practice standards;
- prepare and implement a comprehensive Yorks Creek Diversion Management Plan; and
- prepare and implement a comprehensive Water Management Plan for the Project, including a:
 - water balance;
 - surface water management plan and monitoring program;
 - ground water management plan and monitoring program;
 - program to regularly (every 3 years) validate the water balance and groundwater model; and
 - protocol for minimising cumulative water-related impacts.

H.3 Demonstration of ‘Avoid, Mitigate, Offset’ for Matters of National Environmental Significance (MNES)

Avoidance of Biodiversity Impacts

Glencore notes that the design of the Project has been refined to reduce its disturbance by approximately 158 ha since lodgement of the EPBC Act Referral, including the avoidance of 43 ha of Hunter Valley Eucalypt CEEC and 85 ha of potential suitable habitat for the Swift Parrot and Regent Honeyeater.

While the Project, as proposed, would result in the total clearance of 122.9 ha of CEEC, the Department notes that:

- as a ‘brownfield’ development, the Project would utilise existing cleared areas at the Glendell Mine Site, thereby reducing the total impact area required for the development; and
- the biodiversity offset for the Project may include targeted rehabilitation of the CEEC.

Mitigation and Management of Indirect Biodiversity Impacts

Glencore has committed to a number of measures aimed at minimising the residual biodiversity impacts of the Project. These include:

- salvage of biodiversity features, including habitat resources (e.g. hollow logs, tree hollows, fallen timber and rocks/boulders) and material for rehabilitation (e.g. seed collection, and topsoil);
- comprehensive vegetation and habitat clearing protocols;
- weed and feral animal control;
- fencing and access restrictions;
- bushfire management;
- riparian zone management;
- dust, noise, lighting, blasting and erosion and sediment controls;
- workforce education and training; and
- progressive rehabilitation and landform establishment.

The Department’s recommended conditions would also require Glencore to implement best practice air quality management in accordance with a detailed Air Quality and Greenhouse Gas Management Plan.

Blasting impacts are also likely to be minor, as Glencore would design blasts to minimise ground vibration and overblast pressure within applicable criteria.

The Department considers that noise and lighting impacts can be suitably managed under a Noise Management Plan and Visual Impact Management Plan. The Department’s recommended conditions also require Glencore to develop and implement pest and weed management protocols as part of a comprehensive Biodiversity Management Plan (BMP) for the Project, having regard to relevant Threat Abatement Plans (see **Section H.4.2**).

Biodiversity Offset Strategy

The Department’s recommended conditions require Glencore to implement its Biodiversity Offset Strategy, as described in the EIS and additional information, which accounts for the residual impacts of the Project that cannot be addressed through the proposed avoidance and mitigation measures, as outlined in **Table H2**.

Table H2 | Summary of biodiversity credit requirements for MNES

Ecological Feature	Associated PCT	Ecosystem Credits Required*
Ecosystem Credits		
	PCT 1603	1,490
Central Hunter Valley Eucalypt Forest and Woodland CEEC	PCT 1692	313
	PCT 1604	7
	PCT 1603	1,358
Regent Honeyeater (<i>Anthochaera phrygia</i>)	PCT 1604	11
	PCT 1603	1,358
Swift Parrot (<i>Lathamus discolor</i>)	PCT 1604	11
	PCT 485	34
Spotted-tailed Quoll (<i>Dasyurus maculatus maculatus</i>)	PCT 1603	1,371
	PCT 1604	11
	PCT 1692	322
	PCT 1731	707
Koala (<i>Phascolarctos cinereus</i>)	PCT 1603	1,371
	PCT 1604	11
	PCT 1731	28
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	PCT 485	34
	PCT 1603	1,371
	PCT 1604	11
	PCT 1692	322
	PCT 1731	707

	PCT 1603	33
New Holland Mouse (<i>Pseudomys novaehollandiae</i>)	PCT 1604	11
	PCT 1731	28
	PCT 485	34
	PCT 1603	1,371
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	PCT 1604	11
	PCT 1692	322
	PCT 1731	707

* The credits outlined in this table only relate to the portions of the corresponding PCTs which provide habitat for the relevant MNES, not the full extent of the PCT being impacted by the Project. As such, the credit values will not directly align with the credit requirements outlined in Section 6.8 (Table 9) of the main text of this assessment.

Importantly the ecosystem credits required to be retired for each MNES are a subset of the overall ecosystem credits required to be retired for the Project. With this in mind, the Department's recommended conditions do not include specific credits for each MNES, given that by retiring the ecosystem credits required for the Project (as prescribed in the Recommended Conditions), Glencore would also be satisfying the offset liability for each of the impacted MNES listed in Table H2.

Glencore proposes to retire the required credits in accordance with the Biodiversity Assessment Method, using one or a combination of offsetting mechanisms available under the Biodiversity Offset Scheme, including the establishment of two Biodiversity Offset Sites, use of available credits from other offset sites, payment into the Biodiversity Conservation Fund and mine site ecological rehabilitation. Credits relating to MNES would be retired on a like-for-like basis.

The Department accepts that all offset methods proposed are in accordance with the BAM and are considered 'like for like' in accordance with the *NSW Biodiversity Offset Policy for Major Projects* and the EPBC Act *Environmental Offset Policy*.

Avoidance, Mitigation and Offsetting of Impacts on Water Resources

The Department's recommended conditions impose strict performance measures for the Project. These performance measures would require Glencore to ensure that its operations:

- have negligible impacts on alluvial aquifers (including changes to water quality, water levels or impacts on groundwater users) beyond those predicted in the EIS;
- maintain or improve base channel stability for Bowmans Creek; and
- have negligible impacts on aquatic and riparian ecosystems within Bowmans Creek and its tributaries beyond those predicted in the EIS.

The recommended conditions would require the development of detailed Water Management Plans, including surface and groundwater monitoring programs and Trigger Action Response Plans to manage risks during mining operations.

The recommended conditions also provide a mechanism for remediation of unexpected impacts on water resources. In the event that these impacts cannot be suitably remediated, the recommended conditions would require Glencore to provide a proportionate offset, in consultation with relevant Government agencies.

H.4 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 either 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 Advice.

H.4.1 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 (as has been undertaken for this proposal) to avoid and minimise adverse impacts on biological diversity. The Department's recommended conditions require 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 approvals are 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 approvals are not inconsistent with CITES as the proposed action does not involve international trade in specimens of wild animals and plants.

H.4.2 Recovery Plans and Approved Conservation Advices

The Department has undertaken a detailed and comprehensive assessment of the potential impacts of the Project on listed threatened species and communities under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the EPBC Act. The Department has taken into consideration approved Conservation Advice and Recovery Plans for the species and communities which may be impacted by the Project.

Conservation Advice

The following Conservation Advice is relevant to the proposed action:

- *Approved Conservation Advice (including listing advice) for the Central Hunter Valley eucalypt forest and woodland ecological community* (May 2015);
- *Conservation Advice Lathamus discolor Swift Parrot* (May 2016);
- *Conservation Advice Anthochaera phrygia Regent Honeyeater* (July 2015);
- *Conservation Advice Dasyurus maculatus maculatus (southeastern mainland population) Spotted-tailed Quoll, south eastern mainland* (TSSC, 2020);
- *Approved Conservation Advice for Litoria aurea (green and golden bell frog)* (April 2014);
- *Approved Conservation Advice for Phascolarctos cinereus (combined populations in Queensland, New South Wales and the Australian Capital Territory)* (May 2012);
- *Approved Conservation Advice for Pseudomys novaehollandiae (New Holland Mouse)* (August 2010);
- *Conservation Advice for Chalinolobus dwyeri (Large-eared Pied Bat)* (DAWE, 2021); and
- *Approved Conservation Advice for Asperula asthenes* (March 2008).

There is no approved Conservation Advice in respect of the Grey-headed Flying-fox.

The Department has considered relevant Conservation Advice in its assessment of the Project, particularly in respect to Central Hunter Valley Eucalypt Forest and Woodland CEEC which has the potential to be significantly impacted by the Project.

The key threats to MNES species include mining-related vegetation clearing and landscape fragmentation, introduction of weeds, predation (particularly by feral cats and foxes), removal of fallen timber and bush rock, habitat degradation by livestock and altered fire regimes.

The Department's recommended conditions would require Glencore to:

- engage a suitably qualified person to undertake pre-clearance surveys and relocate threatened fauna encountered during surface disturbance;
- minimise indirect 'edge effects' on vegetation adjacent to disturbance areas;
- manage weeds and feral pests in accordance with a detailed Biodiversity Management Plan;
- maximise the salvage of fallen timber and tree hollows from disturbance areas to improve habitat integrity in biodiversity offset areas;
- manage spontaneous combustion risks and develop and implement a Bushfire Management Plan;
- progressively rehabilitate the Project and establish woodland corridors to connect surrounding habitat; and
- offset the residual impacts of the Project in accordance with the BAM and Biodiversity Offsets Scheme.

The Department considers that the Project can be carried out in a manner that is consistent with relevant Conservation Advice for impacted MNES.

Recovery Plans

The following Recovery Plans are relevant to the proposed action:

- *National Recovery Plan for the Swift Parrot (Lathamus discolor)*;
- *National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)*;
- *National Recovery Plan for the Spotted-tailed Quoll (Dasyurus maculatus)*; and

- *National Recovery Plan for the Grey-headed Flying-fox (Pteropus poliocephalus).*

There are no approved recovery plans for the Central Hunter Valley Eucalypt Forest and Woodland CEEC, Green and Golden Bell Frog, Koala, Large-eared Pied Bat, New Holland Mouse or Trailing Woodruff.

The key objectives of the relevant Recovery Plans include:

- preventing a further decline in the Swift Parrot population and achieving a demonstrable sustained improvement in the quality and quantity of habitat;
- reversing the long-term population trend of decline and increase the number of Regent Honeyeaters to a level where there is a viable, wild breeding population even in poor breeding years; and
- enhancing the condition of Regent Honeyeater habitat to maximise survival and reproductive success and provide refugia during periods of extreme environmental fluctuation;
- reducing the rate of decline of the Spotted-tailed Quoll, and ensure that viable populations remain throughout its current range in eastern Australia; and
- improving the national population trends, and identify, protect and increase key foraging and roosting habitat for the Grey-headed Flying Fox.

Glencore has committed to offset the impacts of the Project on MNES on a like-for-like basis in accordance with the BAM and the Biodiversity Offsets Scheme.

The Department's recommended conditions would also require Glencore to manage indirect impacts on MNES, including predation by feral pests and altered fire regimes, under a detailed Biodiversity Management Plan.

On this basis, the Department considers that the Project can be carried out in a manner that is consistent with the key objectives of the relevant National Recovery Plans.

H.4.3 Threat Abatement Plans (TAPs)

The Department has considered the Threat Abatement Plans (TAPs) relevant to the Project under the EPBC Act. These TAPs are available at <http://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved>. The TAPs which are relevant to the Project are as follows:

- *Threat Abatement Plan for competition and land degradation by rabbits* (in relation to the Regent Honeyeater).
- *Threat abatement plan for predation by feral cats* (in relation to the Swift Parrot, Green and Golden Bell Frog, Spotted-tailed Quoll, Large-eared Pied Bat).
- *Threat abatement plan for predation by the European red fox* (in relation to the Green and Golden Bell Frog, Spotted-tailed Quoll).

The Project has the potential to:

- facilitate the spread, or lead to a higher abundance of cats and foxes (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.

The Department has included measures for the control of feral animals under the recommended Biodiversity Management Plan for the Project, including specific requirements for Glencore to consider the actions identified in relevant TAPs. With these measures in place, the Department considers that the action can be carried out in a manner which is compatible with the relevant TAPs.

The following TAPs apply to species and communities affected by the action, but are not considered relevant to the Project:

- *Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (2016)* (this TAP is relevant to Green and Golden Bell Frog, but the Project is not expected to result in the spread of this disease though the local area); and
- *Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomic* (this TAP is relevant to *the* New Holland Mouse, but the Project is not expected to result in the spread of this disease though the local area).

H.5 Additional EPBC Act Considerations

Table H3 contains a range of further mandatory considerations to be taken into account and factors to have regard to under the provisions of the EPBC Act.

Table H3 | Additional Considerations for the Commonwealth Minister under the EPBC Act

EPBC Act Section	Consideration	Conclusion
<i>Mandatory considerations</i>		
136(1)(b)	Social and economic matters are discussed in the EIS and Section 6.11 of this Report.	The Department considers that the proposed development would result in a range of benefits for the local and regional economies and would allow for the continued and valuable production of coal from the region.
<i>Factors to be taken into account</i>		
136(2)(a)	<p>Principles of ecologically sustainable development (ESD), including the precautionary principle, have been taken into account, in particular in:</p> <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 	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.

- 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.

136(2)(e)	Other information on the relevant impacts of the action.	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 Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC)	The Department has reviewed the advice and recommendations of the IESC, and considered Glencore's response (see Appendix D) to these matters in Section 6.7

Factors to have regard to

176(5)	Bioregional Plans	<p>The Commonwealth Government released its bioregional assessment package for the Northern Sydney Basin - Hunter Subregion in May 2018.</p> <p>The Department notes that the Project area is not within the Bioregional Assessment area.</p> <p>The Department also notes that a more contemporary and detailed assessment of the Project's potential impacts on water resources and biodiversity has been provided in the EIS. The Department considers that these assessments are more likely to provide an accurate prediction of cumulative environmental impacts of the Project than any regional-scale assessment tool.</p>
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Considerations on deciding conditions

134(4)	<p>Must consider:</p> <ul style="list-style-type: none"> • 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. 	<p>Documents provided by Glencore are provided at Appendices A, C and D of this report.</p> <ul style="list-style-type: none"> • The Department considers that the recommended conditions of consent in Appendix I are a practicable and cost-effective means to achieve their purposes. • These conditions have been prepared following careful considerations of material provided by Glencore and following consultation with NSW Government Agencies and DAWE.
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H.6 Conclusions on Controlling Provisions

H.6.1 Threatened Species and Communities (sections 18 and 18A of the EPBC Act)

The information provided to date identifies that the Project could have the potential to result in significant impacts on the Central Hunter Valley Eucalypt Forest and Woodland CEEC.

The Project also has potential to significantly impact the Regent Honeyeater, Swift Parrot, Green and Golden Bell Frog, Spotted-tailed Quoll, Koala, Large-eared Pied Bat, New Holland Mouse, Grey-headed Flying-fox and Trailing Woodruff, however the ACM indicates that significant impacts to these species are unlikely to arise.

The Department considers that the impacts of the proposed 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 I**).

Glencore has committed to offset the impacts of the Project on threatened species and communities, as outlined in **Table H2**, in accordance with the requirements of the NSW *Biodiversity Offsets Scheme*.

The recommended conditions provide flexibility for Glencore to use one or more of the mechanisms available under the Biodiversity Offsets Scheme, provided that all credits relating to MNES are retired on a like-for-like basis.

Glencore would be required to retire all of the credits required for the Project prior to commencing mining operations in the Project area, or other timeframe agreed by the Planning Secretary. This timing reflects the need to retire relevant biodiversity offset credits prior to disturbance, but also allows for flexibility in the commencement of limited construction activities where the Planning Secretary is satisfied that sufficient credits have been retired for these works (e.g. through payment into the BCF), while a Biodiversity Stewardship Agreement is being entered into for the land based offsets.

The Department has also recommended a condition requiring Glencore to prepare a detailed Biodiversity Management Plan. This plan would describe the measures to be implemented to:

- avoid and minimise impacts to threatened species and communities;
- regenerate, enhance and re-establish Hunter Valley Eucalypt CEEC;
- re-establish habit and foraging resources for the Swift Parrot and Regent Honeyeater; and
- control feral pests in accordance with the relevant TAPs.

The Department recommends that the Commonwealth Minister require Glencore to implement the State's conditions, where they relate to the management of impacts on threatened species and communities listed under the EPBC Act.

H.6.2 Water Resources (sections 24D and 24E of the EPBC Act)

The Project was jointly referred by the Department and DAWE to the IESC, requesting advice on potential surface water and groundwater impacts, including potential impacts on GDEs, downstream water users and receiving environments. The IESC's advice is included in **Appendix D**.

The Department has considered the IESC's advice and Glencore's response in its assessment of the Project and in its recommended conditions (see **Appendix I**).

H.7 Other Protected Matters

DAWE 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, migratory species, Ramsar wetlands, the Commonwealth marine environment, Commonwealth land, Commonwealth actions, nuclear actions, the Great Barrier Reef Marine Park and Commonwealth Heritage places located overseas.

H.8 Conclusions

Threatened species and communities (Sections 18 and 18A of the EPBC Act)

For the reasons set out in **Section 6.8** and this Appendix, the Department recommends that the impacts of the action would be acceptable, subject to the avoidance and mitigation measures described in Glencore's EIS (see **Appendix A**) and Submissions Report (see **Appendix C**), and the Department's recommended conditions of consent (see **Appendix I**).

A water resource, in relation to coal seam gas development and large coal mining development (Sections 24D and 24E of the EPBC Act)

For the reasons set out in **Section 6.7** and this Appendix, the Department recommends that the impacts of the action on a water resource, in relation large coal mining development would be acceptable, subject to the avoidance and mitigation measures described in Glencore's EIS (see **Appendix A**), Submissions Report (see **Appendix C**) and additional supporting information (see **Appendix F**), and the Department's recommended conditions of consent (see **Appendix I**).

Appendix I – Recommended Instrument of Consent for SSD 9349

Refer to "Recommendation" folder on the Department's website at:

<https://www.planningportal.nsw.gov.au/majo01r-projects/project/10086>

Appendix J – Recommended Instrument of Modification for SSD 5850

Refer to "Recommendation" folder on the Department's website at:

<https://www.planningportal.nsw.gov.au/major-projects/project/27026>