GLENDELL
CONTINUED OPERATIONS

GLENCORE

GLENDELL CONTINUED OPERATIONS PROJECT

RESPONSE TO SUBMISSIONS

PART A

MAY 2020

umwelt
Environmental & Social Consultants

GLENDELL CONTINUED OPERATIONS PROJECT

PART A

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Glencore

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Report No.	4166F/GCOP RTS
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1.0 Introduction

The Environmental Impact Statement (EIS) for the Glendell Continued Operations Project (SSD 9349) (the Project) was placed on public exhibition from 11 December 2019 to 14 February 2020. This Response to Submissions (RTS) has been prepared to address the issues raised in the submissions received during the public exhibition period and a number of agency submissions received following this exhibition period.

The existing Glendell Mine forms part of the Mount Owen Complex located within the Hunter Coalfields in the Upper Hunter Valley of New South Wales (NSW), approximately 20 kilometres (km) north-west of Singleton and 24 km south-east of Muswellbrook (refer to **Figure 1.1**). The Mount Owen Complex is owned by subsidiaries of Glencore Coal Pty Limited (Glencore). The proponent is proposing to extend the life of operations at the Glendell Mine and optimise the use of infrastructure at the Mount Owen Complex by extending mining in the existing Glendell Pit to the north (the Project).

A total of 359 submissions were made in response to the public exhibition of the Project EIS. This included 16 agency submissions and 343 community and interest group submissions. The 343 submissions received included 205 submissions in support of the Project.

This RTS has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Glencore and seeks to address the issues raised in agency, community and interest group submissions considering the Department of Planning, Industry and Environment (DPIE) draft guideline on Preparing a Submissions Report (draft guideline) (DPIE, 2019). The RTS is divided into two separate reports (Part A and Part B). At the time of preparation of this Part A report, ongoing consultation and assessment work is being undertaken to respond to the issues raised in relation to Heritage. This additional work is being undertaken to inform Glencore's response to the Heritage Council submission and BCD submission as well as the Plains Clans of the Wonnarua People (PCWP) submission and community submission (submitter ID S-121212). For this reason, responses to these submissions have not been provided in this Part A report. A separate Part B report will be provided following completion of this additional work and submitted to DPIE separately.

It is also noted that a separate response will be provided to the issues raised by the submission from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, established under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (IESC).

Appendix 1 provides a register of objecting, supporting and comment submitters for the Project. It also provides cross-references to relevant sections of this RTS which address the submitters issues or comments.

1.1 The Project

The Project is the proposed extension of open cut mining operations at the current Glendell Mine, to extract the coal reserves in the mining authorities to the north (refer to **Figure 1.2**). This extension would extract an additional 135 Mt, approximately, of ROM coal. This proposed extension of the Glendell Pit is referred to as the Glendell Pit Extension. The mining of the Glendell Pit Extension will involve the extraction of reserves down to and including the Hebden seam. Assuming approval in 2021, the Project would extend the life of mining operations at Glendell to approximately 2044 and provide significant ongoing employment opportunities. The Glendell Pit Extension mining area represents one of the last remaining un-mined and easily accessible resources in the greater Ravensworth area.

The Project represents a brownfield continuation of the existing Glendell Pit and fits within Glencore's commitment to cap its global coal production at 150 Mtpa of saleable product. The Project will occur at a time when production at Glencore's adjacent Liddell Coal Operations, and the Ravensworth East and Glendell Mines have ceased. The coal produced by the Project is 'replacement production' that will help to maintain Glencore's long term production profile.

As a continuation of the existing mining operations, the Project will utilise existing infrastructure at the Mount Owen Complex currently used for mining at Glendell. ROM coal sourced from Glendell Pit Extension will continue to be processed through the Mount Owen CHPP, including ongoing coal stockpiling and train loading at Mount Owen Complex for the life of the Project. This will extend the life of the CHPP for approximately an additional 8 years beyond that currently approved by the Mount Owen Consent (i.e. to 2045) and includes an allowance for the processing of coal mined in the latter stages of 2044 in the 2045 calendar year.

The Project will necessitate some changes to the location of existing Mount Owen Complex infrastructure and associated services which will also be sought through the modification of the Mount Owen Consent. The Project will also link with the Mount Owen Complex Water Management System (WMS). Through the linkage with the Mount Owen Complex WMS, the Project will be connected with Glencore's Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) which enables the transfer of water between the mining operations linked to the GRAWTS. At present, the Mount Owen Complex, Integra Underground, Liddell Coal Operations and Ravensworth Coal Operations are all linked via this scheme. The GRAWTS also includes pipeline infrastructure which enables the transfer of tailings material between operations to enable tailings facilities to be managed more efficiently.

The Project will require the removal of the existing Glendell Mine Infrastructure Area (MIA) (including the administration, training and workforce deployment area, bathhouse facilities, carpark etc.) and the construction of a new MIA. In order to access the pit from the proposed MIA and allow for the maintenance of mobile mining fleet, a Heavy Vehicle Access Road is also required. The Project will necessitate the realignment of a section of Hebden Road, realignment of part of Yorks Creek and the relocation of Ravensworth Homestead. The key features of the Project are shown conceptually in **Figure 1.2**.

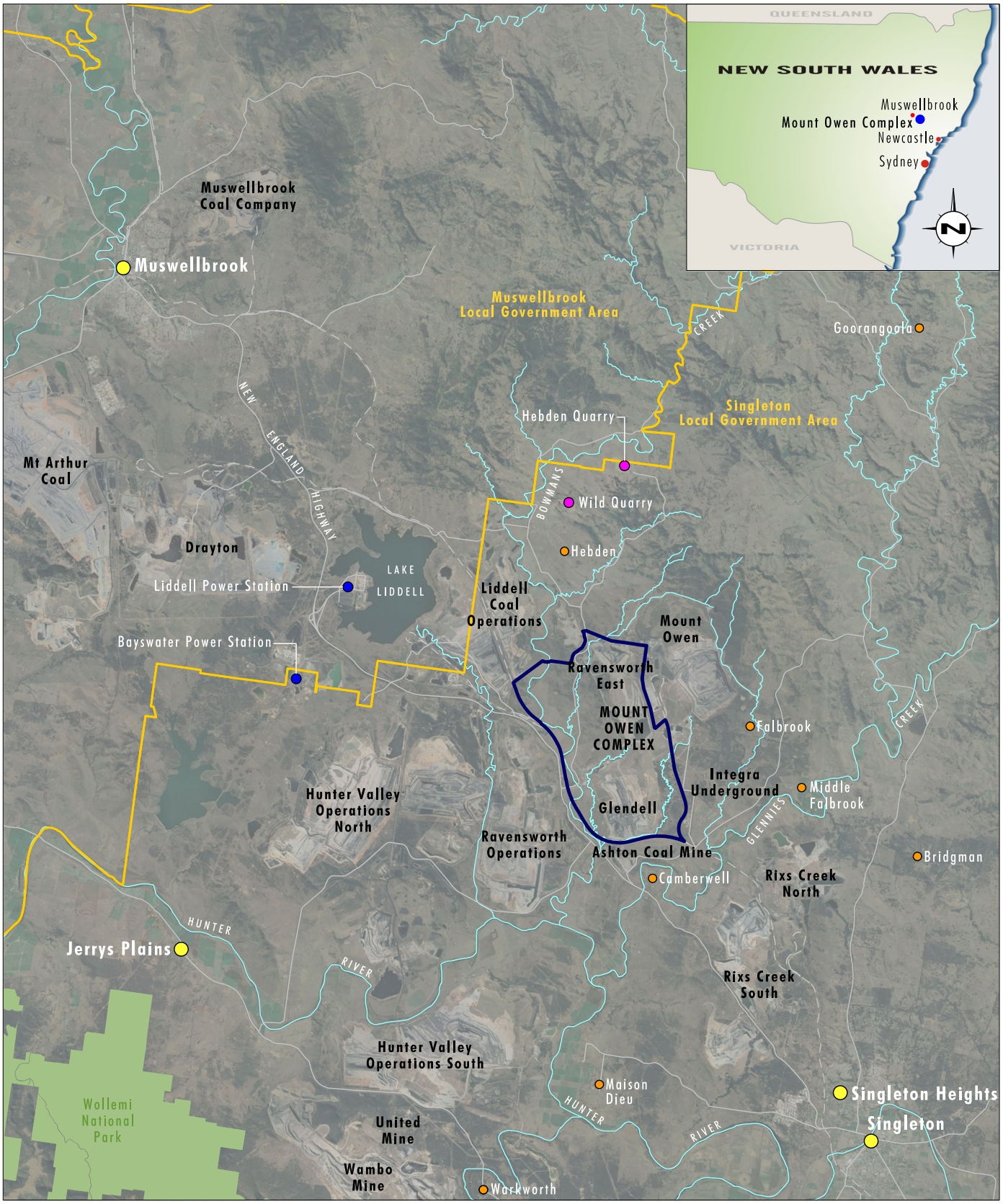


Image Source: Google Earth (2018)
Data Source: Glencore (2019), OEH (2018)

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

File Name (A4): R18/4166_611.dgn
20200428 17.00

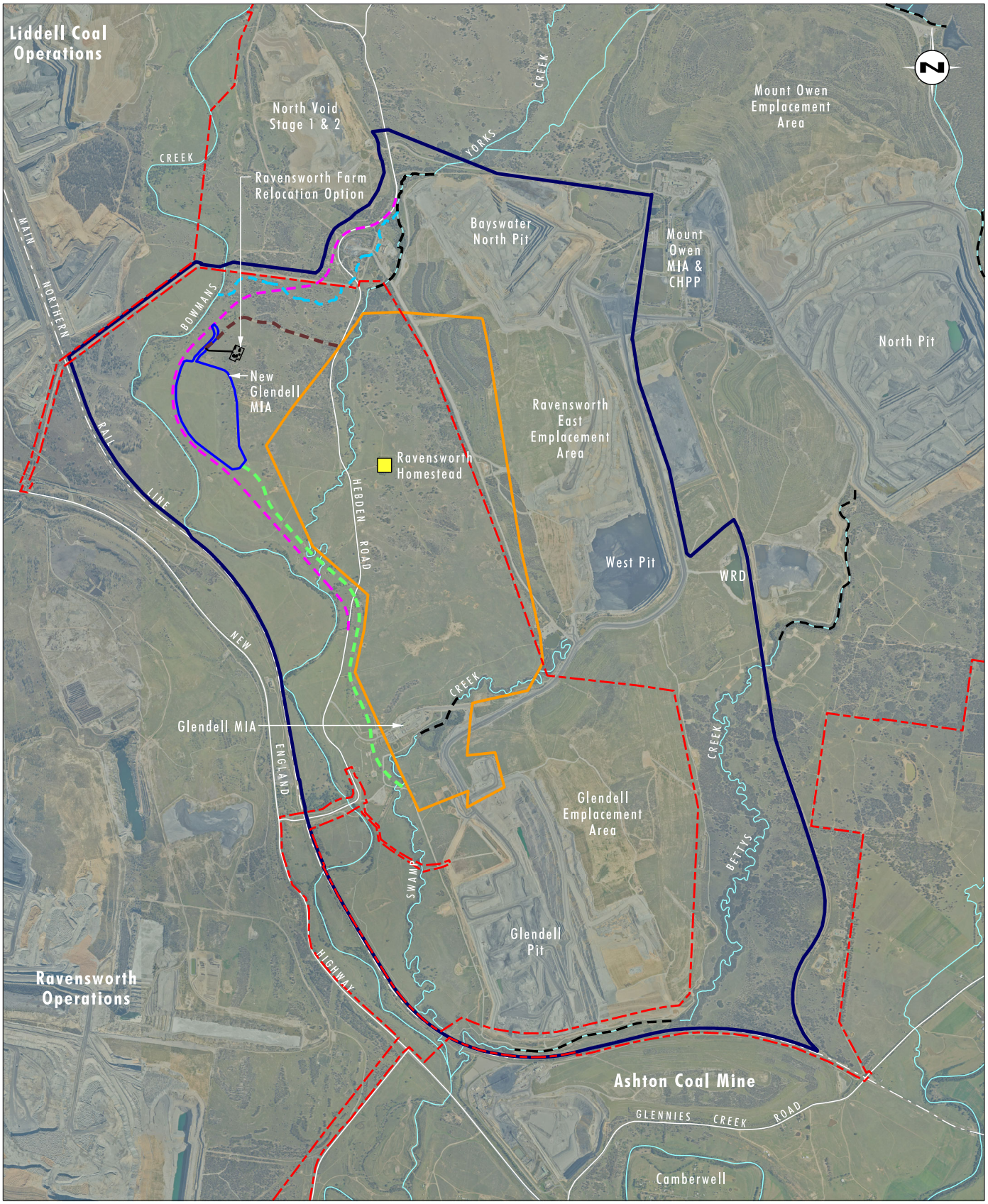


Image Source: Glencore (Dec 2018)
Data Source: Glencore (2019)
Notes: Ravensworth Homestead to be relocated, Mount Owen Consent Boundary assumes Narama Pipeline Modification is approved

Legend

- Project Area
- Glendell Pit Extension
- Mount Owen Consent Boundary
- Ravensworth Homestead
- Existing Creek Diversion
- Construction Access Road

Project Features:

- New Glendell MIA
- Heavy Vehicle Access Road
- Yorks Creek Realignment
- Hebden Road Realignment

FIGURE 1.2

Glendell Continued Operations Project Key Project Features

File Name (A4): R18/4166_612.dgn
20200428 17.07

The Project comprises the following key components:

- brownfield continuation of open cut mining operations of existing approved reserves within the existing Glendell Pit and within a new mining area to the north of the existing Glendell Mine
- provide access to approximately 135 Mt of additional coal reserves through to approximately 2044 using truck and excavator mining methods
- an increase to the existing approved maximum rate of mining at Glendell Mine from 4.5 Mtpa up to approximately 10 Mtpa of coal. This increase would coincide with a decrease in production rates at the other Mount Owen Complex pits to maintain the currently approved throughput at the CHPP
- disturbance of approximately 750 hectares (ha) of primarily cleared rural land outside of areas already approved for disturbance
- continued use of the existing Mount Owen Complex infrastructure for the life of the Project including hauling coal to the existing coal handling, processing and transportation facilities
- emplacement of overburden from the new mining area within the existing approved Glendell mine void to assist with creation of a final landform
- construction of a new MIA
- realignment of a section of Hebden Road
- realignment of the lower section of Yorks Creek, an ephemeral tributary of Bowmans Creek
- relocation of Ravensworth Homestead required to facilitate mining in the new mining area
- construction of a water management system that will be integrated with the existing Mount Owen Complex water management system and wider GRAWTS
- a peak construction workforce of approximately 350 people and continued employment opportunities for the existing operational workforce at the Mount Owen Complex of up to approximately 1,220 full time equivalents (FTE)
- a single final void will remain at the northern end of the new mining area resulting in no additional void in the final landform, which is consistent with the current approved Glendell Mine
- establishment of a final landform that utilises natural landform design principles and provides connectivity to established offsets and areas of existing vegetation. Mount Owen Complex has been recognised as having industry leading rehabilitation practice and this approach will continue to be used for the Project.

The Project has been designed through a detailed social, economic and environmental risk-based approach that aims to maximise resource extraction efficiency and utilise the synergies provided through the use of existing mining infrastructure, whilst seeking to minimise impacts on the environment and surrounding community. As discussed in the EIS, the key learnings from the existing mining operations at the site; the stakeholder engagement program; the comprehensive social impact assessment; and the detailed environmental studies, have all been considered in refining the design of the Project. Numerous changes were made to the design of the Project throughout the impact assessment process in order to minimise environmental and social impacts.

1.1.1 Benefits of the Project

Mining within the existing approved mining area at the Glendell Mine is scheduled to be completed around 2023 if the Project does not proceed. The Project will extend the operational life of Glendell Mine for approximately 20 years providing significant ongoing employment opportunities and other economic benefits at a local, regional and State level. The Project is proposed in an area of historic mining and is a brownfield continuation of the existing mining operation with the target mining area being one of the few remaining economically viable resources in the greater Ravensworth area. The benefits of the Project include:

- maximise efficient recovery of the State's coal resources
- ongoing use of the existing Mount Owen Complex infrastructure and rail infrastructure
- ongoing employment opportunities for the existing Mount Owen Complex workforce
- provide an integrated final landform design across both the existing approved and proposed mining areas, with no additional void as a result of the Project relative to current approved operations
- use the same leading practice environmental management approach and controls as the existing operation
- brownfield continuation of the existing Glendell Mine located in an area of established mining operations
- moving away from the closest private residences in Camberwell and not impacting on any additional residences
- continued support of local community-based groups and initiatives
- ongoing contribution to the local, regional and State economies from a well established mining operation
- a net benefit to the Upper Hunter region of $446.7 million in net present value (NPV) terms
- a net benefit (both direct and indirect) of $1.15 billion to the State over the life of the Project in NPV terms
- provide a royalty revenue stream flowing to the State estimated to be $296.1 million over the life of the Project in NPV terms.

The Project represents a brownfield continuation of the existing Glendell Pit and fits within Glencore's commitment to cap its global coal production at 150 Mtpa of saleable product. The Project will occur at a time when production at Glencore's adjacent Liddell Coal Operations, and the Ravensworth East and Glendell Mines have ceased. The coal produced by the Project is 'replacement production' that will help to maintain Glencore's long term production profile. Further, production of coal in the Hunter Valley is forecast to decline over the next five to ten years. The Project will offset some of this revenue loss and allow utilisation of significant downstream rail and coal loading infrastructure.

Through the implementation of the Project, Glencore believes it can contribute substantial economic benefits at local, regional and State levels whilst minimising environmental impacts and continuing to coexist with the local community.

1.1.2 Assessment Process to Date

Being development for the purpose of coal mining, the Project is declared to be State Significant Development (SSD) under the provisions of State Environmental Planning Policy (State and Regional Development) 2011 and will require development consent under Divisions 4.1 and 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The NSW DPIE is the delegated consent authority to make decisions on SSD applications where there are less than 25 objections to the application, the local council does not object, and there have been no reportable political donations.

The NSW Independent Planning Commission (IPC) is the consent authority for SSD applications where:

- there have been 50 or more objections to the application (other than from a council), or
- the local council has objected, or
- a reportable political donation has been made.

A total of 127 objections were received following the public exhibition of the EIS and therefore the IPC will be the consent authority for the Project.

The EIS for the Project was prepared to assess the environmental and social impacts of the Project and accompanied by a Development Application under Divisions 4.1 and 4.7 of Part 4 of the EP&A Act. The new development consent being sought is proposed to replace the existing Glendell development consent and the Project will operate under the new SSD consent which will regulate future mining at the Glendell Mine including both the existing and proposed mining areas. The Project also requires modifications of the approved operations regulated under the existing Mount Owen Consent, in particular, the extended use of the Mount Owen CHPP and associated transport infrastructure, and the potential use of the Mount Owen MIA. The changes to approved operations under the Mount Owen Consent are being sought as a modification of the Mount Owen Consent under section 4.55(2) of the EP&A Act.

The EIS for the Project was prepared in accordance with the requirements of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000*, including the Secretary's Environment Assessment Requirements (SEARs) which were issued by DPIE on 7 June 2018 and reissued on 11 July 2018 and 12 August 2019 and identified specific requirements to be addressed by the EIS.

The Project was determined to be a Controlled Action (2019/8409) requiring approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) from the Commonwealth Minister for the Environment due to its potential impact on Matters of National Environment Significance (MNES). The assessment path for the Project was confirmed to be under the bilateral agreement between the Commonwealth and NSW Governments and Department of Environment and Energy (DoEE) issued its assessment requirements which were incorporated into the SEARs for the Project and addressed in the Project EIS.

As described in **Section 1.0**, the Project EIS was submitted and then placed on public exhibition from 11 December 2019 to 14 February 2020 with 359 submissions received. This included 16 agency submissions and 343 community and interest group submissions. The 343 submissions received from the community and interest groups included 205 in support, 127 submissions which objected to the Project and 11 were provided as comments.

1.2 Report Structure

This RTS Part A report includes:

- an introduction and a brief summary of the Project to provide context to the submissions (refer to **Section 1.0**)
- an analysis of the submissions provided including the issues and themes raised (refer to **Section 2.0**)
- summary of the actions taken since exhibition (refer to **Section 3.0**)
- detailed response to the issues raised in the government submissions (refer to **Section 4.0**)
- detailed response to the issues raised in the interest group and community submissions (refer to **Section 5.0**)
- a list of proposed additional management measures (refer to **Section 6.0**)
- an updated evaluation of Project merits (refer to **Section 7.0**).

2.0 Submission Analysis

2.1 Breakdown of Submissions

The EIS was placed on public exhibition from 11 December 2019 to 14 February 2020. During the public exhibition period 359 submissions were made on the Project. This included 16 government agency submissions and 16 interest group submissions and 327 community submissions. **Table 2.1** provides a breakdown of submissions received for the Project.

Table 2.1 Breakdown of Submissions

Category	Number of submissions
Agency	**16**
Interest Groups	**16**
Community	**327**
Total	**359**

Appendix 1 provides a register of submitters.

2.1.1 Agency Submissions

As outlined in **Table 2.1**, 16 agency submissions were received, which included:

- Department of Planning, Industry and Environment (DPIE) – Division of Mining, Exploration and Geoscience within the Department of Regional NSW (MEG) (previously Division of Resources and Geoscience (DRG))
- Department of Planning, Industry and Environment – Resources Regulator (DRG)
- Department of Planning, Industry and Environment – DPIE Water
- Department of Planning, Industry and Environment – Biodiversity and Conservation Division (DPIE BCD)
- Department of Primary Industries
- Department of Environment and Energy (DoEE)
- Independent Expert Scientific Committee (IESC)
- Environment Protection Authority (EPA)
- Heritage Council of NSW (Heritage Council)
- NSW Rural Fire Service
- NSW Health
- Transport for NSW
- Crown Lands
- Dams Safety NSW

- Subsidence Advisory NSW
- Singleton Shire Council.

Of the 16 submissions received, 14 were comments and two submissions were recorded as being in support of the Project. These supporting submissions were from DRG and Department of Primary Industries. None of the agencies identified that they oppose the Project, however, several agencies made submissions seeking further clarification regarding aspects of the assessment of the Project. These submissions are discussed further in **Section 4.0**.

As discussed in **Section 1.0**, at the time of preparation of this Part A report, ongoing consultation and assessment work is being undertaken to respond to the issues raised in relation to Heritage. This additional work is being undertaken to inform Glencore's response to the Heritage Council submission and BCD submission . For this reason, responses to these submissions have not been provided in this Part A report. A separate Part B report will be prepared following completion of this additional work and submitted to DPIE.

It is also noted that a separate response will be provided to the issues raised by the submission from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, established under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (IESC).

2.1.2 Community and Interest Groups

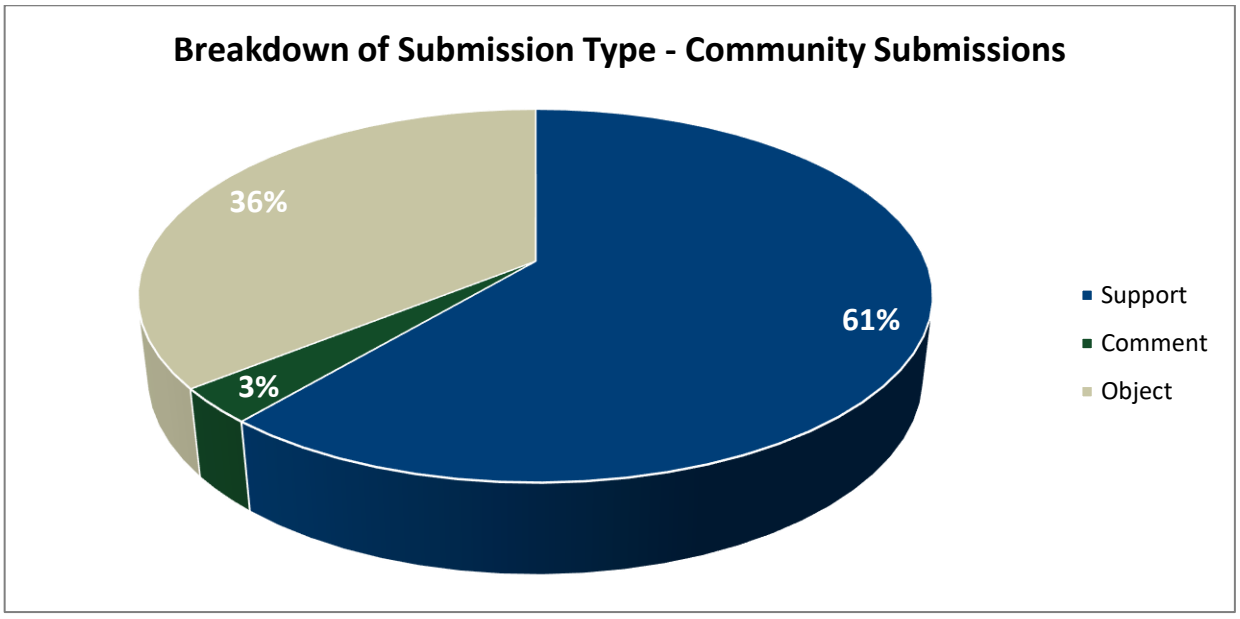
As outlined in **Table 2.1**, 16 interest group submissions were received on the Project. Four of the interest group submissions were received from businesses, however, have been grouped as 'interest group' submissions for the purposes of the analysis. The interest group submissions were received from:

- Denman Aberdeen Muswellbrook Scone Healthy Environment Group
- Doctors for the Environment Australia
- Hunter Environment Lobby
- Plains Clans of the Wonnarua People (PCWP)
- Hunter Environment Lobby Inc.
- Climate Change Australia – Hastings
- Lock the Gate Alliance
- Port Stephens Greens
- EcoNetwork Port Stephens
- Singleton Shire Healthy Environment Group
- Climate Action Newcastle
- Thiess Mining
- Westrac NSW
- Strike Force Services Pty Ltd

- One Key Resources
- Expressway Spares.

As discussed in **Section 1.0**, additional work is being undertaken to inform Glencore's response to the Plains Clans of the Wonnarua People (PCWP) submission and community submission (submitter ID S-121212) and will be included in a separate Part B report. Of the 16 submissions received from interest groups, five were supporting submissions, 10 were objecting submissions and one was recorded as a comment.

In addition to the 16 agency submissions and 16 interest group submissions, 327 community submissions were received on the Project. Of the total 327 community submissions made on the Project, 200 were supporting submissions, 117 were objecting submissions and ten were comments. As a percentage of total submissions, this equates to 61% supporting, 36% objecting and 3% of submission as comments (refer to **Graph 2.1**).



Graph 2.1 Breakdown of Submission Type – Community submissions

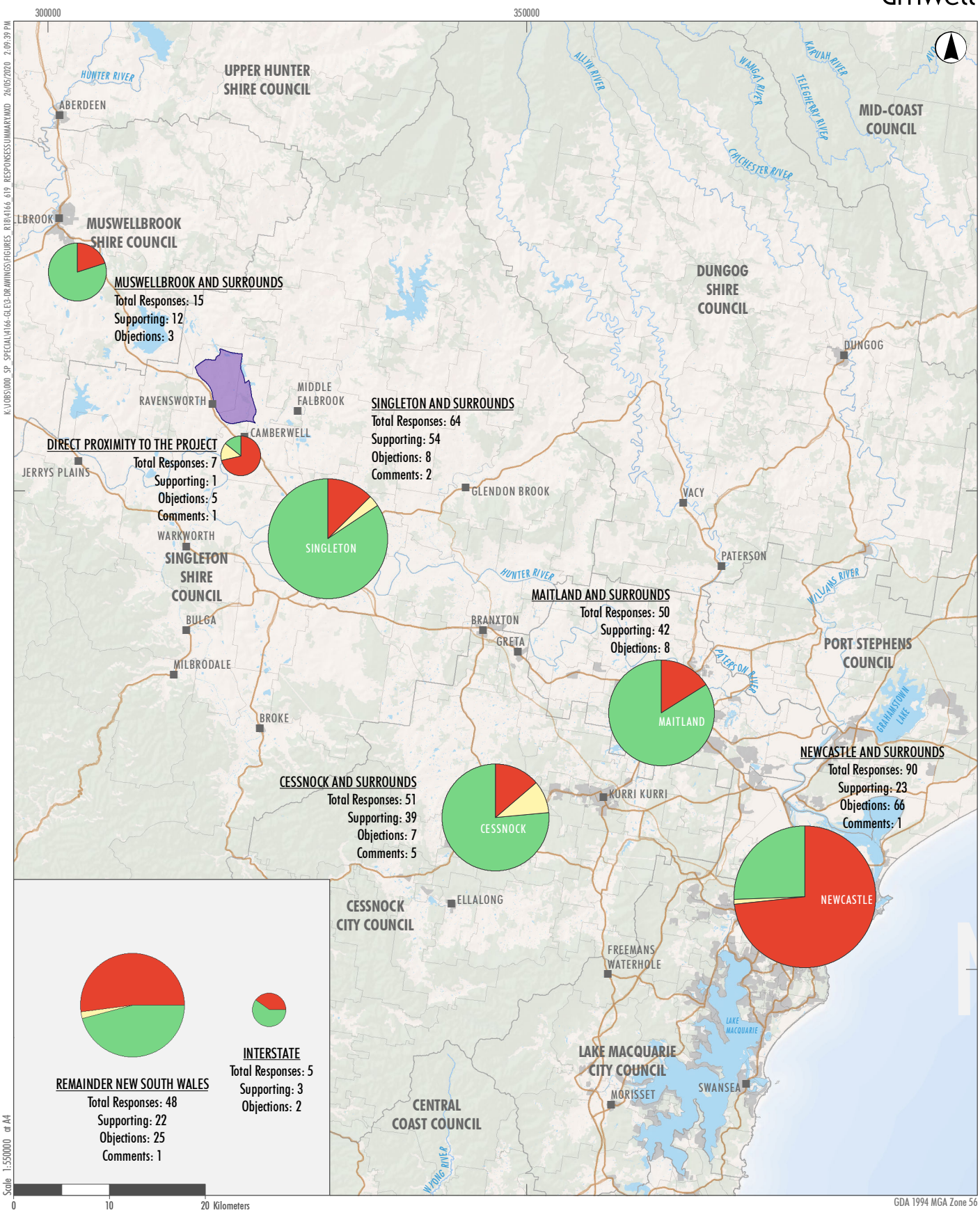
2.2 Spatial distribution of Submissions

The 343 community and interest group submissions received on the Project were classified into spatial areas to allow analysis of the submissions on a local, regional and broader scale. For the purposes of this analysis, 'Local' areas were classified as being in direct proximity to the Project (<5km), 'Regional' areas were classified as locations being between 5 - 100 km of the Project and 'Broader' areas were submissions which were received from locations of greater than 100 km distance from the Project. Agency submissions were not classified into areas as the location of agency submissions is dependent on the location of the agency office.

The areas were defined by grouping submitter locations based on the proximity to the Project and the closest nearby regional centre such as Singleton or Cessnock. The recorded submitter locations which comprise each area used in the following analysis are provided in **Table 2.2** and displayed geographically in **Figure 2.1**.

Table 2.2 Recorded submitter locations which comprise each Area

Area	Submitters Recorded Location			
Local				
Direct Proximity to the Project	Ravensworth	Middle Falbrook	Camberwell	
Regional				
Singleton and Surrounds	Bulga Gowrie Mount Royal Singleton	Wattle Ponds Mirannie Glendon Hunterview	Jerrys Plains Mirannie Mount Thorley	Roughit Sedgefield Singleton Heights
Muswellbrook and surrounds	Aberdeen Castle Rock	Dartbrook Denman	Muswellbrook Scone	Wybong Kayuga
Cessnock and surrounds	Pokolbin Mulbring Cessnock Kurri Kurri North Rothbury Fordwich Pokolbin	East Branxton Branxton Broke Bulga Cessnock Cliftleigh East Branxton	Ellalong Fordwich Greta Heddon Greta Lower Belford Maison Dieu Milbrodale	Millfield Mulbring North Rothbury Nulkaba Pokolbin Stanhope Weston
Maitland and surrounds	Aberglasslyn Bishops Bridge Bolwarra Bolwarra Heights Buttai	Dungog East Gresford East Maitland Gillieston Heights Largs	Lorn Maitland Maitland Vale Rutherford	Telarah Tenambit Thornton Windella
Newcastle and surrounds	Birmingham Gardens Charlestown Cooks Hill Corlette Fern Bay Floraville Gateshead Kotara Kotara South Lambton Macquarie Hills	Merewether Newcastle East Shortland Speers Point Tomago West Wallsend Newcastle Belmont Belmont North Valentine Cardiff Hamilton North	Birmingham Gardens Elermore Vale Adamstown Adamstown Heights Highfields Charlestown Dudley Gateshead Merewether Heights	Maryville Wickham Stockton Islington Tighes Hill Newcastle East The Hill Hamilton Hamilton East Mayfield Broadmeadow
Broader				
New South Wales	Bateau Bay Bonny Hills Chain Valley Bay Figtree Griffith Gumma Hamlyn Terrace Macksville Manly Mascot	Point Frederick Salamander Bay Soldiers Point Stanmore Sydney Wauchope Wentworth Falls Elizabeth Bay Newtown Cromer	Pennant Hills Eastwood Baulkham Hills Fairfield Bundeena Grays Point East Gosford Nelson Bay Lemon Tree Passage	Armidale Forster Port Macquarie Toormina Lennox Head East Lismore Tathra Paddys River Lightning Ridge
Interstate	Dangar Edgecombe	Coomera College Park	Canberra Coolum Beach	South Brisbane



Legend

- Glendell Project Area
- Major Roads
- Major Watercourses
- Local Government Areas
- NSW Suburb Boundaries

Responses to Submission

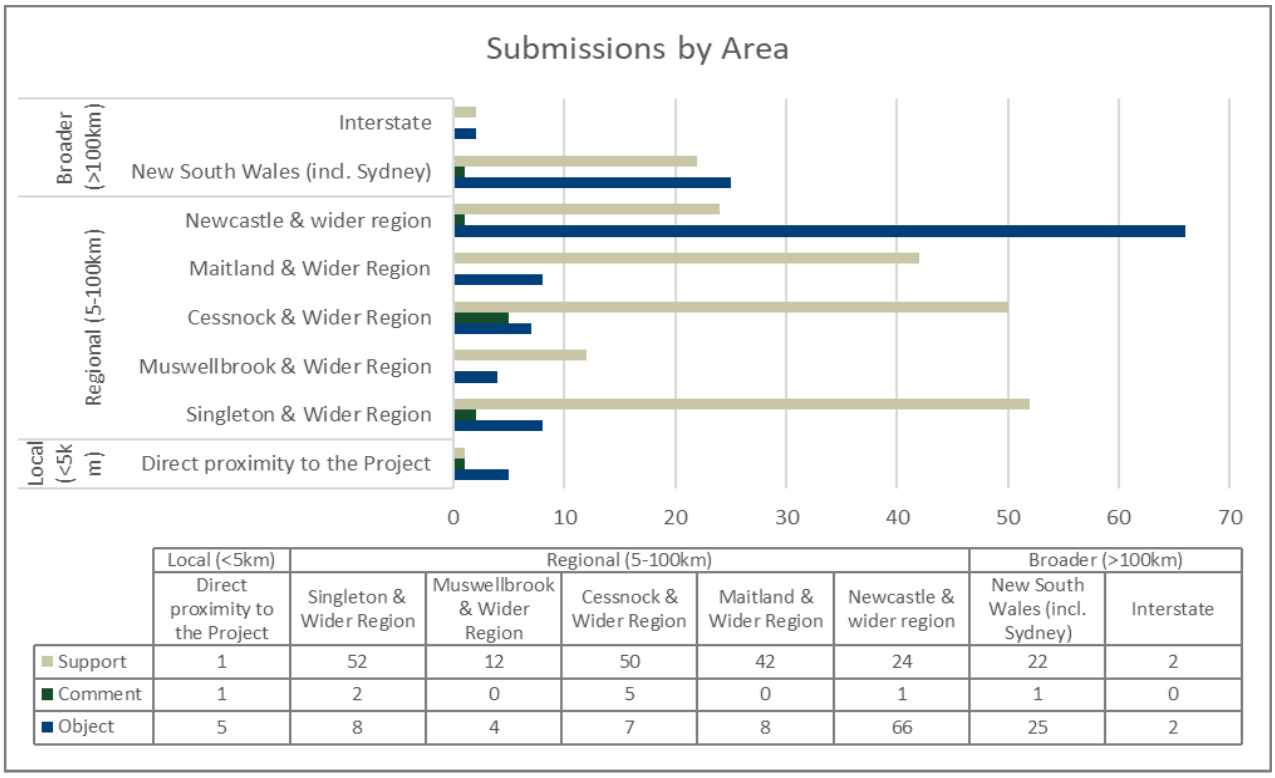
- Objections
- Comments
- Support

Data source: Umwelt (2020)

FIGURE 2.1

Number of responses by Area

Of the 343 submissions, seven submissions were from areas in direct proximity to the Project categorised as Local, 281 submissions were from areas categorised as Regional, and 52 submissions were received from broader areas (wider NSW and Interstate). It should also be noted that three submissions were received which did not specify their location. **Graph 2.2** indicates the number of community and interest group submissions received for each area.



	Local (<5km)	Regional (5-100km)					Broader (>100km)	
	Direct proximity to the Project	Singleton & Wider Region	Muswellbrook & Wider Region	Cessnock & Wider Region	Maitland & Wider Region	Newcastle & wider region	New South Wales (incl. Sydney)	Interstate
Support	1	52	12	50	42	24	22	2
Comment	1	2	0	5	0	1	1	0
Object	5	8	4	7	8	66	25	2

Graph 2.2 Total Number of Supporting, Comment and Objecting Submissions from Community and Interest Groups for Each Area

2.2.1 Local Area Submissions

As shown in **Graph 2.2**, seven submissions were received from the community in direct proximity to the Project. No submissions from interest groups were received. Within these seven submissions received, a number of issues relating to the following themes were raised and responses to these issues are provided in **Section 5.0**.

- Biodiversity – raised in one objecting submission (refer to **Section 5.1.7**)
- Economic contribution and community investment – raised in one supporting submission (refer to **Section 2.3.3.1**)
- Engagement and decision-making – raised in one supporting submission (refer to **Section 2.3.3.1**) and one objecting submission (**Section 5.3.3**)
- Heritage – raised in four objecting submissions (refer to **Section 5.1.4**)
- Impacts on community – raised in one supporting submission (refer to **Section 2.3.3.1**) and three objecting submissions (refer to **Section 5.1.2**)
- Intergenerational equity – raised in one supporting submission (refer to **Section 2.3.3.1**).

- Project emissions – raised in one comment submission and four objecting submissions (refer to **Section 5.1.1**) Water resources – raised in two objecting submissions (refer to **Section 5.1.6**)

2.2.2 Regional Area Submissions

The regional area submissions were categorised based on the closest nearby regional centre and were split into five categories as shown in

Table 2.2. A total of 281 submissions were received from locations classified as regional. Of these 281 submissions, a number of issues were raised relating to the following themes:

- Agriculture – raised in one comment submission (refer to **Section 5.1.10**)
- Biodiversity – raised in five objecting submissions (refer to **Section 5.1.8**)
- Bushfire – raised in two objecting submissions (refer to **Section 5.1.9**)
- Climate change – raised in 80 objecting submissions (refer to **Section 5.1.3**)
- Compliance with SEARs – raised in two objecting submissions (refer to **Section 5.3.1**)
- Economic assessment – raised in two objecting submissions (refer to **Section 5.3.2**)
- Ecologically sustainable development – raised in one comment submission (refer to **Section 5.4.1**)
- Engagement and decision making – raised in three supporting submissions (refer to **Section 2.3.3**) and eight objecting submissions (refer to **Section 5.3.3**)
- Heritage – raised in eight comment submissions (refer to **Section 2.3.2**) and 13 objecting submissions (refer to **Section 5.1.4**)
- Impacts on community – raised in five supporting submissions (refer to **Section 2.3.3**), two comment submissions (refer to **Section 2.3.2**) and 21 objecting submissions (refer to **Section 5.1.2**)
- Merits – raised in seven supporting submissions (refer to **Section 2.3.3**) and eight objecting submissions (refer to **Section 5.4**)
- Project design – raised in two objecting submissions (refer to **Section 5.2.1**)
- Project emissions – raised in two comment submissions (refer to **Section 2.3.2**) and 33 objecting submissions (refer to **Section 5.1.1**)
- Rehabilitation – raised in six objecting submissions (refer to **Section 5.1.7**)
- Water Resources – raised in 34 objecting submissions (refer to **Section 5.1.6**).

2.2.3 Broader Area Submissions

Broader areas were defined as submissions received from locations over 100 km away from the Project which included wider New South Wales including Sydney, and interstate. A total of 52 submissions were received from broader areas. Of these submissions, the issues raised related to the following themes and responses to these issues are provided in relevant sections.

- Climate change– raised in 26 objecting submissions (refer to **Section 5.1.3**)
- Heritage – raised in one objecting submission and two comment submissions (refer to **Section 5.1.4**)
- Ecologically sustainable development – raised in three submissions (refer to **Section 5.4.1**)
- Engagement and decision-making – raised in one objecting submission (refer to **Section 5.3.3**)
- Impacts on community – raised in eight objecting submissions (refer to **Section 5.1.2**)
- Project emissions – raised in ten objecting submissions (refer to **Section 5.1.1**)
- Rehabilitation – raised in one objecting submission (refer to **Section 5.1.7**)
- Water resources – raised in ten objecting submissions (refer to **Section 5.1.6**).

2.3 Categorisation of Issues

A content analysis was undertaken on all community and interest group submissions to identify the issues and themes raised by submitters. Re-occurring issues and themes within submissions were used to categorise and group submissions. This has allowed for the identification of key issues and supporting themes for community and interest groups. The submission summary is provided in **Appendix 1** with a summary provided below.

Issues have been categorised into the following broad groups as outlined in the draft guideline:

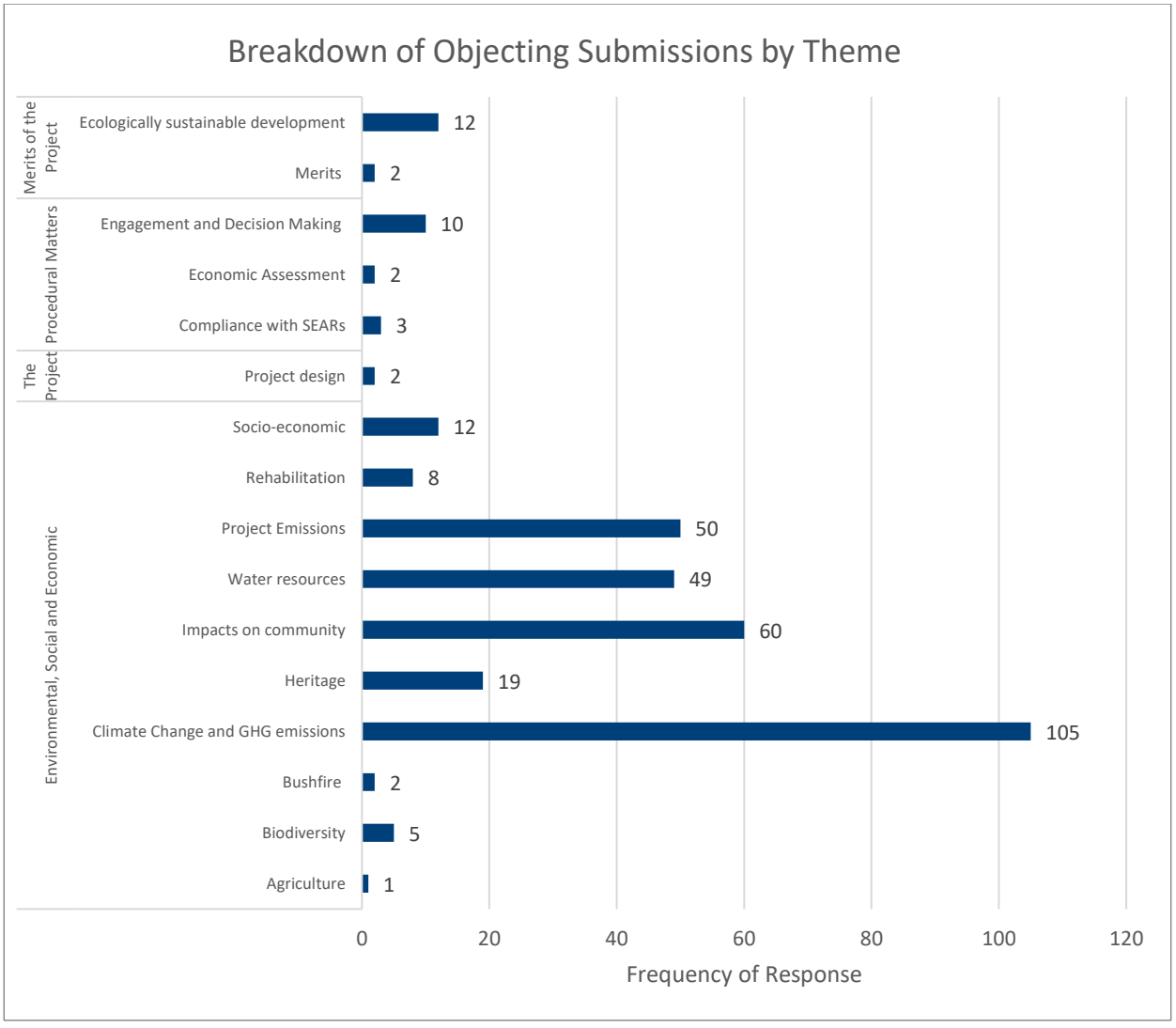
- environmental, social and economic impacts of the Project (e.g. amenity, air, biodiversity, heritage)
- the Project (e.g. the site, the physical layout and design, uses and activities, timing)
- the merits of the Project (e.g. justification for the project, consistency of project with Government plans, policies or guideline)
- procedural matters (e.g. level or quality of engagement, compliance with SEARs, identification of relevant statutory requirements)
- issues beyond the scope of the Project or not relevant to the Project (e.g. broader policy issues).

The broad issues were then divided into themes and sub-themes where relevant in order to provide greater definition of the issues raised. Further detail of the categorisation of issues are provided in the following sections.

2.3.1 Objecting Submissions

Analysis of the 127 objecting submissions was undertaken and the main concerns were climate change, greenhouse gas emissions and impacts on community. **Graph 2.3** shows the number of objecting submissions by issue theme received on the Project.

- environmental, social and economic impacts of the Project (311 impacts)
- the Project (2 impacts)
- procedural matters (15 impacts)
- the merits of the Project (12 impacts).



Graph 2.3 Overarching themes of objection submissions

A response to these submissions is provided in the relevant sections within **Section 5.0** of this report.

2.3.2 Submissions Providing Comment on the Project

A total of 11 submissions were received that provided feedback on the Project, which were not classified as either support or objecting to the Project. Of these 11 submissions, one submission was received from a community member in direct proximity to the Project, eight were from regional areas and three were from broader areas of interest.

Nine comment submissions raised heritage, eight of which were in relation to the relocation of Ravensworth Homestead to the village of Broke where the buildings would form the town centre. Relocation of the homestead to Broke is one of two relocation options proposed in the EIS with the other being a local move option referred to as Ravensworth Farm.

These submissions were supportive of the option to relocate Ravensworth Homestead to Broke and had a clear sentiment of the community and economic benefits the homestead could bring the Broke township. Due to their supporting nature, they have been categorised as supporting submissions, with examples and discussion provided in **Section 2.3.3**. However, one submission also questioned the financial cost of moving the homestead and its benefit.

Community Submissions

I think that asking the mine to spent (sic) 28 million dollars on relocating this relic is an absolute disgrace. This money could be far better spent on a hospital, schools, infrastructure or any number of things. But the insanity of the world we live in means we will make a business waste it relocating a house just because parts of it are old. But seeing as this is the way of the world I think the The (sic) community will get the most benefit from the Broke proposal.

The remaining comment submission related to heritage theme was in relation to the option for the relocation of the Ravensworth Homestead in close proximity to its current location, at Ravensworth Farm.

Community Submission

While I recognise the rarity and historical and associative significance of the Ravensworth Homestead and its environs, it appears that the economic benefits of mining has sealed its fate in this location. Therefore I submit that any relocation should be on the original 10,000 acres land grant of Dr Bowman with conditions.

This submission was focussed on retaining some of the heritage values of the Homestead and believed that the buildings should remain on the original Bowman land grant (Ravensworth Farm option) being a more suitable option to preserve some of these values. A further discussion of heritage issues raised in submissions is provided in **Section 2.3.3** (supporting) and **Section 5.1.4** (objecting).

Other issues raised in comment submissions related to the Project being on unsuitable grazing land, Glencore's good environmental performance record, the Aboriginal cultural heritage process and dust impacts. These issues are addressed in **Section 5.0** where relevant.

2.3.3 Supporting Submissions

Of the 343 submissions received from community members, and interest groups, 205 were supporting. Five of these submissions were received from interest groups and the remaining were received from community members.

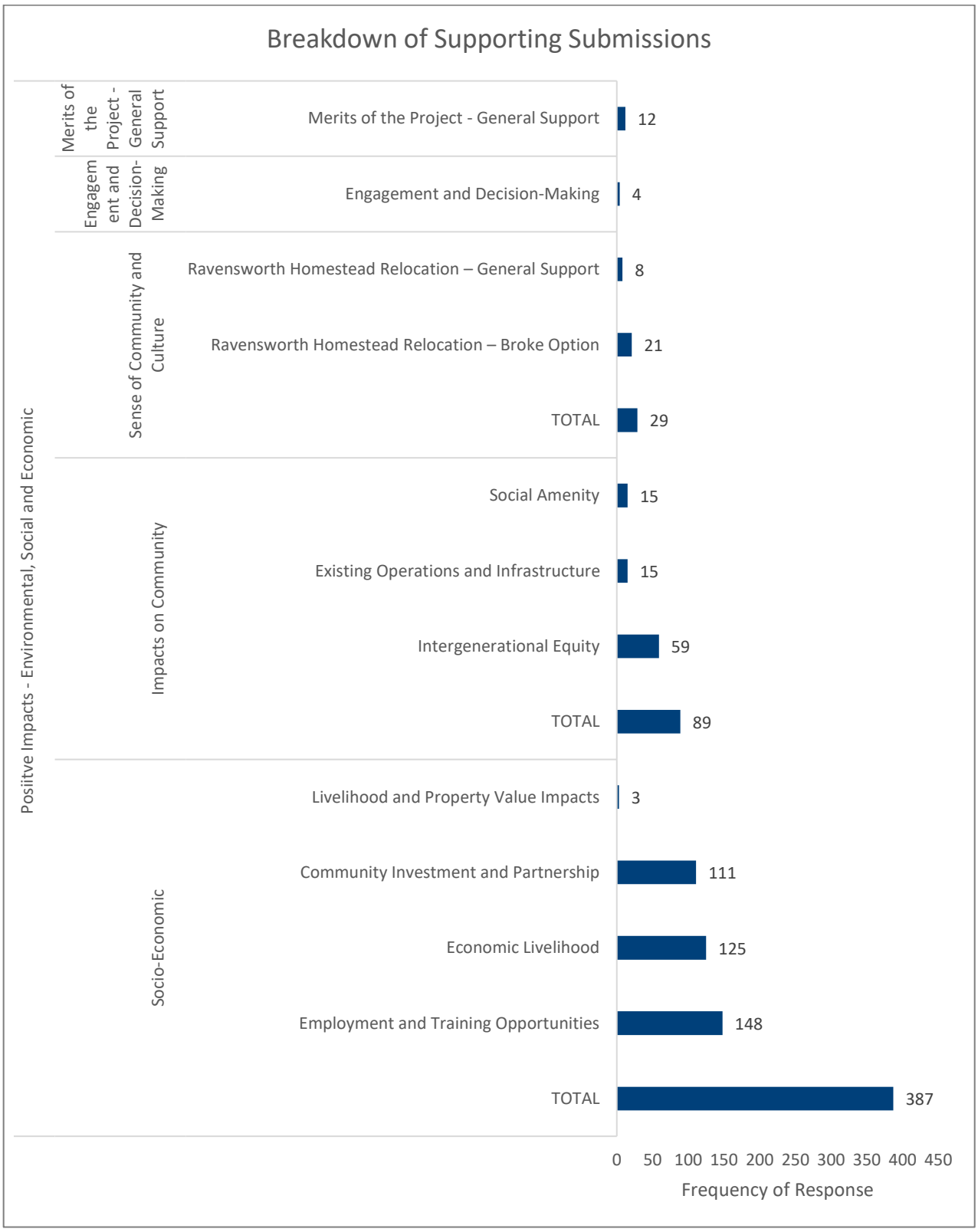
One submission was received from a local community member located in direct proximity to the Project, 180 submissions were received from regional classified areas (including Singleton and the surrounding community) and 25 submissions were received from broader classified areas. As multiple themes may exist within one submission, frequencies reported for each impact category will be higher than the number of submissions received.

The grounds for supporting the Project (refer to **Graph 2.4**) were in relation to environmental, social and economic impacts/benefits of the Project (521 positive impacts).

2.3.3.1 Environmental, Social and Economic Issues

Of the 521 positive impacts identified in relation to the Environmental, Social and Economic Issues of the Project, there were five common themes (refer to **Graph 2.4**), being:

- socio-economic (387)
    - employment and training opportunities
    - community and investment partnership
    - economic livelihood
    - property value
- impacts on community (89)
    - social amenity
    - intergenerational equity
    - existing operation and infrastructure
- sense of community and culture (29)
    - Ravensworth Homestead relocation – general support
    - Ravensworth Homestead relocation – Broke option
- engagement and decision-making (4)
- merits of the Project – general support (12)



Graph 2.4 Categorisation of Supporting Submissions

Further details regarding the sub-themes are addressed below with examples of submission responses provided.

Socio-economic

Employment and Training Opportunities

Sustained employment and ongoing job security were frequently cited (148) across community and interest group submissions as being important for economic continuity in the region. These submissions were largely received from the areas categorised as regional, which includes the Singleton and wider Hunter Valley region. Employment and training opportunities was also a consistent theme from stakeholder consultations undertaken as part of the SIA (Appendix 11 of EIS). Section 6.2.3 of the SIA discussed stakeholder perceptions regarding opportunities for continued employment afforded by the Project, and the importance of continued operations for the sustainability of local and regional communities. Examples of submissions related to sustained employment and training opportunities are provided below.

Community Submissions

'Further developments like these ensure locals remain employed and able to support their families.' S-120494

'I support the project as Australia needs to maintain as much industry as possible, sustaining good employment opportunities for our residents and keeping local mining and business communities alive.' S-120515

'The continued operations of Glendell ensures that hundreds of dependent employees, contractors and related businesses will continue to have work and be able to contribute economically to the area.' S-120517

Interest Group Submission – One Key Resources

The approval of Glendell's Continued Operations Project is vital to the on going employment of these people, who in turn contribute to the local economy, schools and sporting organization's. If the project is not given the green light the impacts will go beyond the employees working at the mine, it will affect local contracting company's that rely on the mine to keep other local people employed.

Community Investment and Partnership

Investment of mining companies in the locality and the broader region and partnerships with local community organisations was also raised during the SIA (Appendix 11 of EIS), with stakeholders emphasising the need for companies to support local endeavours in close proximity to their Projects. Community investment and partnership was raised in 111 submissions, with 95 of these submissions received from regional categorised areas and 15 received from broader area submissions. Emphasis during submissions was largely placed on supporting local businesses and communities within the Hunter region, including those located in Singleton and Muswellbrook.

Examples of submissions are provided below.

Community Submissions

'I support the Glendell Continued Operations Project for the value added to the employees, local partnerships and mining industry as a whole.' S-119688

'Glendell Mine provides a huge economic boost to the Hunter Region with money being spent in the local area using local suppliers and with employees living in the Hunter Region. Glendell Mine needs to continue as they provide a huge employment opportunities (sic) for the area, putting millions of dollars back into the local community.' S-120320

*'The Glendell Continued Operations proposal has endless benefits for NSW as a whole and more importantly the local communities of Muswellbrook, Scone, Maitland, Cessnock and surrounds. These benefits include:*Boosting state coffers through increased extraction up to 10 Million Tonne Per Year *Securing Local Jobs well into the future - This in turn flows down to local businesses increasing their revenues, *Glencore continuing to fund local projects, i.e. school and junior sporting organisations.'* S-120330

'The Glendell continued operations will also directly input approximately $296,000,000 from royalties to the NSW government, who can then spend that money on hospitals, schools, roads and infrastructure and many more projects that will increase employment and productivity within the state of NSW.' S-119209

Economic Livelihood

Economic benefits were raised in 125 submissions and related to the ongoing benefit to individual and family livelihoods as a result of direct mining employment. The indirect flow on effects to local business and suppliers was also noted. Of these submissions, one submission was received from a respondent in direct proximity to the Project, with the majority of submissions (106) received from areas categorised as regional, 17 submissions from broader locations across NSW, and one from an unspecified location.

Community Submissions

'More than 23,000 coalminers in NSW rely on coalmining for their livelihood. There are more than 7,000 local businesses across NSW that are supported by mining. Coal mining is important to me and my family, our community and NSW. Coal is NSW's most valuable export commodity, with a value of more than $20 billion.' S-120869

'The Glendell north project will secure my future until I retire and hopefully see my kids pursue a future as an electrician, fitter or mining engineer. The positive effect it has had on the community and the hunter valley cannot be underestimated. I hope the mine gets approval for the sake of all the families that are employed by the mine.' S-120543

'Many people in Singleton and surrounding areas either work in the mining industry or are in a business which supplies goods or services in varying degrees. Even businesses which have no direct contact, still benefit from the population of Singleton buying goods and services from them.' S-120501

Interest Group Submission - Thiess

'Through the development of the Glendell Continued Operations Project, Glencore and Thiess will continue to create and deliver significant long-term social and community benefits through local employment and training, local procurement and community engagement opportunities. This underpins stronger community relationships and delivers a more cost-effective sustainable workforce.'

Property Value

Three submissions raised the positive impacts of mining on property values and other key community service sectors. In these submissions the linkage and associations between the presence of mining operations, employment of local populations, housing and other community service provision were clearly articulated. All submissions were received from areas categorised as regional (Singleton, Mason Dieu and Maitland Vale). Positive effects to property values were also reported by a small number of participants during the SIA (Section 6.2.9, Appendix 11 of EIS).

Community Submissions

'I have grown up in Singleton and it used to be a dairy town, but this obviously did not financially impact upon the residents as much as mining has done for the benefit of the town. I have seen mines close before and the ripple effect to Singleton is very apparent and quite devastating. For example, the people who used to work at the mine generally are forced to leave town, which affects the prices of homes and the rental houses are usually the worst affected. The shops suffer as people become nervous about spending money. Singleton is now very much a mining town and mines opening and closing are big news and even bigger concerns for us all.' S-120501

'I was able to purchase and sell my first house due to the regions strong housing market. Mining provides high employment rates and is a significant contributor to our good economy.' S-120673

'I wish to make a submission in support of the Glendell Continued Operations Project. With other mine sites such as Liddell and Muswellbrook Coal coming to the end of their mine life at a similar time as Glendell, I am concerned with the potential impact to the local community with regards to job opportunities, job loss, property prices and decline of local population and services to the area.' S-120498

Impacts on Community

Social Amenity

15 supporting submissions outlined that the Project would result in a reduced community impact with proposed mining operations moving away from existing sensitive receptors e.g. residents in Camberwell, thus reducing impacts on some localities. The majority of submissions were received from areas categorised as regional (including Singleton), with one submission received from a proximal landholder.

Community Submissions

'The Glendell Continued Operations Project moves further away from local villages and surrounding neighbors, suggesting a reduction in those affected by light, air and noise pollution.' S-121083

'The Continued Operations will have no significant extra effects on the local communities as it is moving away from the closest community.' S-120601

'The pit location is isolated and has minimal impact on local residents.' S-120672

'The site adheres to all EPA guidelines and is an industry leader in reducing the effects of noise, dust and ground vibration on the surrounding community.' S-120554

'As a resident of the Hunter Valley in NSW, I believe this project should be approved. The existing mine has been operating since 2008 without any significant impacts socially or environmentally. Glencore as a company strives for best practise in these areas.' S-121004

'The fact is that Glendell mining operations will actually be mining away from the village of Camberwell. Glendell have also gone to great lengths to implement controls to manage any noise and dust that may occur.' S-120599

Intergenerational Equity

Rehabilitation and Future Land Use

During the SIA (Section 6.2.4 of Appendix 11 of EIS), rehabilitation was considered a priority issue, with stakeholders noting Glencore's responsibility to restore the Project Area appropriately to facilitate future land use. In this regard, several stakeholders recalled the positive efforts of the company in rehabilitation. 41 submissions received reiterated this view outlining the positive land management and rehabilitation performance of Glencore more broadly, and the Project specifically. Examples of community submissions are provided below.

Community Submissions

'The project will be managed to (the) same high environmental standards as the existing operation and the rehabilitation of which has been recognised as industry best practice.' S-120575

'Glendell continued operations needs to keep going...Glendell have one of the best rehabilitation projects in the Hunter valley , returning the country back to prime grazing lands has always been a key role , " there is cattle grazing next to the operations now and have been for years , and are in great condition " .' S-120641

'Other aspects are also required to be taken into consideration and from viewing related documents I believe Glencore has addressed these and has proven history of doing so in the Hunter Valley , in returning mined land back into productive, sustainable , proven farming land, and regeneration of bushland which is proven habitable to native species.' S-120636

'Glendell mine works to the highest standards in the mining industry and is highly focused on safety and environmental impacts. Glendell leads the industry in rehabilitation of its past mined areas.' S-120642

'What happens when the coal is all mined? Well Glencore will (as they always have) continue to use industry leading rehabilitation practices. Which will ensure the foot print left on Earths crust will be (as) minimal as possible.' S-120893

Environmental and Social Performance

42 submissions supported the existing environmental performance of the Glendell Mine. Submissions in support also indicated Glencore as a good corporate citizen in their overall performance as an operator and business, including community support and partnerships, which were discussed above. The majority (35) of submissions received related to the Project's environmental and social performance and were from regional areas, including the regions of Maitland (11) and Cessnock (8) providing a large proportion of responses. Two submissions were received from those within 5 km of the Project and five were received from broader regions.

Community Submissions

'I feel Glendell has completed a thorough assessment, executing work at industry best practice and are addressing the project to make sure it has minimal impact on the surrounding environment and community during and after mining.

I have seen first-hand that Glendell takes environmental issues very serious and always look to improve and maintain environmental compliance and has recently been recognised as having industry leading rehabilitation practices.' S-120668

'For many years the agricultural businesses and Mining operations have worked successfully side by side. The strict environmental guidelines already set in place and monitored constantly should prove to those objecting to the continuation of these Operations that they have no valid reason to object.' S-120295

'I feel Glendell has completed a thorough assessment, executing work at industry best practice and are addressing the project to make sure it has minimal impact on the surrounding environment and community during and after mining.

I have seen first-hand that Glendell takes environmental issues very serious and always look to improve and maintain environmental compliance and has recently been recognised as having industry leading rehabilitation practices.' S-120668

'The mine operator has proven to show a strong focus on environmental compliance and a dedication to fostering a relationship with local community. Being a mine in the Hunter Valley NSW with most on site employment being DIDO, wages earned at the mine have a high likelihood of supporting local business.' S-121180

Climate Change, Green House Gases and Energy

17 submissions received in support of the Project also referenced the company's existing practice at Glendell in minimising the effects of climate change in providing a lower emission generating coal compared to that produced from coal mining in other countries. The company's approach to environmental management and reduction of environmental impacts where possible, was also noted. Ten submissions raised high quality coal as a supporting justification for the Project, outlining the quality of coal produced at Glendell as superior to other countries with submitters perception that burning higher quality resources potentially reduces carbon emissions.

Community Submissions

'Glendell has a very capable, forward looking and progressive management team who are constantly looking for and implementing cutting edge technology blended with common sense to ensure that their operation, although relatively small, runs efficiently with the minimal possible impact on the environment.' S-120259

'The GCOP project will provide a lower emissions alternative to Indonesian coals that would otherwise fill the supply deficit' S-121008

'Coal from Australian coal mines has ideal qualities and it has fewer impurities, such as sulphur, than coal from other countries such as Asian countries. So the use of Australian coal is reducing pollution, such as sulphur dioxide, on a worldwide basis.' S-120866

'Australia has the best coal in the world for power generation. Given the forecast world demand for coal, Australia is best placed to meet this demand with the least impact on the environment.' S-120689

'I believe that while coal mining obviously has an (ill defined) use by date, there will continue to be a very significant role for thermal coal to play for decades to come and I believe the pale blue dot we all share will, on balance, be better off using our high quality coal than the generally much poorer quality reserves from Asia.' S-120259

Existing Operations and Infrastructure

A total of 15 submissions were supportive of how the company was utilising existing infrastructure on site (where possible), with submission also indicating a preference for continued mining given the history of the operation in the area. Of the 15 submissions received, 12 submissions were from areas categorised as regional and three submissions were from localities across NSW.

Community Submissions

'The brownfields project is an extension of existing operations in place over the past 10 years, considering this the project will have minimal impact on the environment within the Hunter Valley area.' S-120888

'The expansion will see continued use of existing Mt Owen Complex Infrastructure to process and send the coal to the port.' S-120888

'It makes much more sense to continue this project as a development of an existing mine rather than approve a greenfield mining project elsewhere.' S-120318

'This project will not require any new infrastructure and will occur on land owned by Glencore' S-120689

Sense of Community and Culture

29 supporting submissions were received in relation to the relocation of the Ravensworth Homestead and the preservation of the history and heritage of the building and outbuildings.

Ravensworth Homestead Relocation – General Support

Submissions in support of the relocation of the Ravensworth Homestead referenced the importance of continued maintenance of the homestead, suggesting that if not relocated this may result in structural deterioration and damage. This view was consistent with outcomes of SIA consultations, where 69% of stakeholders were concerned that if not relocated, the homestead may deteriorate like other buildings in the area (Section 6.2.2.3, Appendix 11 of EIS).

Of the submissions received, 27 of these were received from areas categorised as regional (including Singleton and Broke), one submission was from the broader area (NSW) and one submission did not specify their location. Eight submissions received from areas categorised as regional, and the submission received from the broader area stated general support for the relocation of Ravensworth Homestead, but did not specify a preferred relocation option. One supporting submission also questioned the cost of relocating the buildings and whether that money should be re-directed and spent on other community-based projects.

Community Submissions

'The Heritage listed house never gets visited by any of the public and is run down and dangerous and getting a mine site to spend the amount of money it would be to move it would be a waste of funding that could go to other community projects.' S-120896

'The undertaking of the relocation of Ravensworth Homestead is to be commended and shows that they are a compassionate company and very aware of the surroundings and the beginnings of settlement in this area.' S-120319

'The proposal to move the house mentioned in this submission will enable people to actually visit the house instead of it sitting out to rot and decay away to nothing.' S-119078

'The proposal to move the house mentioned in this submission will enable people to actually visit the house instead of it sitting out to rot and decay away to nothing. I feel the site up to this point has always put the community first and always responded swiftly to any issues that arise..' S-119078

'The positive steps to re-invigorate the run down ruins of a heritage building are amazing. Realistically the Ravensworth Homestead has sat there for decades and would eventually end up as a pile of sandstone. The investment that Glencore proposes to make to safely move and uplift the building will be a huge benefit to the wider community and ensure the historic relevance of the homestead is maintained.' S-119662

'Relocation of the Ravensworth homestead has also been a major challenge , but Glendell operations have gone above and beyond to ensure that the relocation will be done in the best possible manner so the beauty and historical integrity of the buildings remain intact.' S-120599

Ravensworth Homestead Relocation – Broke Option

28 submissions (including eight comment submissions as mentioned in **Section 2.3.2**) received stated their support for the relocation of Ravensworth Homestead to Broke. All of these submissions were received from areas categorised as regional, which included Broke. The preference for the relocation of the Ravensworth Homestead to Broke centred around the ability of the Broke community to use and maintain the buildings and preserving the homestead as a historical landmark. Tourism opportunities were also identified as a prominent reason for the relocation to Broke given that the area is well frequented by tourists to the Hunter Valley.

Community Submissions

'I would also like to see the Ravensworth Homestead relocated to Broke for the entire community to use. This would be a great initiative for local schools to use for educational purposes as well as a function center for corporate meetings, weddings and other events. I have personally witnessed other homesteads such as Wambo and Liddell go to ruin and have all but fallen over due to the lack of care and maintenance.' S-120525

'I fully support the relocation of the Ravensworth homestead to Broke to create a new "town centre". I think it would be a huge asset to the local community & a great use of a piece of local history.' S-120725

'It will also allow for the restoration of Ravensworth Homestead; to return it to the property to its former glory so that it is accessible to the public and historians, and to preserve the history of the property for future generations to enjoy.' S-120778

'This will be a unique opportunity to celebrate the Upper Hunter Valley's heritage in a re-purposed heritage sandstone homestead building which would become a tourist destination in its own right. It could incorporate a museum celebrating local Indigenous and European history, a local wine tasting centre, a shop selling local produce, a cafe/restaurant and a function/exhibition space, which would provide an income to help maintain the buildings.' S-120775

Comment submissions

'There is very strong support around Hunter Valley Wine Country for a proposal to move Ravensworth Homestead to the town of Broke. I support this vision. I believe it has a lot of merit and would be a win for the coal industry, for tourism, for the township of Broke and for the heritage of the Hunter Valley.' S-120875

'I definitely support the initiative to relocate the old Ravensworth homestead to Broke as part of this as a small compensation to the community for the continuing mining activity. It will provide a hub for wine tourism and the local community, and allow the development of projects that support a transition from mining in the area' S-120843

'I have been a resident of Broke for over 20 years until recently. The proposal to move the Ravensworth Homestead to Broke and create a community icon for the Hunter Valley is strongly supported by me.The Broke proposal is ideally located centrally between Wollombi and Bulga with a rich Indigenous history between the Awabakal, Worimi, Grfinghi and Kamilaroi tribes.' S-120710

Engagement and Decision-Making

Four submissions were received which outlined the positive engagement practices of the Glendell team as part of the Project. Openness and transparency in the company's approach was firmly noted, as was their commitment to environmental management and compliance.

Community Submissions

'From this long and deeply engaged perspective I know that Glencore maintain very high standards of environmental stewardship and community engagement, whilst operating efficiently and profitably.' S-120259

'I have found Glencore to be very transparent when dealing with the local community and believe, as an operator, they will and have done what is reasonably possible to minimise the impact this will have on local environment.' S-120586

'The mine operator has proven to show a strong focus on environmental compliance and a dedication to fostering a relationship with local community.' S-121180

Merits of the Project – General Support

12 supporting community submissions were received on the Project which stated no specific issues or reasons for support. These submissions were classified as supporting the Merits of the Project. Seven of these submissions were received from submissions categorised as regional areas and five submissions were from broader areas classification.

3.0 Actions Taken Since Exhibition

3.1 Project changes following EIS Exhibition

Section 3.0 of the EIS provides a detailed description of the Project for which Glencore is seeking approval. As discussed in the EIS, Glencore implemented a detailed project design, stakeholder engagement, and environmental and social impact assessment for the Project. This process allowed for the findings of the technical studies and consideration of stakeholder views to inform the Project design, thereby minimising environmental and social impacts. The process included a thorough examination of different mining options and changes that could be made to minimise impacts through project design. Due to this thorough design and assessment process, and following review of submissions received and the additional work and engagement that has been undertaken as part of the RTS phase, no design changes have been made to the Project as described in the EIS, however, further management commitments have been made as discussed in **Section 6.0**.

3.1.1 Revised Assessments

The Greenhouse Gas and Energy Assessment (GHGEA) submitted as part of the Project EIS used the default NSW Method 1 fugitive emissions factor (0.054 t CO_2-e / ROM t) in accordance with National Greenhouse Accounts (NGA) Factors 2018 (DoEE 2018). As noted in Section 13.3.2 of the EIS, the Method 1 approach was used as final gas analysis results of the proposed Glendell Pit Extension were not available at the time of the assessment. Fugitive emissions from the open cut operation have now been re-calculated using a gas distribution model of the Project, (calculated by the Proponent based on results of drill core gas sampling and analysis) based on the Method 2 approach described in the NGER (Measurement) Determination 2008. The GHGEA has been updated based on this revised analysis and is provided as **Appendix 2**. A summary of the revised fugitive emissions is provided in **Table 3.1** below.

Table 3.1 Revised Greenhouse Gas Emissions over the life of the Project

	(tCO_2-e)	(%) of total emissions
Scope 1	6,057,000	2.67
Scope 2	458,000	0.20
Scope 3	220,424,000	97.13
TOTAL	**226,939,000**	**100**

As discussed in the original assessment (Appendix 28 of EIS), the application of the Method 1 assessment method was considered a conservative approach based on a review of the interim fugitive gas model results available at the time. The Method 2 assessment indicates that the actual fugitive gas emissions associated with the Project are likely to be less than 50% of that calculated by using the default NSW Method 1 fugitive emissions factor.

3.2 Ongoing Stakeholder Engagement

As described in the EIS, engagement has been an integral component of the Project and a comprehensive engagement program has been implemented. Following submission of the EIS in December 2019, Glencore continued its engagement program with stakeholders throughout the exhibition period which will continue throughout the assessment phase.

Engagement has also been ongoing throughout the preparation of this RTS document including engagement with government agencies and stakeholders to clarify issues raised in submissions and help inform the appropriate responses. Wider engagement throughout the RTS phase is being undertaken with stakeholders using a range of mechanisms including:

- dedicated webpage for the Project and direct contact details available for the Project team
- meetings and email communication with relevant government agencies
- preparation of a summary booklet to all nearby neighbours surrounding the Project Area and other key stakeholders. The summary booklet will be a magazine style document that provides an overview of the Project, a summary of the key findings of the EIS and the submissions received in the RTS process
- distribution of Greater Ravensworth Area (GRA) Newsletter and Community Information Sheets to nearby neighbours and key stakeholders containing updated project information on where the assessment process is up to
- phone calls to nearby neighbours and other key stakeholders to provide an update on the RTS phase
- updates to the Ravensworth Homestead Advisory Committee (RHAC) throughout the assessment process=
- issue of the updated Aboriginal Cultural Heritage Assessment Report (ACHAR) to RAPs for their review following inclusion of the PCWP Values Report.

Where appropriate, Glencore will continue to engage with stakeholders as the Project progresses through the assessment and determination process.

4.0 Response to Agency Submissions

Government agency submissions typically relate to technical matters in their areas of responsibility as well as matters that the agency considers require consideration by the consent authority or to be addressed by conditions of development consent.

The following provides a response to the specific matters raised in each agency submission. The issues raised in the agency submissions are identified in the following sections in text boxes, with a response provided following each text box.

4.1 Division of Resources and Geoscience

The Division recommends that an independent expert examination of the proposed final landform would be required to determine if the final landform case selected by the Proponent is the best option.

DPIE have advised Glencore that they will be commissioning an independent review of the proposed final landform. Glencore will cooperate with the independent reviewer to provide the relevant data and information required as requested.

Biodiversity Offset Assessment

The Division requests that the Proponent consider potential resource sterilisation in relation to any amendments to proposed biodiversity offset areas. The Division requests that both the Geological Survey of NSW – Land Use Assessment team and holders of existing mining and exploration authorities that could be potentially affected by planned biodiversity offsets be consulted. This will ensure there is no consequent reduction in access to prospective land for mineral exploration or potential for the sterilisation of mineral and extractive resources.

Glencore have committed to developing an offset strategy during the assessment process in consultation with the BCD and DPIE. One option for inclusion in the strategy is land based offsets as described in Section 7.6.4 of the EIS. If land-based offsets are chosen for inclusion in the offset strategy, Glencore will consult with any relevant authority holders regarding the offsets proposed for the Project to determine if any of the proposed offset areas are likely to result in potential resource sterilisation. Glencore will also consult with the Geological Survey of NSW – Land Use Assessment team regarding proposed offsets for the Project which may impact upon resources or authorities.

If the proposed offsets are located within Glencore mining title areas, an examination of potential resources within these areas will be undertaken prior to their nomination as offsets so that access to potentially economically viable resources is not adversely impacted. Under Section 5.9 of the *Biodiversity Conservation Act 2016* (BC Act) the consent of the holder of any mining lease, mineral claim or production lease is required before a biodiversity stewardship agreement can be entered into in relation to the land the subject of the lease. The Minister must also consult with the holders or any other types of mining or petroleum authorities which apply to the land proposed to be subject to a biodiversity stewardship agreement prior to entering into the agreement.

The Division requests to review the draft conditions of approval before finalisation and any granting of development consent.

Noted.

4.2 Resource Regulator

Based on the review of the EIS, the Regulator advises the Department of Planning, Industry and Environment that it has no specific comments.

Noted.

The Resources Regulator requests a review of the draft development consent conditions prior to finalisation and any granting of development consent.

Noted.

4.3 Department of Planning, Industry and Environment – Water

Pre-approval Recommendation - the proponent should address the NSW Aquifer Interference Policy (DPIE Water, 2012) minimal impact consideration – "Highly Productive Groundwater Sources, Water Quality, Part 1(c)" – in relation to connected surface water impacts and an evaluation of the need for a low permeability barrier.

Parts 1(c) and 1(d) of Water Quality considerations in Table 1 of the Aquifer Interference Policy (AIP) for Alluvial Water Sources provides:

> (c) *No mining activity to be below the natural ground surface within 200 m laterally from the top of high bank or 100 m vertically beneath (or the three dimensional extent of the alluvial water source - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply".*
>
> (d) *Not more than 10% cumulatively of the three dimensional extent of the alluvial material in this water source to be excavated by mining activities beyond 200 m laterally from the top of high bank and 100 m vertically beneath a highly connected surface water source that is defined as a "reliable water supply".*

Detailed investigations were undertaken to define the extent of alluvium associated with Bowmans Creek, Swamp Creek and Yorks Creek (refer to Appendix A of the Groundwater Impact Assessment (GWIA), Appendix 16 of EIS) and analyse groundwater quality within the various alluvial and Permian aquifer systems in proximity to the Project (Section 5.8 of Appendix 16 of EIS). This analysis indicated that Bowmans Creek is the only highly productive groundwater source in the Project Area.

As part of the detailed mine design process, 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 Part 1(c) AIP Water Quality minimal impact consideration was satisfied. The surveyed high bank and set back from the Glendell Pit Extension are shown in **Figure 4.1**.

The Project does not involve mining below the alluvial water source.

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

0 100 200 400m

Legend

- Glendell Pit Extension
- Hebden Road Realignment
- Surveyed High Bank of Bowmans Creek
- Drainage Line

FIGURE 4.1

Glendell Pit Extension
Setback from High Bank of Bowmans Creek

Figure 4.1 also shows the mapped extent of alluvium within the surrounding area, as verified by the Groundwater Impact Assessment (AGE 2019) (GWIA). The Glendell Pit Extension includes the mining of small sections of the Swamp Creek and Yorks Creek alluvium. The cumulative extent of alluvial material associated with the Bowmans Creek alluvial aquifer is well below the 10% threshold identified in Part 1(d) of the AIP Water Quality minimal impact considerations.

It is also noted that the predicted final pit lake water level within the Glendell Pit will remain below the pit crest, including on the high recharge, low permeability sensitivity scenarios modelled. Accordingly, the groundwater modelling undertaken for the Project indicates that decant from the void, either directly or through spoil will not occur based on the mine plan modelled.

As the water quality minimal harm criteria are satisfied and the groundwater modelling indicates that there will be no decant from the pit or seepage through spoil, the need for a low permeability barrier in either Swamp Creek or Yorks Creek is not considered necessary.

The installation of low permeability barriers was considered as part of the Project design and is discussed in Section 7.5.9.1 of the EIS. As discussed in that section, modelling indicated that a low permeability barrier had negligible benefits in terms of mitigating alluvial take. It is noted however that the mine design does not preclude the installation of low permeability barriers in the future should groundwater impacts differ from those predicted in the EIS. As detailed in the EIS, ongoing monitoring and groundwater modelling will be undertaken throughout the life of the Project. The future installation of low permeabilities barriers will be considered should monitoring and/or modelling indicate that they represent a reasonable and feasible mitigation measure for any unexpected impacts including potential impacts on water quality.

4.3.1 Water Balance and Licensing

Post-approval Recommendation

Report the water balance for Glendell mine operations separately to and in addition to the Mt Owen mine complex;

The post-approval recommendation is noted.

The Water Management Plan for the Mount Owen Complex will be updated for the Project and this will include an updated water balance. The water management system for the Glendell Mine is however fully integrated with the water management system for the areas of the Mount Owen Complex regulated under the Mount Owen Consent. Due to this integration, inflows and outflows from the Glendell Project cannot be fully separated from other parts of the Mount Owen Complex.

Post-approval Recommendation

The project should develop a strategy prior to the completion of mining activities to ensure the sufficient licences are obtained to cover the take of aquifer water from the Hunter Unregulated Water Sharing Plan within the Glennies water source (aquifer type);

As part of the detailed mine closure planning process, the need for licences in the post closure landform will be identified having regard to the following:

- the regulatory regime applicable at the time of closure
- updated groundwater modelling, including modelling of post closure recovery conditions
- detailed final landform design (including any dams and pit lakes retained in the final landform)

- approved post closure land use requirements

The mine closure planning process will include a strategy for obtaining all necessary licences prior to the predicted take occurring. Any dams retained within the final landform that are in excess of harvestable rights or do not qualify for harvestable rights exemptions will also be modified to comply or will be licenced as required by the regulatory regime in force at the time.

Post-approval Recommendation

The project must obtain the necessary licences for the dams prior to project commencement.

The project proposes to have 2 online sediment basins at the downstream section of the realigned Yorks Creek. It is noted that online basins are not permitted on 3rd order streams and above according to the Guidelines for Controlled Activities on Waterfront Land (NRAR 2019). Furthermore, new in-river dams on 3rd order streams and above are prohibited in the Glennies Water Source in the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009.

If the project is approved to allow for the proposed dams then the necessary licences for them must be obtained prior to the commencement of the project.

The Project does not include the need for any dams that would require licensing prior to the commencement of mining operations.

The *Guidelines for Controlled Activities on Waterfront Land* (NRAR 2019) is a guidance document for activities within waterfront land on existing creeks. The application of these principles to creek diversion design elements is not considered appropriate where these elements are required to ensure the proper geomorphological and ecohydrological functioning of the elements.

The proposed in-stream features of the realigned section of Yorks Creek are necessary to ensure geomorphological processes within the realigned creek operate as closely as possible to existing processes. Further, the detailed design of the Yorks Creek Realignment includes design features to manage sediment flow within the creek system to mimic natural processes and also the inclusion of depressions to mimic natural deeper areas in the creek which may hold water for extended periods following flow events. These features are not 'detention basins 'as contemplated in the Guidelines for *Controlled Activities on Waterfront Land* (NRAR 2019) but are rather elements necessary to ensure the realigned section of Yorks Creek has similar attributes and geomorphological and ecohydrological function as the existing creek.

The basins at the lower end of the steeper reach of the Yorks Creek Realignment are intended to operate as stilling areas to reduce flow velocities and dissipate energy to reduce the potential for scour and erosion; they may hold water for short periods following flow events similar to other areas along the existing alignment of Yorks creek but are not designed as permanent dams, nor will they operate as 'dams'. To the extent these features do hold water, they will operate as potential refugia for aquatic ecosystems following rainfall events and are considered to be a positive environmental design element. These features are not considered to be 'in-river dams' within the meaning of Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009

It is noted that the proposed Yorks Creek realignment is located within the Jerrys Water Source which is not subject to the prohibition of Dams on 3rd order or higher streams under clause 37 of the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009. The Project does not propose any works within the Glennies Water Source.

Licensing of evaporative loss from depressions within the realignment is similarly not considered to be required as these processes will mimic existing natural processes within the section of Yorks Creek being realigned and the volume of these depressions is considered negligible.

4.3.2 Groundwater

Post-approval Recommendation -

Update the Water Management Plan to:

- **Incorporate additional and replacement monitoring bores around the proposed project expansion area in their WMP, in consultation with DPIE Water;**
- **Include a requirement that the groundwater modelling be reviewed at least every two years and prior to mine closure;**
- **Include monitoring of the two private (non-mine owned) groundwater bores located on private property close to Bowmans Creek on land which is managed by Daracon; and**
- **Include make good arrangement in the WMP should a Trigger of 2m Drawdown occur with the two Private bores.**

The recommendations are broadly consistent with the management and mitigation measures identified in Section 7.5.9.1 of the EIS and existing approved Water Management Plan.

The current Water Management Plan (of which the Groundwater Management and Monitoring Plan forms a part) includes a commitment to the annual validation of the groundwater model as part of the development consent Annual Review process by comparing predicted results to monitoring results collected over the life of the development. Models and predicted impacts will be revised as necessary following the results of the validation. The existing Groundwater Management and Monitoring Plan for the Mount Owen Complex also includes a commitment to the validation of groundwater inflow predictions every three years or earlier in the event of significant mine plan changes. These existing validation processes will be extended to the proposed Project.

Subsequent to exhibition of the EIS, Glencore has consulted with Daracon who own the land on which the two private bores are located. Arrangements between Daracon and Glencore will enable ongoing access to these bores to monitor groundwater levels. Daracon has advised Glencore that the bores are not presently used by Daracon.

Consistent with the current Water Management Plan, Glencore commit to a make good arrangement with Daracon in the event that cumulative impacts at the bores result in drawdown of greater than 2 m.

4.3.3 Surface Water

Post-approval Recommendation - Address the following issues regarding Yorks Creek:

- **Yorks Creek diversion is to be consistent with the Guidelines for Controlled Activities on Waterfront Land (NRAR 2019), and include (but not limited to) a Vegetated Riparian Zone of 30 m from top of bank;**
- **Prepare a final watercourse design and construction plan for the Yorks Creek diversion following the ACARP 2002 and Queensland government (DNRM 2014) guideline, and consistent with the design objectives outlined by Fluvial Systems (2019), and incorporate it into the final landform plan for the mine;**
- **Identify and report on the hydrologic stress and geomorphic alteration occurring due to the diversion of Yorks Creek;**
- **Investigate options for water release into Yorks Creek to enhance geomorphic processes; and**
- **Undertake performance monitoring and reporting of the Yorks Creek diversion following A Rehabilitation Manual for Australian Streams by Rutherford et al 2000.**

As noted in a previous response (refer to **Section 4.3.1**), the *Guidelines for Controlled Activities on Waterfront Land* (NRAR 2019) are not specifically designed for works associated with the construction of creek realignments. Notwithstanding, the rehabilitated landform will endeavour to recreate a vegetated riparian zone of 30 m within the realigned channel subject to constraints such as the proximity to the relocated Hebden Road (including road safety concerns such as visibility) and internal and farm access roads. Works within the 'Waterfront Land' will have regard to the guidelines.

The other Post-approval Recommendations listed above regarding the design of the Yorks Creek Realignment and ongoing monitoring are consistent with the commitments set out in Section 7.9.4.3 of the EIS and are supported.

4.4 Environment Protection Authority

4.4.1 Air

The following responses have been prepared with the assistance of Jacobs Pty Limited (Jacobs) who completed the Air Quality Impact Assessment (AQIA) for the Project.

Details of $PM_{2.5}$ mitigation measures

The EPA requires details of the mitigation measures that will be implemented to reduce the predicted $PM_{2.5}$ impacts and associated risk of exceedances of relevant $PM_{2.5}$ impact assessment criteria due to the Proposal.

Appendix G of the Air Quality Impact Assessment (AQIA) predicts impacts from the Proposal equal to the EPA's annual average $PM_{2.5}$ impact assessment criteria of 8 µg/m3 at ten private properties that are not subject to Voluntary Land Acquisition and Mitigation Policy (VLAMP) acquisition rights. Some of these residences are located to the east of the Glendell Mine/Mount Owen Complex in Middle Falbrook (AQIA Figure 34).

The predicted annual average $PM_{2.5}$ concentrations in Appendix G of the AQIA were reported to the same number of decimal places as the assessment criteria (i.e. zero decimal places, the same as the 8 µg/m^3 criterion). **Table 4.1** provides a copy of the model predictions to one decimal place for private properties where the rounding of the annual average $PM_{2.5}$ concentration becomes equal to the assessment criteria. It can be seen from these results that all predictions are below the 8 µg/m^3 (cumulative) criterion. The maximum contribution of the Project, as per the data in Appendix G of the AQIA, was up to 6%.

Table 4.1 Predicted annual average PM2.5 concentrations at selected private receptors

Property ID	Predicted cumulative annual average $PM_{2.5}$ concentrations (µg/m^3)					Criteria
	2014	Year 1	Year 6	Year 13	Year 18	
007a	6.6	7.8	7.8	7.6	6.2	8
007b	6.6	7.9	7.8	7.7	6.1	8
007c	6.5	7.6	7.6	7.4	6.1	8
010	6.6	7.5	7.5	7.3	6.1	8
281	6.3	7.5	7.4	7.3	6.0	8
282	6.4	7.6	7.5	7.4	6.1	8
325	6.7	7.6	7.5	7.3	6.4	8
326	6.7	7.5	7.5	7.3	6.4	8
327	6.7	7.5	7.4	7.2	6.4	8
329	6.7	7.5	7.5	7.2	6.5	8

The PM_{10} emission control factors discussed above will also assist in the mitigation of the $PM_{2.5}$ fraction associated with dust related emissions.

Emissions from the combustion of diesel on site also contribute to $PM_{2.5}$ emissions and potential impacts. Mitigation measures will be also implemented to reduce the predicted $PM_{2.5}$ impacts from machinery diesel exhausts and plant and equipment. As discussed in Section 12 of the AQIA, Glencore has existing measures in place to limit diesel exhaust emissions across its operations and these measures will continue to be implemented for the life of the Project.

Glencore has been an early adopter of the latest emissions technology rated engines to the market. In particular, Glencore has specified lower emission US Tier 2 engines for all new mining equipment tenders since 2011 and has purchased these engines where available. From this self-nominated specification, over 50% of Glencore's NSW mining equipment fleet comprises of US Tier 2 engines. The decision to specify the lower emission engines was undertaken with no current national or state obligation in place to move to lower diesel emission engines; however these engines were adopted as they became available. For any new mining equipment purchased for the Project (not including recommissioned equipment) and prior to suitable Tier 4 equipment being available, Glencore will specify US Tier 2 engines, where available.

Glencore is committed to minimising diesel exhaust emissions associated with the Project and has made the following commitments to mitigation measures. The proposed measures aim to address the equipment maintenance and engine replacement strategies from the NSW Coal Mining Benchmarking Study: Best practice measures for reducing non-road diesel exhaust emissions (EPA, 2015). Specifically, the measures proposed by Glencore include:

- Servicing all machinery in accordance with maintenance contracts and adopting original equipment manufacturer recommendations for maintenance.
- Targeting the maintenance to ensure equipment remains fit for purpose over its whole life cycle.
- Defining failure modes, effects and criticality which helps to minimise potential equipment failure.
- In addition, Glencore will use a number of processes to minimise diesel fuel use which, in turn, will minimise diesel exhaust emissions. Such processes will include:
- Optimising the design of haul roads to minimise the distance travelled between the pit, ROMs and overburden dumping locations, where practicable.
- Minimising the re-handling of material.
- Managing truck payloads to utilise the tray space without overloading.
- Optimising the length of haulage routes to improve operating efficiency.
- Optimising ramp gradients according to pit geometry parameters and mobile equipment performance characteristics.
- Reducing idle times.
- Developing long, medium and short term operational plans to optimise the recovery of approved resources.
- Managing truck utilisation rates to minimise truck waiting times.
- Maintaining the mine fleet in good operating order.

As these control factors also reduce diesel use, there is also an economic incentive to implement these measures where reasonable and feasible.

Analysis of PM10 impacts

The EPA requires consideration of whether additional mitigation measures can be implemented to reduce the predicted PM10 impacts as a result of the Proposal as listed in the table at Attachment B.

Appendix G of the AQIA lists the maximum 24-hour PM10 concentrations at all identified receptors. It indicates exceedances of the EPA's PM10 24-hour impact assessment criteria at numerous private properties that are not subject to VLAMP acquisition rights. Many of these residences are located to the east of Glendell Mine/Mount Owen Complex in Middle Falbrook (AQIA Figure 28).

The table at Attachment B lists the predicted 24-hour PM10 concentrations for these private properties, and the number of days they are predicted to exceed the EPA's PM10 24-hour impact assessment criteria of 50 µg/m3 (cumulative basis). The number of predicted exceedance days for the Proposal compared to predicted exceedance days for operations in 2014 are also listed. The AQIA does not provide any further information or discussion on the exceedances of the impact assessment criteria at all these private residences.

Table 26 in Section 12 of the AQIA (Jacobs, 2019) outlined the standard emission management measures that will be adopted as part of the Project. These measures were incorporated in the modelling of potential PM_{10} impacts and also evaluated in terms of best practice management. The evaluation confirmed that the proposed measures were consistent with best practice dust mitigation measures.

In addition to the standard emission management measures, there will also continue to be operational controls in place at Glendell Mine (and at other surrounding mines) which will also have a direct effect on emissions to air, including PM_{10}. In the case of Glendell Mine, Glencore is committed to the continued implementation of reactive and proactive operational controls during adverse weather conditions in order to minimise impacts.

- Reactive air quality management will continue to assess the need to modify the activities in response to the following triggers:
- visual conditions, such as excessive visible dust
- meteorological conditions, such as dry, strong wind conditions, and/or
- ambient air quality conditions (that is, elevated short-term PM_{10} concentrations).

Proactive air quality management will involve the discussion and planning of activities in advance of potentially adverse conditions. Specifically, the proactive air quality management approach will include:

- a system that provides personnel with a daily forecast of expected dust conditions in the vicinity of the operation
- discussion of the dust forecast at daily operational meetings, and
- modifying planned mining activities, as appropriate, to minimise or avoid the potential dust impacts.

The reactive and proactive management measures outlined above will result in reduced levels of mining-related activity at Glendell Mine relative to the mining-related activities considered as part of the current air quality modelling and presented in the AQIA (Jacobs, 2019). In practice these management measures, which will vary on a daily basis subject to prevailing atmospheric conditions, will lead to lower emissions to air than for unconstrained activities. Consequently, the estimated emissions in Tables 13, 14 and 15 of the AQIA should represent conservative estimates as these further detailed operational controls have not been explicitly modelled. It follows that the predicted impacts of the Project will also be conservative, that is, the predicted impacts will over-state the actual impacts.

One of the commitments of the Project is to continue to minimise particulate matter emissions, consistent with the EPA's Dust Stop program. This commitment has been historically demonstrated by the completion of all relevant pollution reduction programs and implementation of the most reasonable and feasible particulate matter emission control options. As an extension of an existing operation, management and mitigation measures implemented as part of this process will continue to be applied to the Project.

Appendix G of the AQIA (Jacobs, 2019) provided tabulated model results, including the predicted number of days above 50 µg/m3 for cumulative PM_{10}, for all identified sensitive receptors. The purpose of presenting the number of days above 50 µg/m^3 for both 2014 and future operational (cumulative) scenarios was to show the potential change in air quality (as PM_{10}) from existing (2014) conditions. It is acknowledged that the modelling has shown a potential change in the number of days above 50 µg/m^3 at some private sensitive receptors not subject to existing acquisition rights. However, it is noted that acquisition criteria under the Voluntary Land Acquisition and Mitigation Policy (VLAMP) in relation to maximum 24-hour average PM_{10} applies to an incremental impact of 50 µg/m^3 (increase in concentration due to the development alone). The predicted Project only impacts for maximum 24-hour average PM_{10} are not predicted to exceed the relevant VLAMP criteria at any private residences that do not currently have acquisition rights under existing development consents.

At the majority of properties (82 of 131) there was no change in the predicted number of days above 50 µg/m^3 from existing (2014) conditions. The biggest differences were predicted to be three additional days above 50 µg/m^3 (in the worst case year) at one private infrastructure receptor (the Daracon Facility), due to the combined influences of the Project and other operations at maximum approved (or proposed) production. This prediction is within the variations observed in historical air quality monitoring data.

As discussed in Section 7.2 of the EIS, the cumulative modelling results are based on the inclusion of all approved and proposed mining operations including those that are not currently operating as well as assumed maximum production rates for all operations. It should therefore be noted that the predictions at key sensitive receptors for future operational scenarios represent a conservative estimate of impacts.

The model outcomes have been considered for the assessment of impacts, in the context of model performance, and it has been concluded that PM_{10} concentrations will continue to be variable from day-to-day, due to existing conditions and sources in the Hunter Valley as well as extraordinary events, including the potential for exceedances in the future. This conclusion was informed by the historical air quality monitoring data which showed that Camberwell has experienced between 11 and 44 days above 50 µg/m^3 (PM_{10}) in each of the past seven years and the predictions of future conditions represented a similar range of potential impacts.

The potential air quality impacts associated with the Project will continue to be managed in accordance with the existing management processes currently implemented at the Mount Owen Complex, in accordance with the existing Mount Owen Complex Air Quality and Greenhouse Gas Management Plan (AQGHGMP), which will be reviewed and updated as part of the implementation of the Project.

Analysis of Worse Case Scenarios

The EPA requires confirmation that background air quality was included in the modelled ground level concentrations and provide further investigation of cumulative concentrations from both the highest backgrounds and highest incremental concentrations in accordance with Table 11.3 of the Approved Methods for receptors in Table 1 in respect of PM10 concentrations.

Background air quality was included in the modelling. Section 5.4 of the AQIA outlined the background levels that were used to inform the assessment of potential cumulative impacts. The potential cumulative impacts were determined from the combination of:

- contributions from the Project
- contributions from other existing mining operations and other approved (but not yet operational) mining projects and
- background levels that would apply in the absence of mining-related sources.

The background levels were determined from data collected in the vicinity of Glendell Mine, therefore satisfying the requirement of the Approved Methods, that the "existing background concentrations of the pollutants in the vicinity of the proposal should be included in the assessment". Background levels were derived from 2014 data. The selection of this modelling year is discussed in Section 5 of the AQIA and also discussed further below in the discussion of community and organisation stakeholders.

Additional investigation of cumulative PM_{10} concentrations has been carried out. As noted in the "Approved Methods", in situations where background levels are elevated the proponent must "demonstrate that no additional exceedances of the impact assessment criteria will occur as a result of the proposed activity and that best management practices will be implemented to minimise emissions of air pollutants as far as is practical" (EPA 2016). Additional investigation of the predictions has therefore been carried out, in particular for property 156 located in Camberwell. This property (currently subject to acquisition rights) is one of the nearest private sensitive receptors to the Project and would represent potential worst case in terms of Project contributions. The outcomes for this location will be relevant (albeit more conservative) to those properties identified in the EPA's submission.

Figure 4.2 shows the predicted 24-hour average PM10 concentrations at property 156 over the course of a year, for each assessment year, including the contributions from the Project, other mines (existing and approved) and background levels. This graphical representation addresses the example of Table 11.3 in the "Approved Methods", but for every day of the year.

It can be seen from **Figure 4.2** that the most common factor for days above the 24-hour criterion is anticipated to be when the combined sum of background levels and contributions from other mining operations is in the order of 30 µg/m^3 or greater. Increments due to the Project which lead to a potential exceedance of 50 µg/m^3 range between 1.5 and 24 µg/m^3 (12 µg/m^3 on average) in Year 1.

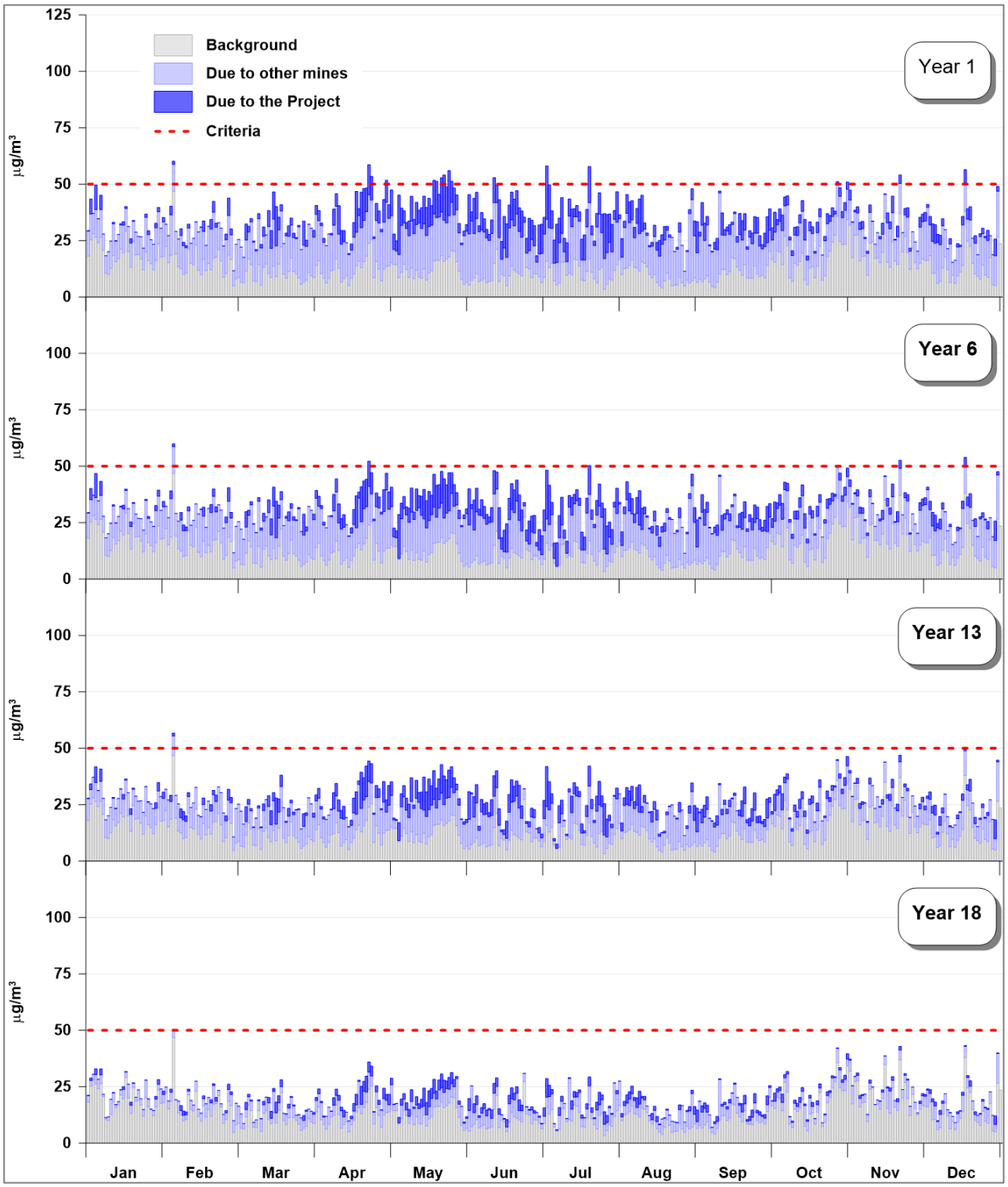


Figure 4.2 Predicted 24-hour average PM10 concentrations at Camberwell (property ID 156)

The model results in **Figure 4.2** suggest that most exceedances would occur in autumn or winter, most likely when winds are from the northwest.

The air quality monitoring data presented in Section 5 of the AQIA showed that Camberwell has experienced between 11 and 44 days above 50 µg/m^3 in each of the past seven years (not including 2019) and the predictions of future conditions represent a similar range of impacts. These impacts will be due to the combined contributions of all sources of dust that influence the region. With this information it was concluded that 24-hour average PM_{10} concentrations will continue to be variable from day-to-day, due to existing conditions and sources as well as extraordinary events, and that operations will need to continue to be managed in a way which minimises the contribution to off-site PM_{10} levels in accordance with the existing Mount Owen Complex AQGHGMP. This plan will be reviewed and updated as part of the implementation of the Project.

Source Apportionment

The EPA requires a source apportionment assessment of particulates to quantify the contribution of the proposed Glendell operations to the air quality impacts at private residences. Additional actions and measures may need to be proposed to ensure that impacts do not exceed EPA's air quality criteria in respect of PM10 concentrations.

The proportional contributions of the various mining operations to particulate matter concentrations in the Camberwell and Middle Falbrook areas have been examined by extracting results from the models described in the AQIA (Jacobs, 2019). Specifically, the predicted annual average PM_{10} concentrations at property 156, located in the centre of Camberwell, have been collated for all years of assessment and for all source contributions including background levels. **Figure 4.3** shows these results. Annual average PM_{10} has been selected for this assessment given that concentrations of this particulate matter classification have historically approached or exceeded the recently (2017) introduced EPA cumulative impact criterion of 25 µg/m^3.

The contribution from the Project is predicted to be up to a maximum of 5 µg/m^3 in Year 1, decreasing to 1.5 µg/m^3 by Year 18. The decreasing contribution from the Project over time reflects the progression of mining away from Camberwell.

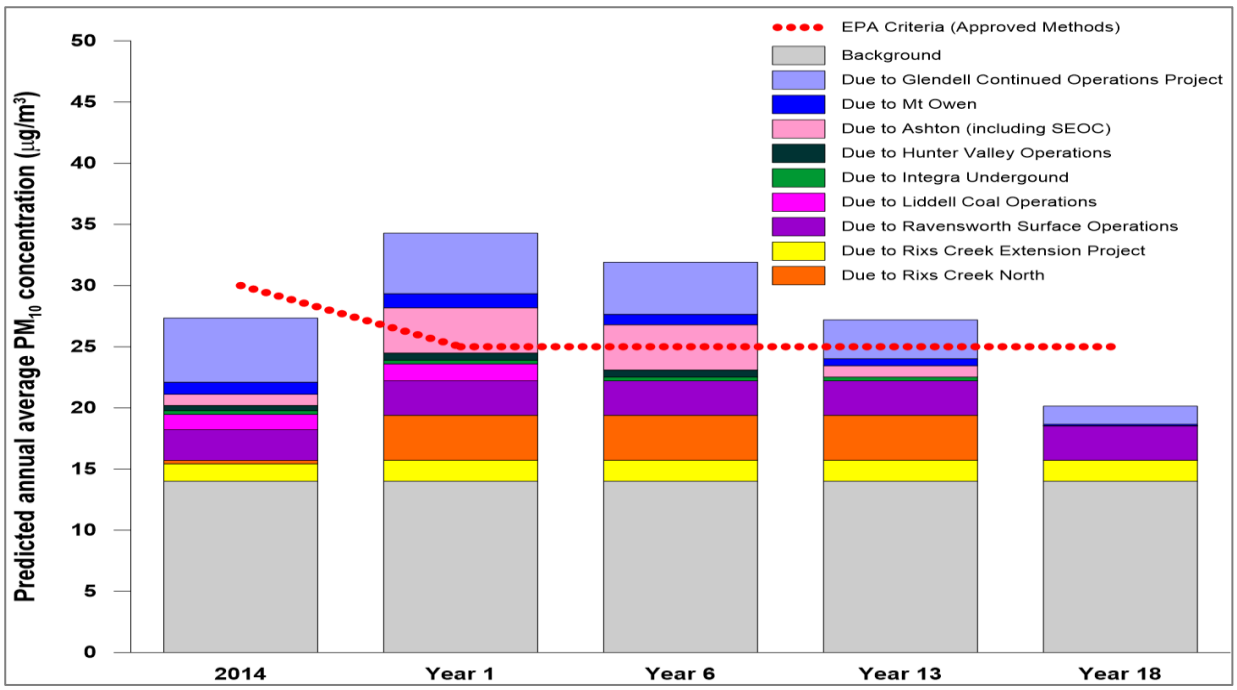


Figure 4.3 Predicted annual average PM10 concentrations in Camberwell (Property ID 156)

As can be seen from **Figure 4.3** the cumulative PM10 levels are predicted to exceed 25 µg/m^3 in Year 1 and Year 6 without a contribution from the Project, and assuming that other mines are simultaneously and continuously operating at approved maximum levels. **Figure 4.3** also identifies that the Project may result in an exceedance of the 25 µg/m^3 criterion in Year 13 relative to a no project scenario. This outcome is being influenced by various assumptions including a conservative assumption that Rix's Creek North would be able to continue operating at its approved maximum production rate to the end of its current consent period of 2035[1]. In reality, it is likely that the currently approved Rix's Creek North resource will be extracted well before this period and the level of assumed production from Rix's Creek North in the model is not likely to occur unless a further approval is obtained.

Figure 4.3 also highlights the relative contributions of background levels and mining operations, at Camberwell. In order of significance the contributions for the worst case year (Year 1) are predicted to be ranked as follows:

- Background (39%)
- Glendell (14%)
- Ashton including South East Open Cut (10%)
- Rix's Creek North (10%)
- Ravensworth Surface Operations (8%)
- Rix's Creek including continuation (5%)
- Liddell (4%)
- Mount Owen Continued Operations as modified (3%)
- Hunter Valley Operations (2%)
- Integra Underground (1%)

The modelling has identified a potential for cumulative annual average PM_{10} concentrations to exceed 25 µg/m^3 in Camberwell under selected operating scenarios, assuming the Project and all other mines are simultaneously operating at approved maximum production levels. These concentrations are anticipated to be within the range of levels that have historically been measured in the area. Nevertheless, Glencore is committed to the implementation of best practice emission management measures as well as the continued implementation of reactive and proactive operational controls during adverse weather conditions in order to minimise these potential impacts.

All properties within Camberwell currently have voluntary acquisition rights under one or more development consents.

Figure 4.4 shows the breakdown of predicted annual average PM_{10} concentrations in the Middle Falbrook area, specifically for property 007a. The contribution of the Project to this area is predicted to be lower than Camberwell at around 2%, with no exceedances of the EPA's cumulative annual average PM_{10} criteria.

[1] The Rix's Creek North Project Approval (08_0102) was originally part of a consolidated approval (08_0101 and 08_0102) covering both open cut and underground. Under the consolidated approval, open cut mining operations were only to be carried out to 31 December 2022. The total identified open cut resource in 2010 was approximately 38.4 Mt ROM. Underground mining operations were permitted to be carried out to 31 December 2035. Modification 6 split the Consolidated Project Approval into the open cut and underground components following the sale of the assets to different operators. Following the split of project approval, both open cut and underground operations were approved to 31 December 2035. It is noted however that the currently approved resources under the open cut consent are likely to be exhausted well before this date.

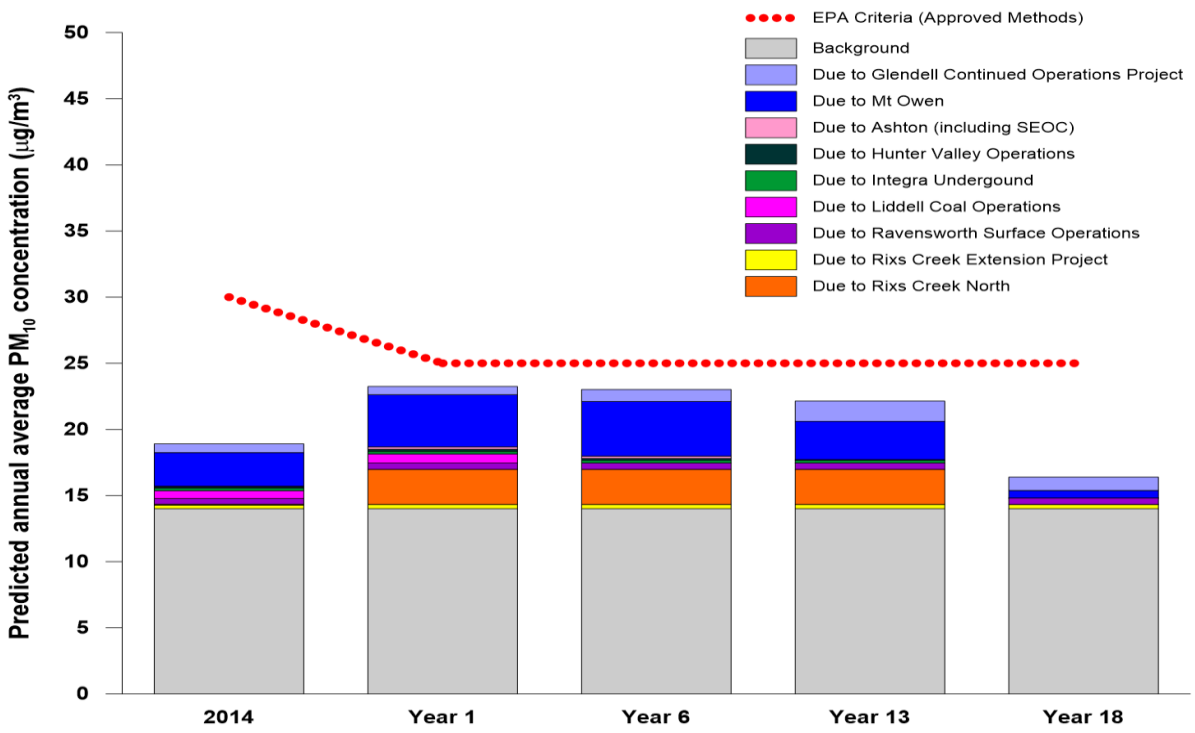


Figure 4.4 Predicted annual average PM10 concentrations in Middle Falbrook (Property ID 007a)

4.4.2 Waste

Additional Waste Stream Details

The EPA requires further details about all waste streams that will be generated as a result of activities associated with the Proposal. This should include the types of waste to be generated (as per the EPA's Waste Classification Guidelines), the expected quantities in tonnes and the manner in which the waste streams will be managed, including all relevant mitigation measures to protect the environment. This is necessary because only a limited discussion of waste streams is provided in Section 7.15 of the EIS.

Consistent with the approved operations, waste generated by the Project will continue to be managed on site in accordance with the Mt Owen Complex Non-Mineral Waste Management Plan. The waste classification under the Waste Management Plan has been undertaken in accordance with the NSW EPA Waste Classification Guidelines and will continue to be implemented on site.

The Mount Owen Complex is managed under an integrated Waste Management System. To meet the objectives of the Waste Management Plan and other relevant regulatory requirements, Glencore engage appropriately licensed waste management contractors to manage the waste produced at the complex. The waste management contractors perform all activities required under the waste management plan including on-site waste management, off-site waste disposal, investigation of increased recycling opportunities and required reporting.

Waste from the Mount Owen Complex is classified into six different waste classes, in accordance with the NSW EPA Waste Classification Guidelines, including:

- Special waste
- Liquid waste

- General solid waste (putrescible)
- General solid waste (non-putrescible)
- Hazardous waste; and
- Restricted solid waste.

Appropriate mitigation and management are implemented as part of the Waste Management Plan particularly in relation to the storage and disposal of hazardous waste. Where recycling options are not available waste is appropriately stored and disposed via a suitably licenced facility. The specific management requirements for each waste stream are detailed in the Mount Owen Complex Waste Management Matrix which forms Appendix B of the Waste Management Plan.

Quantities of waste associated with the Glendell Mine will vary, however quantities are expected to increase at the peak of production. Given production will decrease at Mount Owen Mine the quantities produced overall are expected to be similar to that currently produced by the Mount Owen Complex. In 2019 the Mount Owen Complex produced approximately 3,298 tonnes of waste (1,701 tonnes at Mount Owen/Ravensworth East Mines, 1,597 tonnes at Glendell Mine). Approximately 2,754 tonnes of waste from the Mount Owen Complex was recycled in 2019..

There will be a temporary spike in the quantity of waste generated as a result of the construction phase of the Project (likely occurring during years 1 and 2). Volume and management of construction waste is discussed further below.

Justification of Waste Management

The EPA requires adequate justification for the waste management options to be used for any wastes produced at the Premises. Waste management options should be considered in accordance with waste hierarchy contained in the Waste Avoidance and Resource Recovery Act 2001. Where waste will be disposed of, either on site or elsewhere, the EPA requires justification such as a life cycle analysis with environmental costs and benefits included.

This additional information is necessary because the EIS states that large waste tyres and concrete waste will be buried at the premises. This appears to be contrary to the waste hierarchy contained in the Waste Avoidance and Resource Recovery Act 2001.

The strategy for waste management at the Mount Owen Complex is avoidance, minimisation and segregation at the source. Resource management options under the *Waste Avoidance and Resource Recovery Act 2001* are considered against a hierarchy of avoidance, resource recovery (reuse, recycling, etc) and then disposal, consistent with the hierarchy of waste management at Mount Owen Complex, refer to **Figure 4.5**.

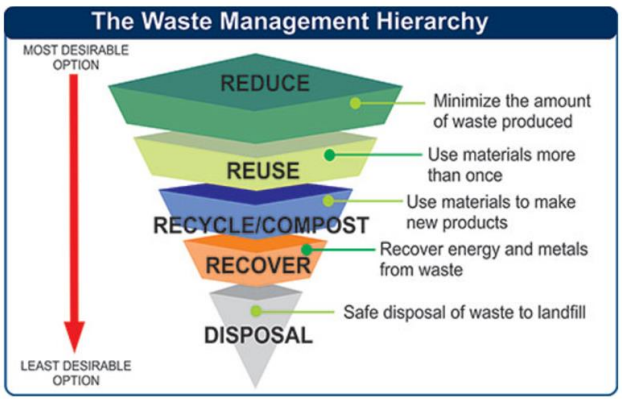


Figure 4.5 Waste Management Hierarchy (Source: Mount Owen Complex Waste Management Plan)

As discussed in the EIS, heavy vehicle tyres will continue to be disposed of through deep burial in overburden emplacement areas in accordance with the Mine Tyre Disposal Procedure, consistent with the approved operations. The number of tyres and location buried on site is recorded and would continue to be recorded as part of the continued operations. Appropriate and feasible recycling of heavy vehicle tyres is currently not available within a feasibly accessible location. Note that light vehicle tyres will continue to be repaired by an appropriate tyre contractor or disposed of at an appropriately licenced facility when required. Approximately 2,000 tonnes of concrete waste is expected to be recovered as part of the construction activities which will be disposed of at a licenced disposal facility, it will not be buried on site.

4.5 Biodiversity and Conservation Division – Environment, Energy and Science

As discussed in **Section 1.0**, at the time of preparation of this Part A report, ongoing consultation and assessment work is being undertaken to respond to the issues raised in relation to Heritage. This additional work is being undertaken to inform Glencore's response to the BCD submission. For this reason, responses to the Aboriginal Cultural Heritage matters raised by BCD have not been provided in this Part A report. A separate Part B report will be provided following completion of this additional work and submitted to DPIE separately.

Biodiversity

1. BCD recommends that the 55 hectares of 'exotic vegetation' in the project area is re-assessed in accordance with the Biodiversity Assessment Method (BAM) to determine if it should be classified as native vegetation or exotic vegetation. All areas of native vegetation should be assessed in accordance with BAM, including collecting site data and running it through the BAM calculator.

The Biodiversity Development Assessment Report (BDAR) (Appendix 20 of the EIS) mapped vegetation within the Development Footprint dominated by exotic species as exotic grassland as it could not be adequately assigned to a Plant Community Type (PCT). These areas typically contained greater than 50% perennial weed species cover and are located around existing infrastructure or upstream of the Bowmans Creek floodplain where there has been a long history of agricultural activities. Commonly recorded exotic grasses in these areas included Rhodes grass (*Chloris gayana*), kikuyu (*Cenchrus clandestinus*), prairie grass (*Bromus catharticus*), Coolatai grass (*Hyparrhenia hirta*), soft brome (*Bromus molliformis*) and perennial ryegrass (*Lolium perenne*), as well as groundcovers such as galenia (*Galenia pubescens*) and spear thistle (*Cirsium vulgare*).

We note that in undertaking a review of the final disturbance boundaries associated with the Project following additional surveys, the final area of 'exotic vegetation' mapped in the Development Footprint was found to be less than the 55 ha identified in Section 3.2.2 of the BDAR. Minor revisions to the Development Footprint boundary following the completion of the Category 1 mapping process minimised the total area of disturbance of this community. The area that required re-assessment as part of the RTS is 50.5 ha.

In order to allocate these areas to a PCT, additional sampling was undertaken following summer rain in April 2020, with four plot/transects collected within the Development Footprint in accordance with the BAM (refer to **Figure 4.6**). A process of PCT allocation was then undertaken in order to identify a 'best fit' PCT for the community.

The highly disturbed nature of the vegetation in these areas make the allocation of the vegetation zone to a PCT difficult from a floristic perspective, as the native species recorded in plots and rapid vegetation assessments are commonly recorded across the central Hunter Valley in many PCTs and in a variety of landscapes. The process of PCT allocation involved the following:

- the dominant and characteristic species were entered into the online plant community identification tab in the Bionet Vegetation Classification and an initial list of PCTs was generated

- The profiles for each of the possible PCTs were then interrogated and the most appropriate match assigned based on floristic, structure, soil, landform and distribution details

The following list of PCTs were identified as part of the initial screening process:

- PCT 42 - River Red Gum / River Oak Riparian Woodland Wetland in the Hunter Valley

- PCT 485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley

- PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter

- PCT 1604 - Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter

- PCT 1692 – Bulloak Grassy woodland of the Central hunter Valley.

In summary, the similarity of the floristic data set to the PCTs identified as potentially occurring in the Development Footprint are shown in **Table 4.2**. The percent similarity is a simple measure of the proportion of native species recorded in plots within the vegetation zone, compared to the floristic data set provided in the Bionet Vegetation Classification. It is noted that the list of species provided in the Bionet Vegetation Classification does not represent the full suite of species expected to occur in that PCT, rather it generally provides a list of the most commonly recorded or dominant species in each stratum. The number of constituent species in the Bionet Vegetation Classification profile impacts the percent similarity scores identified in the table below.

Table 4.2 Percent Similarity of floristic data set between the Vegetation Zone and Candidate PCTs

Candidate PCT	% similarity	Notes – Number of species in common between data sets
PCT 42 - River Red Gum/River Oak Riparian Woodland Wetland in the Hunter Valley	16.7	Two groundcover species
PCT 485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley	30.4	Seven groundcover species
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter	14.3	Two groundcover species
PCT 1604 - Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter	14.3	Two groundcover species
PCT 1692 – Bulloak Grassy woodland of the Central hunter Valley	44.4	Four groundcover species

PCT 485 - River Oak Riparian Grassy Tall Woodland of the Western Hunter Valley was discounted from the analysis on the basis of landscape position, despite exhibiting one of the highest percent similarity in a floristic context. This PCT represents vegetation that occurs as a riverine forest along lower order creeklines and rivers. Similarly, PCT 42 - River Red Gum/River Oak Riparian Woodland Wetland in the Hunter Valley was discounted on the basis of both very low floristic similarity and landscape position, as this PCT represents a floodplain community and the vegetation zones in question are above the 1% AEP.

Very low levels of floristic similarity were also identified between the vegetation zones and the groundcover compositions of PCTs 1603 and 1604. These PCTs commonly occur in the Central Hunter Valley and PCT 1603 is the dominant PCT in the Development Footprint.

PCT 1692 was also discounted on the basis that this community is unlikely to have occurred widely of the lower slopes and flats in the central Hunter Valley. There was no evidence of Bulloak (*Allocasuarina luehmannii*) regeneration in this vegetation zone. While greater than 44% of species were found to be in common with PCT 1692, this only represents a total of four native species.

Following analysis of floristic, structure, soil, landform and distribution details relating to the candidate PCTs, no one PCT was identified as a 'best fit' for the previously unallocated vegetation zone identified in the Development Footprint. It is also noted that 32 of 59 species, or 54.2% of the species recorded in the additional surveys were exotic species.

Following review of the data collected during the surveys subsequent to the lodgement of the BDAR, consideration was then given to the list of candidate ecosystem credit species that require assessment as part of the BDAR, that are linked to the requisite PCT against which the vegetation zones are allocated.

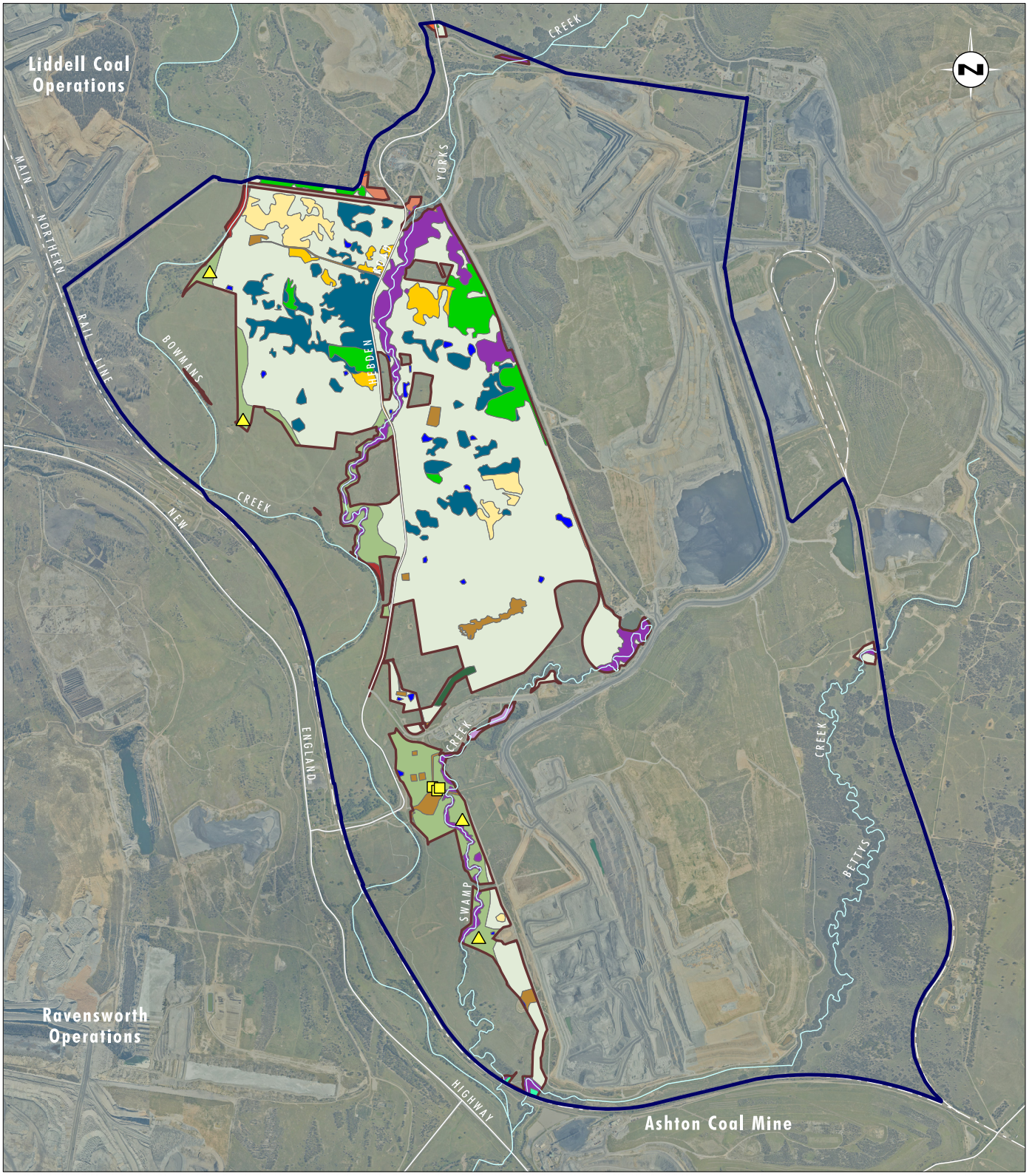


Image Source: Glencore (Dec 2018), Data Source: Glencore (2019), Umwelt (2020)

0 0.5 1.0 2.0km
1:40 000

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

File Name (A4): R18/4166_617.dgn
20200514 15.51

Ecosystem credits are a measurement of the value of threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur within a PCT, and PCTs generally. Ecosystem credits measure the loss in biodiversity values at a development site. On this basis, it is considered that PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter is the most appropriate PCT against which the vegetation zone should be measured, having regard to the following:

- landscape position on the lower slopes of the Development Footprint
- absence of canopy regeneration
- the PCT represents the most extensive PCT in the Development Footprint and surrounding landscape of the central Hunter Valley
- prior to the extensive clearing and general ongoing disturbance associated with agricultural activities there is a moderate to high likelihood that the PCT occurred in this area
- the ecosystem credit species associated with the PCT are considered to form an appropriate basis against which to assess the impacts of the Project.

As a result of this analysis, an additional vegetation zone was added to PCT 1603, being a modified derived native grassland. This vegetation zone has been sampled in accordance with the BAM and the BAM calculator (BAM-C) has been updated to reflect these changes.

One hectare of exotic vegetation occurs in the Development Footprint which is mapped as Vegetation Zone 12 – PCT1603 (Exotic). This area was allocated to PCT 1603 to determine whether it would generate ecosystem credits. The Vegetation Integrity Score was 0.2 and as a result, does not generate ecosystem credits. A description of the exotic vegetation is provided in Section 3.2.2 of the BDAR.

The revised PCT mapping across the Development Footprint is shown In **Figure 4.6** and a summary of the revised areas of PCTs and ecosystem credits is provided in **Table 4.3** below. In addition, description of the new vegetation zone is also provided in **Table 4.4**.

Table 4.3 Ecosystem Credits Generated by Additional Vegetation Zones

Vegetation Zone	Area in Development Footprint	Ecosystem Credits Generated
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter_ modified derived native grassland	49.5	404
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter exotic	1.0	0

Table 4.4 Zone 11 – PCT 1603 Narrow-leaved Ironbark – Bull Oak - Grey Box shrub – grass open forest of the central and lower Hunter (Modified Derived Native Grassland)

PCT Name	Narrow-leaved Ironbark – Bull Oak - Grey Box shrub – grass open forest of the central and lower Hunter	
Condition	**Modified Derived Native Grassland**	
PCT Formation	KF_CH3 Grassy Woodlands	
PCT Class	Coastal Valley Grassy Woodlands	
PCT Percent cleared	74.00	
Area (ha)	49.5	
Patch Size Class	0 ha (patch size is calculated for intact native vegetation only)	
General Description	Vegetation Zone 11 occurs upslope of the Bowmans Creek floodplain (refer to **Figure 4.6**). The identification of Vegetation Zone 11 was based analysis of floristic, structure, soil, landform and distribution details relating to the candidate PCTs, however with a very high proportion of weed species in the ground layer and an absence of canopy regeneration, the PCT allocation is not predicated on floristic analysis alone.	
Canopy Description	An intact or scattered canopy was absent from the vegetation zone.	
Mid-storey and Shrub Layer Description	Mid-storey and shrub layers were generally absent from Vegetation Zone 11.	
Ground Cover Description	Common/abundant natives: couch (*Cynodon dactylon*), red grass (*Bothriochloa macra*), *Urochloa piligera*, umbrella grass (*Digitaria divaricatissima*), early spring grass (*Eriochloa pseudoacrotricha*), purple wiregrass (*Aristida ramosa*), *Oxalis perennans, Paspalidium distans*, wiry spurge (*Phyllanthus virgatus*), and two-colour panic (*Panicum simile*), common fringe-sedge (*Fimbristylis dichotoma*).	
Introduced Species	Common/abundant weeds: *Setaria parviflora*, goose grass (*Eleusine tristachya*), galenia (*Galenia pubescens*), fleabane (*Conyza sp.*), blue heliotrope (*Heliotropium amplexicaule*), greater beggar's ticks (*Bidens subalternans*), African lovegrass (*Eragrostis curvula*), Paddy's lucerne (*Sida rhombifolia*), purpletop (*Verbena bonariensis*), common sowthistle (*Sonchus oleraceus*)	
PCT Allocation	This is a highly modified community that does not conform to any native PCT. For the purposes of the BDAR and to generate ecosystem credits, this vegetation zone has been attributed to PCT1603 based on its position in the landscape, in proximity to Vegetation Zone 4 - PCT1603 (derived native grassland), and the characteristic ecosystem credit species associated with the PCT.	
BC Act Status	Not consistent with any listed TEC under the BC Act.	
EPBC Act Status	Not consistent with any listed TEC under the EPBC Act.	

2. BCD recommends that Tab 2 of the BAM calculator file is updated to include 'Rivers and streams'; as a landscape feature, to show that Yorks Creek crosses the proposed development footprint, and that the BAM calculator is re-run.

The BAM calculator has been revised to include Yorks Creek as a landscape feature and has been re-run. This change in the BAM calculator did not affect the credit outcome.

3. BCD recommends that the planted Acacia pendula trees in the Project Area are assessed in accordance with BAM 2017 to determine if they generate ecosystem or species credits.

A total of 13 *Acacia pendula* were recorded in an approximately 1.8 ha area of planted vegetation, in proximity to the Glendell Mine offices and infrastructure area. The *Acacia pendula* has been planted in a mix of native species, which includes grey box (*Eucalyptus moluccana*), spotted gum (*Corymbia maculata*), narrow-leaved ironbark (*Eucalyptus crebra*), forest red gum (*Eucalyptus tereticornis*), slaty gum (*Eucalyptus dawsonii*), weeping myall (*Acacia pendula*) and swamp oak (*Casuarina glauca*). The mid-storey was sparse and dominated by non-local Cootamundra wattle (*Acacia baileyana*) and small-leaf bluebush (*Maireana microphylla*) was also present.

The groundcover vegetation was low and sparse and dominated by native forbs, sedges and sub-shrubs. Common species included ruby saltbush (*Enchylana tomentosa*), corrugated sida (*Sida corrugata*), slender flat-sedge (*Cyperus gracilis*), *Einadia polygonoides*, kidney weed (*Dichondra repens*) and yellow burr-daisy (*Calotis lappulacea*). Native grasses included slender bamboo grass (*Austrostipa verticillata*), purple wiregrass (*Aristida ramosa*), speargrass (*Austrostipa scabra*), *Paspalidium distans* and couch (*Cynodon dactylon*).

This is a planted community that does not conform to any native PCT. For the purposes of the BDAR and to generate ecosystem credits, this vegetation zone was attributed to PCT1603 based on its position in the landscape in proximity to Vegetation Zone 4 - PCT1603 (derived native grassland), as well as the presence of several of the characteristic canopy species and ground cover species for PCT1603. The location of the planted *Acacia pendula* is shown on Figure 3.1 in the BDAR and reproduced as **Figure 4.6** as 1603 – Plantation. The 1.8 ha Vegetation Zone 3 – 1603 Plantation generates 33 ecosystem credits.

Plate 4.1 Example of Planted Acacia pendula identified in a mixed planting of native species, corresponding to Vegetation Zone 3 documented in the BDAR.

Table 4.5 Ecosystem Credits Generated by Vegetation Zone 3 - PCT 1603 Narrow-leaved Ironbark – Bull Oak - Grey Box shrub – grass open forest of the central and lower Hunter (Plantation)

Vegetation Zone	Area in Development Footprint	Ecosystem Credits Generated
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter_ Plantation	1.8	33

The BDAR identifies that the *Acacia pendula* plants likely conform to NSW Scientific Committee Final Determination for the Endangered Population of *Acacia pendula* in the Hunter Catchment. This is considered to be a conservative assessment as the scientific committee determination is silent on planted individuals and non-local provenance. The individuals recorded are not naturally occurring and do not occur in a native vegetation community. We acknowledge that the revisions to the BAM that were exhibited in 2019 are not currently finalised or gazetted, however we note that the intent of Appendix D of the draft BAM 2019 does not intend for threatened species planted for any reason other than for the conservation of the species to generate species-credits.

The 33 ecosystem credits generated by the loss of 1.8 ha of planted native species adequately compensates for the loss of the 13 *Acacia pendula* recorded in the Development Footprint, and additional species credits should not be generated.

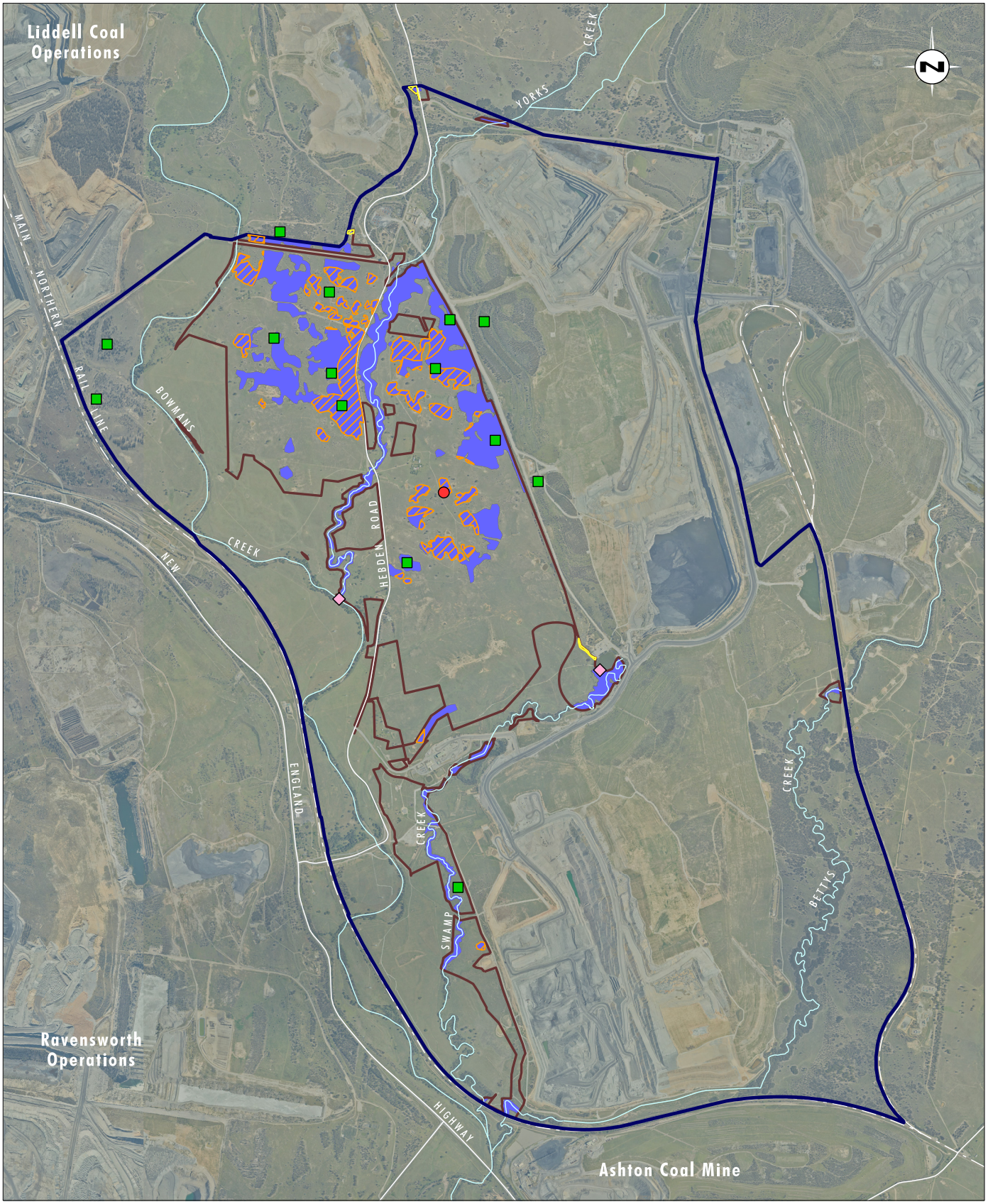


Image Source: Glencore (Dec 2018)
Data Source: Glencore (2019), Umwelt (2019)

0 0.5 1.0 2.0km

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

File Name (A4): 4166_619.dgn
20200514 15.50

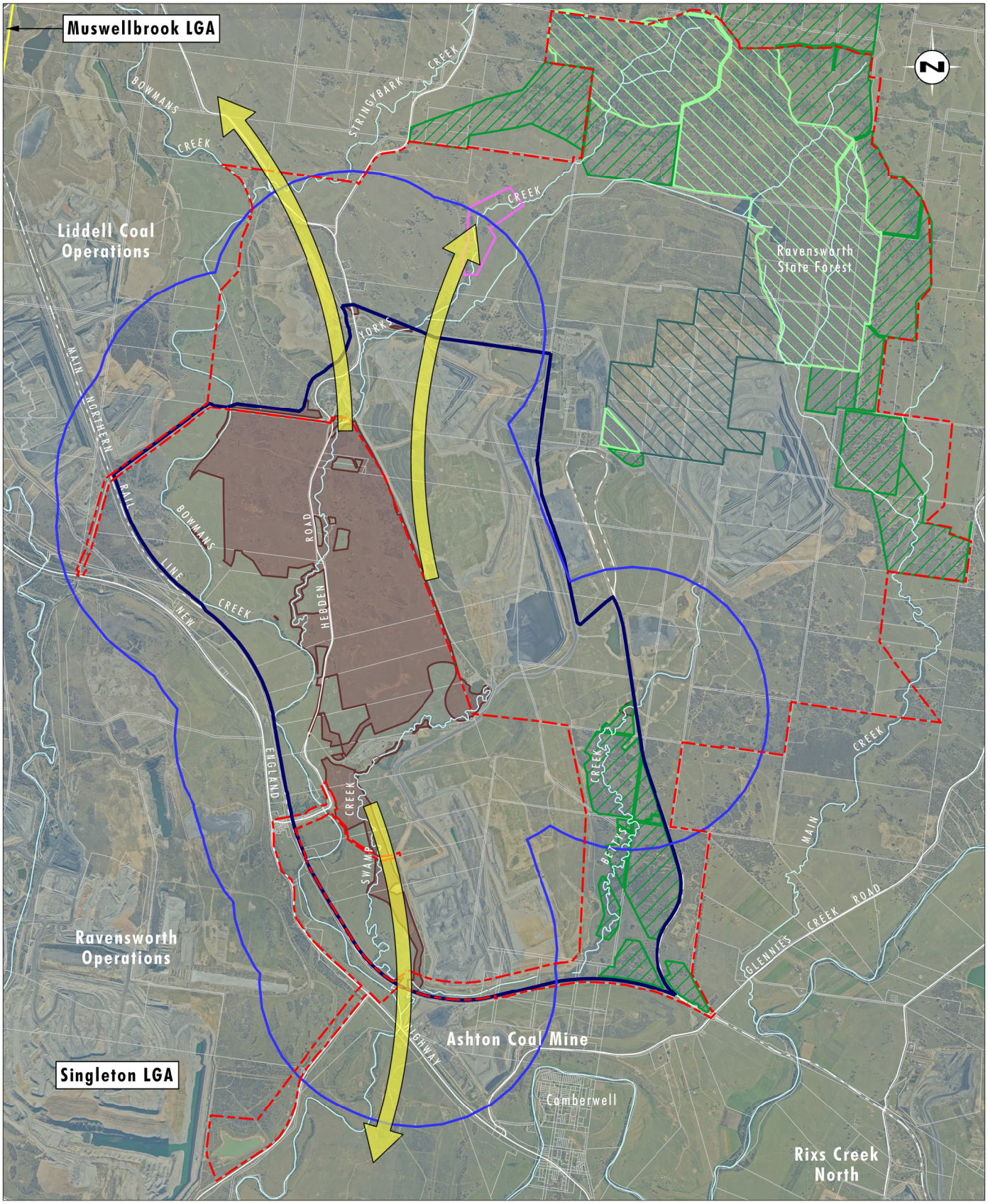


Image Source: Glencore (Dec 2018)
Data Source: Glencore (2019), Department of Finance, Services & Innovation (2019)
Note: Mount Owen Consent Boundary assumes Narama Pipeline Modification is approved

0 1.0 2.0 3.0km
1:60 000

Legend

- Project Area
- Mount Owen Consent Boundary
- Biodiversity Assessment Area (Development Footprint)
- 1500m Buffer
- Local Government Area (LGA)
- Fauna Riparian Movement Corridors
- Existing Mount Owen Complex Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Mount Owen Continued Operations Approved Operational Area
- Yorks Creek Voluntary Conservation Area

FIGURE 4.8

Habitat Connectivity

File Name (A4): 4166_618.dgn
20200514 15.50

4. BCD recommends that the proponent provide additional information to meet all requirements of the Biodiversity Development Assessment Report.

BCD has requested the following additional information:

- **Clarification on when the humidity records given in Table 2.4 (Weather Conditions for Species-Credit Surveys) were taken.**

The humidity data presented in the BDAR was collected by the Bureau of Meteorology at their Singleton weather station. Relative humidity data is collected at either 9.00 am or 3.00 pm.

- **A map showing the location of the Tiger Orchid (*Cymbidium canaliculatum*) and Weeping Myall (*Acacia pendula*) plants in the Project Area.**

The location of the tiger orchid (*Cymbidium canaliculatum*) is identified on Figure 3.3 of the BDAR and reproduced as **Figure 4.7**. The location of the 13 Acacia pendula records is shown on Figure 3.1 in the BDAR and on the above on **Figure 4.6** as 1603 – Plantation.

- **Consideration of *Thesium australe* and *Dichanthium setosum* potential to occur in the Project Area and whether these species may occur on site and require targeted survey.**

Thesium australe and *Dichanthium setosum* were not predicted to occur by the BAM-C and were therefore not subject to targeted surveys in accordance with the BAM as part of the Project. It is noted that extensive targeted and seasonal threatened flora surveys were undertaken which would likely have identified these species in the event that they occurred in the Development Footprint.

While not predicted to occur by the BAM-C, both *Thesium australe* and *Dichanthium setosum* were identified as part of the EPBC Act referral process. The DAWE Protected Matters Search Tool predicted that the species could occur based on the known ranges of the species.

The outcomes of the biodiversity assessment in the EPBC Referral (Umwelt 2019) identified the following:

MNES Name	Status		Likelihood to Occur within the Biodiversity Impact Assessment Area	Assessment of Significance Required?
	BC Act	EPBC Act		
Austral toadflax *Thesium australe*	V	V	Unlikely - not recorded within the Biodiversity Impact Assessment Area despite targeted floristic surveys and unlikely to occur based on known distribution.	No
bluegrass *Dichanthium setosum*	V	V	Unlikely – not recorded within the Biodiversity Impact Assessment Area despite targeted floristic surveys and unlikely to occur based on known distribution.	No

The outcome of the referral process identified the Project as a controlled action for a range of threatened ecological communities and species, however further assessment of *Thesium australe* and *Dichanthium setosum* was not required due to the very low likelihood of the species occurring in the Development Footprint.

Further survey and assessment is not considered warranted for this Project based on the lack of suitable habitat.

- **A map showing the connectivity elements and corridors discussed in section 5.2.1 of the BDAR, as required by Sections 4.2.1.8 – 4.2.1.11, Section 5.2 and Table 25 of the BAM**

The impact of the Project on connectivity and corridors is provided in Section 5.2.1 of the BDAR. A figure representing the biodiversity connectivity and corridor linkages is provided as **Figure 4.8**.

- **An MS-Excel spreadsheet of plant species recorded and the quadrats in which they were recorded as described in Table 25 in the BAM**

A MS-Excel spreadsheet has been provided separately to the rog.hcc@environment.nsw.gov.au mailbox. It is noted that this information is provided in the BDAR as Appendix D.

- **Shapefiles of stages of the project and the final project footprint that are shown in Figures 3.2 to 3.6 of the main report of the EIS should be provided; as per Table 25 of the BAM.**

These shapefiles were provided to the BCD as part of the EIS submission. They have been resupplied to the rog.hcc@environment.nsw.gov.au mailbox as part of this RTS.

5. BCD recommends that the proponent undertake survey of the Project Area for Delma impar using survey techniques from the Survey guidelines for Australia's threatened reptiles (Department of Sustainability, Environment, Water, Populations and Communities, 2011).

This species is considered unlikely to occur within the Development Footprint. Whilst it is noted that the surveys completed across the Development Footprint for the preparation of the BDAR did not specifically meet the targeted survey requirements for this species, Glencore have completed extensive ecological survey across the wider Mount Owen Complex which includes in excess of 20 years of annual ecological monitoring. Therefore, considering the breadth of ecological survey and assessment across the years and the heavily degraded nature of the Development Footprint, this species was excluded from assessment.

Notwithstanding, Glencore will commission surveys for *Delma impar,* however due to seasonal requirements, these surveys cannot be undertaken until September 2020, with preparatory works (setting out of tiles) conducted during winter 2020. A proposed methodology, in accordance with the survey techniques established in the Survey Guidelines for Australia's Threatened Reptiles (Department of Sustainability, Environment, Water, Populations and Communities, 2011), will be utilised for field surveys. Glencore would request that DPIE continue the assessment of the Project without these surveys having been completed noting in the unlikely event that surveys discover the species within the Development Footprint, species-credits will be generated in accordance with the BAM.

It is proposed that this commitment be captured as a condition of consent.

6. BCD accepts the Category 1- exempt land, and Category 2-regulated land mapping in the development footprint area of the project.

Noted.

Rehabilitation and Mine Closure Strategy

7. BCD recommends that the mine rehabilitation plan includes the management of aggressive exotic species that, if established, would lead to poor rehabilitation outcomes.

The Mount Owen Complex, including the Glendell mine, operates under a common approved Mining Operations Plan (MOP)/Rehabilitation Management Plan (RMP) (Glencore, 2019) and common approved Biodiversity and Offset Management Plan. Both the MOP/RMP and the Biodiversity and Offset Management Plan include specific measures to address exotic weed species and feral animals. The Rehabilitation Strategy (Glencore, 2019) developed under the Mount Owen Consent also includes specific consideration of weed control and rehabilitation objectives and while it currently only applies to the areas covered by the Mount Owen Consent this document will be expanded to include the future Project Area also. Appendix 24 of the EIS contains an updated Rehabilitation and Mine Closure Strategy for the Mount Owen Complex which covers both existing approved operations at Mount Owen as well as the changes proposed as part of the Project. The weed management principles identified in the currently approved Rehabilitation Strategy have been carried through to the Rehabilitation and Mine Closure Strategy prepared for the Project.

Should the Project be approved, weed and feral animal control measures will be reviewed and updated where necessary as part of the management plan review process.

8. BCD recommends Port Jackson Fig (Ficus rubiginosa) is included in the planting mix for native woody vegetation in post-mine rehabilitation to provide food and shelter for threatened species.

The species list for all communities targeted in the Rehabilitation and Closure Strategy will be updated to include Port Jackson Fig (Ficus rubiginosa). It is noted however that direct planting of this species will be required, rather than it forming part of a seed mix. The typically ephiphytic nature of the early growth stages of this species mean that it may also be 'planted' on stumps emplaced within the landform.

9. BCD recommends a consent condition is included that requires the 'Rehabilitation and Mine Closure Strategy' to be developed in consultation with the Biodiversity and Conservation Division.

Noted.

Flooding and Flood Risk

13. BCD recommends that a stream stability monitoring program be developed for the Lower Bettys Creek diversion.

The Project does not result in any change in flows reporting to the Lower Bettys Creek diversion until the release of rainfall runoff from rehabilitated parts of the final landform into the catchment. The release of the former Swamp Creek catchment area will report through the Western Rail Dam (WRD) which will be operated as an in stream detention basin. The detailed design of the WRD in the final landform and the tie-in with Bettys Creek will be developed as part of the mine closure planning process resulting in the Swamp Creek catchment being smaller than the pre-mining extent of Swamp Creek and the currently approved conceptual final landform catchment for Swamp Creek. This process will necessarily have regard to the modelling of stream and flood flows in Bettys Creek associated with the final landform design to identify any areas of erosion or scouring risk and appropriate mitigation and monitoring measures. These mitigation and monitoring measures will be identified in the Mine Closure Plan and MOP updates associated with final landform design as well as other relevant management plans including the current Creek Diversion Plan.

Similar modelling processes will be undertaken for other catchments affected by final landform catchment changes with appropriate management and monitoring measured identified in the relevant management plans.

14. The proponent should provide Council with flood behaviour data from its flood impact assessment. Flood data to be handed over should include the GIS files for the inundation extents and TUFLOW 2dm output files suitable for importing into the WaterRide viewing package.

Glencore will provide the model and GIS files to Singleton Council.

Singleton Council will also be consulted as part of the Mine Closure Planning process and the updated results of modelling associated with the final landform will also be provided to Singleton Council in an appropriate file format.

4.6 Department of Primary Industries

Supports – Nil Comments

Noted.

4.7 Singleton Council

The ability of council let alone the community, to review and assess the impacts and consequences of such a significant Project on our region in such a short timeframe over the Christmas period, is not only limited, it creates unnecessary stress for communities already stressed through drought and, now, bushfires. Prior to exhibition, Council strongly requested both the Department and the Applicant delay and extend exhibition to allow adequate time for review.

The length of the exhibition period for a project is determined by DPIE. However, it should be noted that the Project was placed on exhibition from 11 December 2019 to 14 February 2020, which included a two-week extension of the exhibition period by DPIE. This extension period was to allow for DPIE to hold a community information session on Monday 3 February 2020 where community stakeholders were able to raise their concerns and ask any questions to DPIE. The length of the exhibition period for the Project was longer than previous projects of similar scale.

Singleton Council were also given the opportunity to revise their initial submission dated 12 February 2020 following advice from Singleton Council that their submission was preliminary in nature until a meeting of Council formally endorses the submission. The submission dated 12 February 2020 was endorsed without revision during a Singleton Council meeting on Monday 16 March 2020.

Water

Council seeks further clarification from the Applicant on the inter-relationship between the operations of the Greater Ravensworth Area, particularly around:

1. The role of the GRAWTS in ensuring adequate water licenses are held for the Project, and the Mount Owen Complex as a whole, including whether additional water licenses will be required for other participants in the GRAWTS as a result of this Project and therefore the impact that current and additional licensing might have on downstream and Water Sharing Plan users.

The operation of the GRAWTS is described in Section 2.1.4.2 of the EIS.

The GRAWTS involves transfer of water between the Mount Owen Complex, Ravensworth Operations, Liddell Coal Operations and Integra Underground Mine and is a proven mechanism for managing water supply, demand, storage, discharge and licencing needs for these operations. Water (and tailings) transfers between operations are managed with operational triggers and the management of the scheme is reviewed on a quarterly basis. Management of the GRAWTS is discussed at regular Greater Ravensworth management meetings and has a dedicated team led by the Greater Ravensworth Water and Tailings Manager.

All storages used within the GRAWTS must be approved as water storages under development consents associated with the Operations within which those storages are located. As shown in Figure 7.5.9 of the EIS, the GRAWTS contains sufficient storage capacity to handle the water inventory from those Operations that make up the scheme.

The operation of the GRAWTS is subject to a range of operating controls including available water licences, environment protection licences (EPL), and Hunter River Salinity Trading Scheme discharge restrictions at Ravensworth Operations and Liddell Coal Operations. Connections and modifications to the GRAWTS between operations is dealt with through modifications to existing consents which consider implications for the water balance within the GRAWTS.

To date, the GRAWTS has proved to be extremely effective in the management of water across the operations and, during the recent drought, licences held by Mount Owen for Hunter River extractions were able to be temporarily transferred to the Bulga Coal Complex as sufficient stored water remained available with the GRAWTS.

The site water balance for the GRAWTS prepared as part of the Surface Water Assessment (Appendix 17 of the EIS) assumed no change to existing licence allocations. This assessment concluded that the GRAWTS has sufficient storage and groundwater and surface water allocations to meet water demands at all operations within the GRAWTS including the proposed Project.

2. The timing of water licensing needs across the Greater Ravensworth Area, as well as the volume and location for internal water transfers, particularly mine water and its associated storage locations as generated by the Project;

The water balance for the Project (Appendix 17 of the EIS), which includes consideration of GRAWTS linkages and approved operations at other GRAWTS operations has assumed existing water supply licence allocations are maintained throughout the life of the Project. Accordingly, no additional water supply licencing is required for operational purposes as a result of the proposed Project. The water balance also identified that adequate storage volumes exist for the storage of mine water to service all GRAWTS operations, including the proposed Project, and also considers internal water transfers.

The timing and strategy for obtaining any licences necessary to meet legislative requirements is discussed in Section 6.8.3 of the EIS.

3. Overburden emplacement across the operations, including scheduling;

Overburden emplacement associated with Project is detailed in Section 3.2.3.2 of the EIS. Overburden obtained from the Glendell Pit and Glendell Pit Extension will primarily be emplaced in pit i.e. in the void created by the mining operations. Overburden from the Project will also be used for the landform development associated with the realignment of Yorks Creek. Some overburden from the Glendell Pit Extension may also be emplaced on the Ravensworth East emplacement area and may also be used for capping processes associated with the closure of tailings facilities at the Mount Owen Complex.

Crushed rock material from within the Glendell Pit may also be used for haul road, access roads and other construction work within the Mount Owen Complex.

As a general principle, overburden is emplaced as close to the point of extraction as possible as this reduces the costs associated with haulage.

The Project does not involve the transfer of any overburden to other operations outside the Mount Owen Complex.

The indicative scheduling of active overburden emplacement during the various stages of the Project is shown in Figures 3.2 to 3.5 of the EIS. **Figure 4.9** shows the volume of overburden moved over the course of the Project.

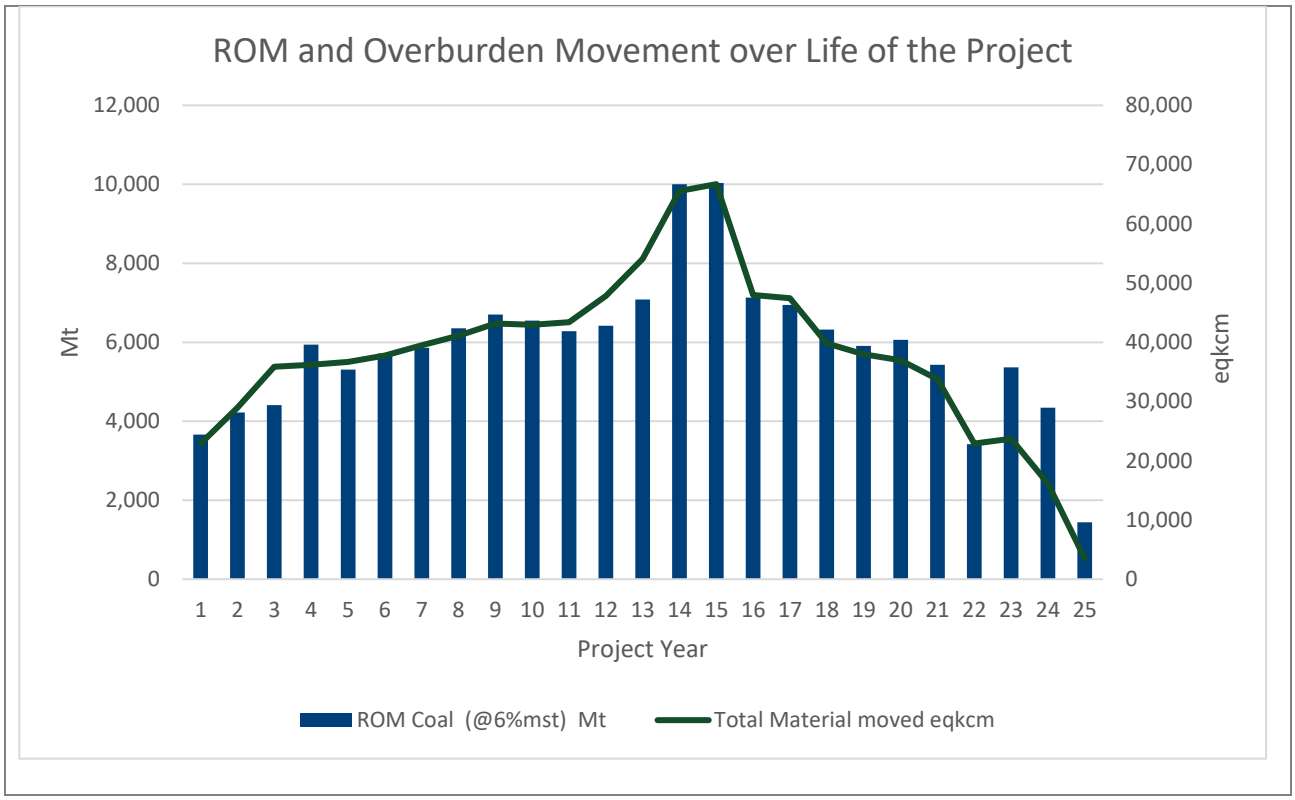


Figure 4.9 ROM and Overburden Movement Over Life of Project

4. Reject and tailings production from the Project, and the impact of this production on the capacity of storages and rehabilitation timing of tailings and emplacement areas at the Mount Owen Mine

As ROM coal from the Project is processed at the Mount Owen CHPP, the management of fine tailings and coarse reject from the CHPP is managed under the Mount Owen Consent in addition to the co-disposal of coarse reject with overburden in the Glendell Emplacement Area to be regulated under the Glendell Continued Operations Consent (if approved). As the processing of coal from the project through the existing Mount Owen CHPP does not cause an increase in the maximum production from the existing facility, the Project does not involve any substantial changes to the coarse rejects and tailings strategy for the Mount Owen Complex.

Consistent with currently approved operations, the GRAWTS linkages also enable the transfer of tailings between the Mount Owen Complex, Liddell Coal Operations and Ravensworth Operations. These linkages enable former mining voids to be progressively filled in an efficient and targeted manner. As shown in Figure 3.19 of the EIS, the voids currently approved for tailings storage within the GRAWTS have sufficient capacity to handle the additional tailings associated with the processing of ROM Coal from the Project.

The coarse reject and tailings management associated with the Project are described in Section 3.3.4 of the EIS. Section 3.3.4.2 of the EIS outlines the approach to fine tailings management including processes to facilitate the consolidation and drying of tailings facilities. The indicative scheduling of tailings emplacement facilities and their rehabilitation at the Mount Owen Complex is shown in Figures 3.2 to 3.5 of the EIS.

5. Scheduling of construction, mining, decommissioning and rehabilitation activities across the Greater Ravensworth Area, which impact not only approved production limits for the respective mining operations, but also approved workforce numbers, water licensing requirements (as identified above), and cumulative amenity impacts to be felt by the community for a longer period of time; and

The Project does not propose any changes to production rates, the life of mine or decommissioning and rehabilitation activities at any other operations other than those proposed in the EIS. Cumulative impact assessments completed for the EIS have either considered approved production rates at other operations or (conservatively) no change to existing approved operations (e.g. traffic assessment has assumed natural traffic growth on the New England Highway and has not accounted for a likely decline in traffic as other operations reduce production rates and cease).

In addition, infrastructure works required for the project will not impact upon existing mining operations with a proposed construction schedule for these works contained in Table 3.3 of the EIS.

The assessment of the Project's interactions with other operations within the GRAWTS has assumed no change to existing water licence extraction and discharge limits.

Cumulative amenity impacts have been considered in detail in the Air Quality Impact Assessment (AQIA) (refer also to **Section 5.1.1.1**), Noise Impact Assessment (NIA) (refer also to **Section 5.1.1.3**) and the Social Impact Assessment (SIA) (refer also to **Section 5.1.2**).

6. The provision of a figure that depicts the inter-relationships, flow pathways and volumes of each flow pathway for all input and outputs related to the interdependencies.

Figure 2.3 of the EIS shows the key GRAWTS infrastructure and linkages. Further details including the various flow and storage capacities and projected operational demands have been considered within the site water balance assessment forming part of the SWIA (Appendix 17 of the EIS).

The rates of flow through and between these various linkages is dynamic and varies on a regular basis depending on the particular demands of different operations within the GRAWTS. This will vary according to weather conditions and also as a result of production changes. As discussed above, management of the GRAWTS is discussed at regular Greater Ravensworth management meetings in conjunction with the Greater Ravensworth Water and Tailings Manager. Water transfers are managed with operational triggers and the status and management of the scheme is reviewed on a quarterly basis.

Hebden Road Realignment

The proposed realignment of Hebden Road will result in a significant increase in annual travel time, the equivalent of 80 days additional travel time per annum across all road users. In addition, the Project proposes blasting delays of up to 15 minutes per vehicle per blast, resulting in lost time of 4.5 days per year for road users. The costs associated with these delays are estimated to be $6.07M. The impact to road users, including local bus and school bus services and other commercial users, is therefore significant.

Hebden Road is an existing rural collector road that spans across both the Singleton Council and Muswellbrook Council local government areas (LGA). As discussed in the EIS, the Project requires the relocation of a section of Hebden Road, located wholly within Singleton LGA in order to maximise resource recovery in line with the *Mining Act 1992*.

The impact of this relocation, including social and economic impacts, has been considered and is presented in the Project EIS documentation, which includes community feedback as well as calculations of economic impact associated with slightly longer travel times due to increased road length (1.2 km) and occasional closures due to blasting. It should be noted that as Mount Owen Complex is a key user of Hebden Road for the purpose of accessing other mining operations at the Mount Owen Complex as well as the Project, it is in Glencore's interest to improve the road safety and performance and reduce any impact on road users as a result of the Project.

The Hebden community (including residents and quarry operations) did not identify the lengthening of Hebden Road and its temporary closure during specific blasting events as a significant issue. The main concern raised by the community during consultation was the effect of road closures on school bus and commuter movements during peak times. To address this concern, blasts requiring road closure will be undertaken at times that avoid school related traffic where possible and planned road closure will be notified beforehand in order to minimise disruptions on local road users.

The method of calculation of increased travel time put forward by Singleton Council in their submission incorrectly applies factors presented in Table 16 of the Economic Impact Assessment (EIA) (EY 2019) to calculate a financial impact of $6.07 million (sum of delay costs due to increased road length and road closures associated with blasting) on road users over the life of the Project. The corrections required are discussed below.

Delay Costs Due to Length

The calculation advised by Singleton Council for delay costs due to increased length of the road is:

5.5	(additional daily hours) x
$85.50	(light vehicle hourly cost + heavy vehicle hourly cost) x
365	(days per year) x
20	(years of Project life)
= $3.43 M	(undiscounted)

In this calculation the annual delay hours from Table 16 should be used as 1992.9 hours over the year is the more accurate number than the rounded daily hours.

In addition, the hourly cost for light vehicles and heavy vehicles should not be added together but rather weight-averaged based on the total number of heavy and light vehicle movements occurring along Hebden Road per day taken from the vehicle counts. This number is presented as the hourly cost in Table 16 as $46.40/hr.

Finally, the number of years the delay applies should be adjusted to 22 years as the EIA has calculated the impact based on delays commencing occurring in 2023 until 2044 inclusive.

This results in the calculation below (which is consistent with the calculated build-up of costs presented in Table 16 of the EIA noting that the total annual delay hours due to additional travel length (1992.9 hours) multiplied by the weight-averaged hourly cost ($46.40/hr) is $0.09M/yr):

1992.9	(annual delay hours) x
$46.40	(weighted hourly cost) x
22	(years of Project life)
= $2.03 M	(or $0.09M/yr) (undiscounted)

Further to this, Singleton Council presents the delay cost as an undiscounted cost. It is not standard practice to report costs in undiscounted terms given the length of the Project with costs being presented in Net Present Value (NPV) or discounted terms to recognise the time value of money. When discounted from 2020 at a rate of 7% as described in the EIA over the 22 year Project life the NPV cost is $0.875 million.

Delay Costs Due to Blasting

The calculation advised by Singleton Council for delay costs due to road closures associated with blasting is:

3.75	(hours lost per blast) x
416	(number of blasts per year) x
$85.50	(light vehicle hourly cost + heavy vehicle hourly cost) x
20	(years of Project life)
= $2.67 M	(undiscounted)

As per the discussion above, the hourly cost for light vehicles and heavy vehicles should be weight-averaged based on daily vehicle movements taken from the vehicle counts with this cost being $46.40/hr.

Additionally, the number of years the delay applies should be adjusted as per the discussion above to 22 years.

This results in the calculation below, which is consistent with the costs presented in Table 16 of the EIA noting that the total annual delay hours due to blasting (1560 hours) multiplied by the weight-averaged hourly cost ($46.40/hr) is $0.07 M/yr:

3.75	(hours) x
416	(number of blasts per year) x
$46.40	(weighted hourly cost) x
22	(years of Project life)
= $1.59 M	(or $0.07M/yr) (undiscounted)

The discounted cost for the delay associated with road closure due to blasting is $0.685 million.

Total Combined Delay Costs

With the correct application of the information presented in Table 16 of the EIA the total undiscounted costs are $3.63 million with the NPV being $1.56 million, which is consistent with the cost presented in Table 16 of the EIA. It should also be noted that the estimate of delay costs presented in the EIA is considered conservative with the actual cost likely to be much less due to:

- The frequency of road closures associated with blasting being less than allowed for. The calculation currently assumes that all blasts (8 per week) will require road closure, however it is estimated that less than 20% of blasts throughout the mine life will require road closure. In addition, road closure is only required where blasting occurs within 500 m of Hebden Road (refer **Figure 4.10**).

- The queueing time during road closures currently assumes that all 15 vehicles are stopped for the full 15 minute closure period. This is unlikely to occur with vehicle stoppage being staggered with not all vehicles experiencing the full 15 minute stoppage time.

The geometry of the existing Hebden Road to be relocated comprises a number of sub-standard curves that restrict the speed limit to below 80 km/hr. The removal of these sub-standard curves and the provision of a new road that maintains a speed limit of 80km/hr for its entire length will partially offset the increase in travel length associated with the relocated road.

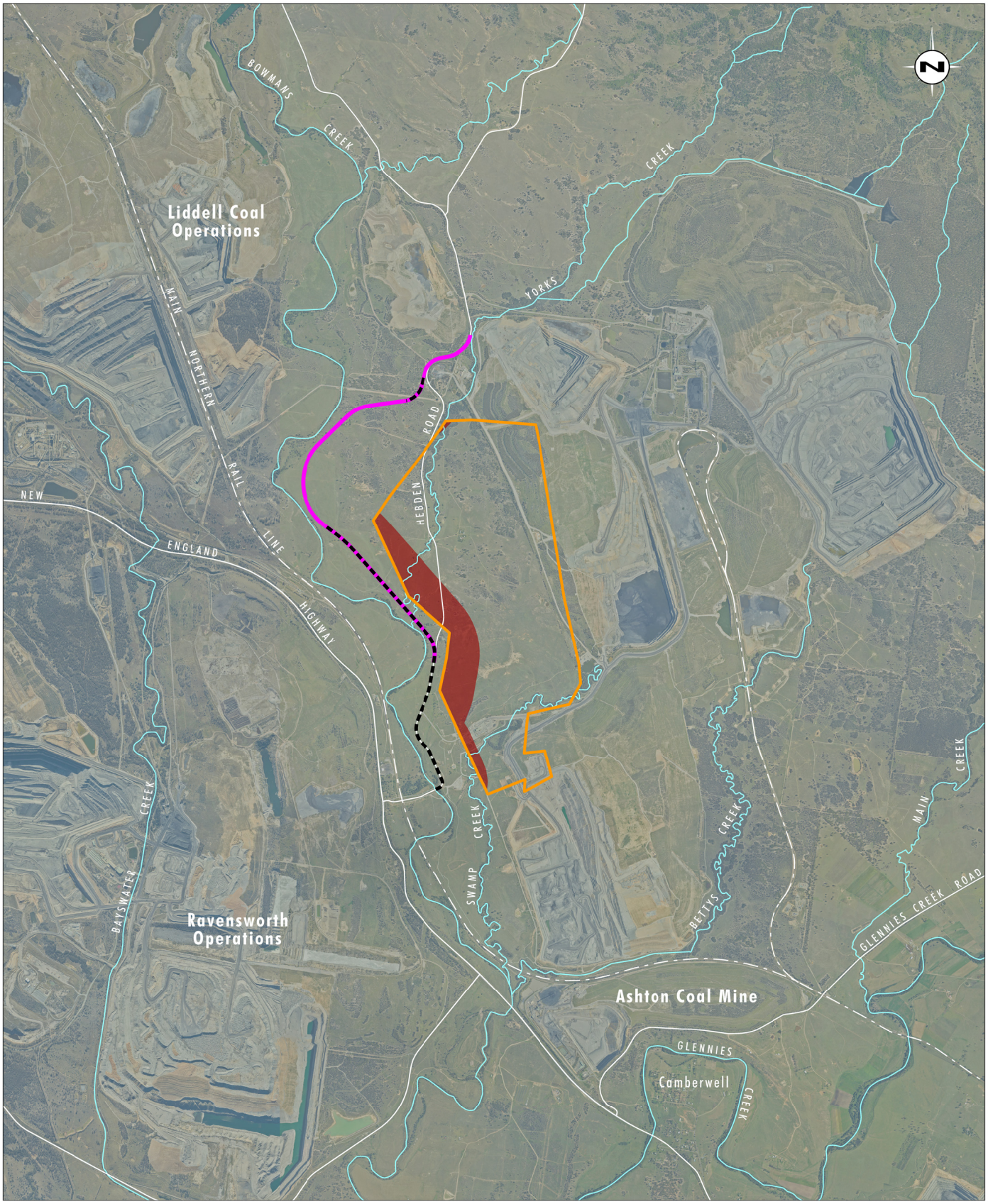


Image Source: Glencore (Dec 2018)
Data Source: Glencore (2019)

0 1.0 2.0 3.0km
1:60 000

Legend

- Glendell Pit Extension
- Hebden Road Realignment
- Areas of Pit where blasting will require temporary closure of Hebden Road
- Sections of Hebden Road subject to temporary closures

FIGURE 4.10

Areas Subject to Temporary Road Closures Due to Blasting within 500m of Hebden Road

Council seeks further clarification from the Applicant on:

1. How the Applicant intends to provision for the long term (in perpetuity) maintenance of the new Hebden Road to meet the asset life requirements;

Ownership of the future realignment will be transferred to Singleton Council as allowed under the provisions of the *Roads Act 1993* and due to this Singleton Council has been consulted during development of the concept design to ensure the road meets Singleton Council's requirements as a low cost, maintainable asset.

The Singleton Council's submission states that:

- "the condition of Hebden road is fair, with the following asset life : Road surface asset life of 15 years
- Pavement asset life of 60 years
- Culverts/headwalls/bridges asset life of 100 years; and
- Subbase asset life of 120 years."

This estimated asset life for existing elements of Hebden Road noted by Singleton Council in their submission appear to be inconsistent with the current condition of the road and general industry guidelines. In general, rural pavements are designed for a 20-year life (Austroads Guide to Road Design), sprayed seals 5-15 years (Austroads Guide to Pavement Technology), culverts and bridges 100 years (Austroads Guide to Road Design).

While some elements of the existing road are considered to be in fair condition, others require rectification, including areas of road seal and pavement, line-marking, encroachment onto the road by vegetation, guideposts and other road furniture such as signage. It is assumed that the current maintenance schedule for the road would require re-sealing, pavement rehabilitation and other rectification works far sooner than the timeframes indicated by Singleton Council.

The Project will construct new elements of the road along the proposed alignment. This will effectively "re-set" the maintenance and replacement schedule for part of the existing road and allow Singleton Council to defer significant maintenance costs associated with an older asset, in which some elements will be approaching the end of their design life in the near future (if not already), with lower maintenance effort required for the new road.

Glencore acknowledges that some additional maintenance requirements will be required long term due to the inclusion of a new single span bridge and a slight increase in length of the road. Discussions regarding the Hebden Road realignment and a Voluntary Planning Agreement (VPA) for the Project have commenced with Singleton Council in relation to the Project.

2. How the Applicant intends to progress the closure of the old Hebden Road alignment, having regard to the provisions of the Roads Act 1993; and

As outlined in Section 5.3 of the EIS, the existing alignment of Hebden Road will be closed following the commissioning of the new Hebden Road realignment. The process for road closure is regulated by Part 4 of the *Roads Act 1993*.

Glencore has undertaken consultation with the Singleton Council regarding the Hebden Road realignment design. As part of the road closure process, Glencore will arrange the survey and subdivision of the new road realignment and the transfer of this land to Singleton Council. It is expected that the land transfer process would involve a land swap in relation to the bypassed section of road. It should be noted this is a process Glencore have successfully completed with Singleton Council several times previously (e.g. Bowmans Creek bridge and rail crossing on Hebden Road, Broke Road and Lemington Road realignments).

Glencore will continue to consult with Singleton Council in regard to the Hebden Road Realignment and closure of the existing alignment throughout the assessment process and will do all things necessary to assist Council in complying with all necessary legislative requirements regarding its closure.

3. The impact of not realigning Hebden Road, including transparent costs and lost coal value, and the consequent environmental, social and economic impacts and benefits of not relocating the road.

Glencore have undertaken a detailed assessment of various mine plan options, provided in Appendix 1 of the EIS. The various mine plan options were assessed with a view of achieving a balance between optimal resource recovery and financial return, and reducing environmental and social impacts through the implementation of appropriate mitigation measures.

Investigations into mine plan options have been ongoing since 2010 and have included geological and geotechnical drilling, development and assessment of alternate mine plan and infrastructure options and consideration of final landform treatments. Technical constraints which influenced the mine plan development included:

- location of former open cut and underground workings
- geotechnical and geological considerations including localised and regional geological structures
- a deposit featuring mostly thin coal seams (<2 m thick)
- the volume of recoverable coal underlying the volume of overburden (strip ratio).

The outcome of these studies and investigations was the selection of the Project mine plan as assessed in the EIS; this mine plan requires the realignment of Hebden Road. This mine plan is considered to provide the best balance between optimal resource recovery, financial return, royalties to the State and ongoing employment benefits and environmental and social impacts and includes the implementation of a range of mitigation measures. This is also supported by the submission received from DRG on the Project (dated 23 January 2020) which stated “the proposed mine design and mining method submissions adequately recover coal resources and will provide an appropriate return to the state”.

Further, the existing length of Hebden Road that is proposed to be realigned is typical of a rural road and includes elements that are not consistent with current road design standards such as horizontal and vertical curve geometry that includes blind crests, corners requiring advisory speed signage and encroachment in the clear zone by vegetation and powerline infrastructure.

Construction of the new alignment will improve safety conditions of Hebden Road for all road users. The works proposed as part of the Project would replace and re-grade the existing horizontal and vertical geometry through realignment of this section of road and enable the posted speed limit to match the design speed limit of 80 km/hr. The realignment works would also remove the presence of clear-zone hazards and blinds crests or curves. The proposed Hebden Road realignment has been designed in accordance with the NSW Roads and Traffic Authority’s (RTA, now RMS) *Road Design Guide* (1993), Singleton Council’s Development Control Plan (2014) and relevant Austroads guidelines. This would complement recent upgrade works completed to the south of the Project that removed a rail level crossing and single lane bridge over Bowmans Creek and replaced these with a rail overpass and two lane bridge, significantly improving the safety of the road and reducing road user delays.

As described in the EIS commitments, Glencore have also committed to change line marking at the Hebden Road/Glendell Access Road intersection and the Hebden Road/Ravensworth East Access Road intersections to be in line with the new Austroads methodology to improve delineation along Hebden Road and road safety at each mine access intersection. Glencore will also improve delineation on Hebden Road through the Hebden Road realignment which will include lane edge marking and guide posts.

Ravensworth Homestead Relocation

The EIS and associated assessments provide one outcome for Ravensworth Homestead and that is relocation, because the economic consequences of not proceeding with the proposed Project outweigh the impacts of relocation. However, the EIS does not identify any current potential reuse or restoration actions or options that could satisfy a conclusion contrary to Article 9 of the Burra Charter, particularly in the scenario that the Project does not obtain approval. The social impact assessment surveyed the broader community seeking feedback on the proposed Project. The Singleton community highly values heritage and seeks its conservation. However, the social impact assessment limited the survey results to an outcome where relocation is the only viable way to ensure its long-term security, because the assumption is that the Project will be approved. It does not consider what will happen to the Homestead if the Project is not approved, and the views of the broader community around its reuse potential in that scenario, nor does it allow community consideration of a post mining use of the Homestead should it be relocated to Ravensworth Farm.

Ravensworth Homestead lies within the proposed mining footprint and its proposed relocation, coupled with archaeological recording and salvage, is considered a substantial mitigation measure in relation to heritage impacts. If the proposed Project is not approved, the Ravensworth Homestead would remain in situ and kept secure by Glencore.

In 2008-2009, Glencore completed significant repair and restoration works on the Homestead buildings that included structural stabilisation works, roof repairs and repointing of mortar joints. Following this work, Glencore sought expressions of interest for the ongoing use and management of Ravensworth Homestead. Three parties registered an interest in the Homestead. However, rental of the property did not eventuate as the Homestead services (electricity, plumbing, heating, etc.) were considered inadequate for contemporary residential occupation purposes and the internal layout impractical.

The Ravensworth Homestead is inaccessible to the public in its current location. Glencore has facilitated visits to the Homestead as requested however there has been limited interest shown in accessing the site by the public and other interest groups. The buildings are not used and have remained vacant since the purchase of the property by Glencore in 1997. However, Glencore has voluntarily ensured that maintenance of the buildings has occurred over this period to prevent their deterioration, and where possible to preserve much of their current condition, as such they remain in relatively good repair.

In the case that the Project is not approved, Glencore will continue to maintain the homestead and would likely remain vacant whilst ever in Glencore ownership.

The proposed relocation of the homestead and associated buildings provides an opportunity for the homestead to be repurposed and given a useful ‘second life’.

Council seeks further clarification from the Applicant on the:

1. approval requirements, current and future land ownership (as well as outcomes of consultation with current land owners), future Homestead ownership and maintenance, should relocation to McNamara Reserve be approved;

Should relocation of Ravensworth Homestead to Broke Village (McNamara Park) be approved by the consent authority then land tenure is to be secured and further secondary approvals will be required to be obtained.

McNamara Park is Crown Land (Lot 701 DP 93631) owned by NSW Crown Lands and managed by Singleton Council. Native title has not been wholly extinguished over the land and therefore any 'future acts' on this land may be required to be advertised/notified and would first require either a Right to Negotiate Process be followed or an Indigenous Land Use Agreement to be entered into in respect of the land. It is noted that no native title claim currently sits over the land.

Preliminary discussions have been held with NSW Crown Lands regarding access to the Crown Land for the relocation of Ravensworth Homestead. Access could be in the form of a lease (long term or in perpetuity), licence arrangement or potential purchase of the land to accommodate the complex. Further discussions will be held with NSW Crown Lands and Singleton Council, as the land manager, regarding access to McNamara Park throughout the EIS assessment period and as part of the secondary approval process.

The secondary approvals required for the relocation and use of Ravensworth Homestead at McNamara Park will be in the form of a separate Development Application lodged with Singleton Council, which will require the completion of requisite studies including traffic, stormwater and flooding, and flora and fauna.

It is anticipated that the necessary secondary approvals for the Broke option will take approximately two years to obtain from the date of approval of the SSD (if granted) to obtain including the securing of land tenure. Should approval to reconstruct and use the homestead in Broke not be obtained within two years of approval of the SSD then relocation of the homestead would be relocated to Ravensworth Farm. Should approval to relocate to Broke be granted within two years of approval of the SSD.

A new entity in the form of an incorporated (not-for-profit) association (or similar) comprising members of the Broke-Fordwich community and governed by a board of trustees is planned to be established for the future ownership and management of the facility. The final ownership structure is to be progressed throughout the EIS assessment period and post-project determination (if approved). Whilst the ownership and management structure is yet to be confirmed, it is anticipated that financial benefits generated by the facility would be used for funding other community initiatives in the Broke-Fordwich region such as providing improved infrastructure, services and facilities.

2. permissibility of Option 1 and Option 2 in the respective zoning, including a description of the intended final land use approval being sought for the Homestead under each option;

Ravensworth Farm - Option 1: The land at Ravensworth Farm is zoned RU1 – Primary Production, which permits land uses that are compatible with the proposed final land uses for Option 1, such as dwellings, farm buildings, roads, rural industries and agriculture.

For the duration of mining (approximately 20 years), the relocated Homestead buildings would be used by Glencore as an administration centre consisting of office space, meeting facilities and training rooms as indicated in Section 8.1.2 of Appendix 23e of the EIS. Adaptation drawings for the proposed use are shown in Appendix 23g of the EIS. The relocated Men's Quarters would be used to store and display the history (Aboriginal and historical) of Ravensworth Estate and the associated building group. Additionally, select artefacts salvaged from the archaeological (Aboriginal and historical) investigations would be stored and incorporated into the new grounds.

At the completion of mining, possible options include return of the Homestead to use as a private farmstead with an attached landholding or an alternate use that suits future land use and interest in the area. Post-mining use of the relocated Homestead would be determined as part of the Mine Closure Planning process for the Project that would include a final land use assessment to identify the entity responsible for management, use and maintenance of the buildings, alterations necessary to suit the post-mining use and visual catchment rehabilitation commitments (refer Appendix 5 of the EIS).

The proposed final use as a possible farmstead with attached landholding is permitted under the existing zoning of the land.

Broke Village - Option 2: The land at McNamara Park is zoned as RE1 – Public Recreation, which permits land uses compatible with those proposed for Option 2 (refer to the below), such as kiosks, restaurants and cafes, and community facilities. However, should a proposed land use not be permitted within the current zone, the need for a rezoning of the land may need to be investigated.

The relocated Homestead under the Broke Village option would have multi-purpose usage. The facility would comprise a number of precincts as shown conceptually in Figure 23 of Appendix 23f of the EIS with varying uses potentially including:

- **Cultural Precinct (Main House and Kitchen Wing):**
  - Offices
  - Exhibition (art) space
  - Interpretation space
- **Food precinct (Men's Quarters and Barn):**
  - Café/restaurant premises
  - Local produce (cheese, bread, ice creamery)
- **Tourism precinct (Stables):**
  - Cellar door/wine tasting
  - Micro-brewery
  - Function space
- **Market Square:**
  - Markets (monthly)
  - Major events (Broke Fair, Smoke in Broke etc)
- **Service & Amenity:**
  - Toilets
  - Maintenance and greenkeeper

3. the broader community support or otherwise for the management of the Homestead in a scenario where the Project is not approved, including consideration of a post mining use of the Homestead in both its current location and at Ravensworth Farm;

As discussed previously, the Ravensworth Homestead is inaccessible to the public in its current location. Glencore has facilitated visits to the Homestead when requested, however there has been limited interest shown in accessing the site by the public and other interest groups.

Previous expressions of interest for use of the buildings did not eventuate in occupation as the lack of Homestead services (electricity, plumbing, heating, etc.) were considered inadequate for contemporary residential or business occupation purposes and the internal layout impractical.

The buildings are not used and have remained vacant since the purchase of the property by Glencore in 1997. However, Glencore has voluntarily ensured that maintenance of the buildings has occurred over this period to prevent their deterioration, and where possible to preserve much of their current condition, as such they remain in relatively good repair.

In the case that the Project is not approved, maintenance on the Homestead would continue to be undertaken by Glencore to maintain it in its current state and would likely remain vacant whilst ever in Glencore ownership.

In the case of approval of the Ravensworth Farm option significant upgrade of the building services will be completed (electrical, water, sewer) to make the buildings habitable and compliant with current building standards. Further details on proposed building modification and adaptation works required to suit the intended end-use during mining are provided in Appendix 23g of the Project EIS.

At the completion of mining, possible options include return of the homestead to use as a private farmstead with an attached landholding or an alternate use that suits future land use and interest in the area. Post-mining use of the relocated homestead would be determined as part of the Mine Closure Planning process for the Project that would include a final land use assessment to identify the entity responsible for management, use and maintenance of the buildings, alterations necessary to suit the post-mining use and visual catchment rehabilitation commitments (refer Appendix 5 of the EIS).

4. the management actions and controls that would be implemented to ensure appropriate investigation is undertaken for buried remains, and the actions that would be taken in the event additional remains (archaeological and human) are located across the entire Estate area;

Significant archaeological investigations were completed during preparation of the EIS which included targeted ground penetrating radar to investigate the potential for buried remains onsite. This included areas beyond the Ravensworth Homestead, adjacent to Yorks Creek as well as within the grounds of the homestead building group itself. The assessment found no new evidence of remains other than the existing known grave of Miss White (daughter of overseer James White), who is buried within the homestead grounds to the east of the Kitchen Wing. In addition, the Aboriginal archaeological investigation found no evidence of existing ancestral remains within the Project Area. Outcomes of the historic archaeological investigation completed by Casey & Lowe (C&L) is provided in Appendix 23c with outcomes of the Aboriginal archaeological impact assessment completed by OzArk provided in Appendix 22 of the EIS.

As described in Section 7.8.8 of the EIS and described further in Appendix 23c, should the Project be approved, a Heritage Management Plan (HMP) will be developed in consultation with relevant agencies to the satisfaction of DPIE. The HMP will provide detail on heritage impact mitigation measures to be implemented for the further investigation of potential archaeological resources and include an unexpected finds protocol. In addition, the HMP will include processes for dealing with buried remains (both European and Aboriginal) should they be discovered as part of infrastructure works or the mining operation consistent with those processes that currently exist in the Mount Owen Complex Aboriginal Cultural Heritage Management Plan (ACHMP).

Specific archaeological mitigation measures recommended by C&L are provided in Table 7.45 of the EIS based on specific areas within the Core Estate Lands and the mitigation measure proposed based on the impact of the Project within that area. Further details on the policy for the management of human remains are provided in Section 7.3 of the C&L report provided in Appendix 23c of the EIS.

5. the feasibility of McNamara Reserve, in the context of clause 2.14 of the Crown Land Management Act 2016, the Biodiversity Conservation Act 2016, the Roads Act 1993, the Local Government Act 1993 and any other Act/Regulation/Environmental Planning Instrument where an approval or assessment of the impact of such a proposal would be required;

As described in Section 5.2.1.2 of the EIS, for the purpose of facilitating mining activity in the Glendell Pit Extension approval is sought as part of this SSD application to relocate the Homestead, as an ancillary aspect of the development on the basis that relocation will be either locally to Ravensworth Farm (Option 1) or alternatively to Broke Village (Option 2). In the event that the Ravensworth Farm (Option 1) is approved by the consent authority, then approval for this relocation option would be included as part of the SSD development consent and would require no further statutory approvals as all necessary environmental assessments for this option have been completed as part of the current SSD application.

In the event that Option 2 is approved by the consent authority, then it needs to be recognised that land tenure is to be secured for the proposed location or an alternative location, and further secondary approvals for the reconstruction and use of the Homestead in this location will be required to be obtained.

Preliminary constraints assessments of the Broke Village site at McNamara Park have been completed as part of the Ravensworth Homestead options selection process and included land ownership, planning, ecology and Aboriginal cultural heritage (refer Appendix 23f and 23h of the EIS). Further detailed assessments will be completed as part of the secondary approval process if Option 2 is approved by the consent authority.

6. social and economic impact and consequences of such a facility on the Broke community, including future maintenance costs of facilities and infrastructure required to support the relocation that will be borne by the community or any other party, and

If the Broke Village option is approved as a relocation option under this SSD development consent, social and economic assessments will be completed as part of the secondary approval process for the relocation to Broke.

The Project under this SSD application is seeking approval to relocate the Homestead on the basis that relocation will be either a local move to the Ravensworth Farm site or alternatively to Broke Village.

A number of submissions received during exhibition acknowledged the economic benefits to the Broke community and wider region associated with the relocation and establishment of the homestead in Broke. These submissions reflect benefits communicated by the Broke-Fordwich Wine and Tourism Association that included:

- attraction of more visitors to Broke and the region
- promote and boost the sustainability of the existing businesses
- provide opportunities to grow existing businesses and to establish new businesses
- improvement of visual amenity of the village
- addition of a community space as a focal point for the village
- provides further support for established annual events such as Broke Fair, Smoke in Broke and Little Bit of Italy which currently attract up to 10,000 visitors annually to Broke

In regard to future maintenance costs and management of the facility, a new entity in the form of an incorporated (not-for-profit) association (or similar) comprising members of the Broke-Fordwich community and governed by a board of trustees is planned to be established for the future ownership and management of the facility. The final ownership structure is to be progressed throughout the EIS assessment period and post-project determination (if approved). Whilst the ownership and management structure is yet to be confirmed, it is anticipated that financial benefits generated by the facility would be used for funding other community initiatives in the Broke-Fordwich region such as providing improved infrastructure, services and facilities.

7. person or entities responsible for completing the relocation to McNamara Reserve, including the capacity of the identified persons or entities to undertake such actions as are required to complete the relocation (some of which are identified in points 1 to 3 above), a timeline for completion of points 1 to 3 above and a contingency plan in the event the relocation to McNamara Reserve becomes unsustainable; and

Significant investigation of the buildings and consultation with specialist heritage contractors, architects and engineers occurred through development of the EIS to ensure the relocation to Broke through a dismantle and rebuild methodology could be practically achieved.

Glencore will fund the relocation of the Ravensworth Homestead to Broke including the repurposing of the buildings to suit the proposed end-use. Glencore will be responsible for engaging and managing specialist heritage, civil and building contractors to deliver the works. The selection of contractors for the works will be subject to a competitive tender process, which will be undertaken following receipt of the necessary secondary approvals and will include assessment of the contractors experience in similar works, quality of work and ability to adequately resource the work.

It is anticipated that the necessary secondary approvals for the Broke option will take approximately two years to obtain (from the date of the SSD consent, if granted) including the securing of land tenure. Should all approvals required to reconstruct and use the homestead in Broke not be obtained within two years of approval of the SSD then relocation of the homestead would revert to Ravensworth Farm.

Regarding Council's question on 'a contingency plan in the event relocation to McNamara Reserve becomes unsustainable', we interpret this as meaning whether the relocated homestead will be financially sustainable in the long term. Glencore will work with the proposed new owners to develop a sustainable business plan for the proposed redeveloped site at Broke.

8. long term, in perpetuity arrangements that will be imposed and implemented to ensure the Homestead is accessible, sustainable in the long term and reused for an appropriate purpose (in other words, meets the required public interest test), for both Option 1 and Option 2.

Long term, in-perpetuity arrangements for access to the Homestead will vary between the Ravensworth Farm (Option 1) and Broke Village (Option 2) options as described below.

Ravensworth Farm - Option 1: During the Homestead's initial use as a mine administration facility under Glencore ownership, access to the Homestead will be upon request.

Accessibility post-mining will be dependent on future use. For example, if the Homestead is returned to use as a privately owned farmstead then public access could be limited. Post-mining use of the relocated Homestead would be determined as part of the Mine Closure Planning process for the Project and will have regard to long term accessibility.

Broke Village - Option 2: Relocation of the homestead complex to Broke Village will result in the public having relatively unhindered access to the buildings. Given that the buildings will be freely accessible to the public then surveillance and security is a key consideration. Further details on these aspects will be developed as part of the secondary approvals process.

Mine Closure/Final Landform/Final Land use

Council criticism regarding lack of commencement of Mine Closure Planning for current operation

As described in Section 7.9.5 of the EIS, Glencore undertakes mine closure planning in accordance with its internal Mine Closure Planning Protocol, and in accordance with statutory obligations. The proposed conceptual final landform, along with a detailed mine closure cost estimate are required by the MOP/RMP process as approved by the Resources Regulator, throughout the life of the mine.

The existing Glendell consent (DA 80/952) requires the preparation of a Landscape Management Plan which includes a number of subplans. The Landscape Management Plan required under this consent was approved in September 2014 and includes a Final Void Management Plan and a Mine Closure Plan. The Landscape Management Plan covered the entire Mount Owen Complex. For areas within the Mount Owen Consent Area, the Landscape Management Plan has been superseded by the Rehabilitation Strategy however the Landscape Management Plan remains applicable to the Glendell Mine.

The Landscape Management Plan requires mine closure planning processes to commence at least five years prior to planned closure. Internal planning related to the closure of Glendell consistent with current approval requirements has commenced however this has necessarily included the consideration of the ongoing mining proposed by the Project as a reasonable and feasible ongoing land use option for the site. Numerous meetings have been held with Singleton Council and Council officers regarding the Project. The processes undertaken to date are consistent with the obligations applicable under the Glendell Consent and the Operations.

Council seeks further clarification from the Applicant on the:

1. Timing of detailed closure planning for the existing operation, should the Project not be approved, including the actions needed to be taken to achieve a post mining land use that is suitable, and does not result in a negative socioeconomic impact to the community. This analysis must include:

a. Potential areas of the mining lease (or mine owned land) where these land uses could be applied;

b. Relationship between the proposed final land uses and the final landform;

c. The integration of these uses with other existing and proposed land uses in the region, including the compatibility and viability of potentially competing uses;

d. Whether any or all of these options will be safe, stable, non-polluting and sustainable in the context of the final landform; and

e. A timeframe/timetable for investigation and implementation of one or more option(s) through to feasibility.

If the Project is not approved, mine closure and rehabilitation will continue as part of the current approved operations at the Glendell Mine. Glencore has prepared a conceptual Mine Closure Plan for the Glendell Mine in accordance with Condition 42 of the existing Glendell consent (DA 80/952) and this forms part of the approved Landscape Management Plan. The conceptual mine closure plan, together with the MOP, provides a clear, planned and executable mine closure process for the Glendell Mine, and the broader Mount Owen Complex. The conceptual mine closure plan is developed in accordance with relevant legislation and guidelines. The conceptual mine closure plan details the requirements of the relevant legislation, post-mining land use and closure objectives, mine design and planning, rehabilitation/ environmental management/monitoring and social and community engagement.

Glencore will continue to liaise with Singleton Council as required in regard to the mine closure planning for the existing Glendell Mine in accordance with relevant regulatory requirements. It is noted however that the operation is currently approved to mine until the end of June 2024 with rehabilitation operations continuing beyond this date. The Project seeks to extend this to approximately 2044 which would defer much of the detailed mine closure planning processes. As identified in the EIS, the Proponent will consult with Singleton Council on the preparation of the Rehabilitation Strategy covering the Project and the broader Mount Owen Complex.

2. Role of both council and the community in the post mining land use options assessment and analysis, including the extent to which such consultation has occurred and its outcomes;

As a result of other recent mining projects in the Singleton LGA, Glencore has committed to ongoing consultation with Singleton Council to assist with the development of strategic land use planning that will help to provide a sustainable future for the community of Singleton post-mining. As part of the recent approval for the Mount Owen Continued Operations Modification 2, Glencore has committed to the development of a final land use strategy to investigate the potential post-mining beneficial land uses for the Mount Owen Complex. The final land use strategy for the Mount Owen Complex, including the Project, will be developed as part of the mine closure process and will consider alignment with local strategic planning instruments, provision of a sustainable future for the community, utilisation of existing infrastructure and ecological rehabilitation requirements.

The community was consulted throughout the EIS assessment phase and raised future land use and rehabilitation as a common theme across stakeholder groups, including near neighbours and the broader community. Stakeholders raised the importance of the responsibility of Glencore to restore the land after closure of the operation to ensure a viable land use. Consistent with the existing mine closure planning commitments under the Mount Owen Consent (SSD 5850), consultation with stakeholders, including the local community and proximate landholders will commence prior to planned closure with a detailed mine closure plan being developed at least five years prior to planned closure.

3. The relationship between post mining land use and the principles of strategic land use planning, including the extent to which the Applicant has consulted with council on the future strategic land use planning outcomes for the local government area;

The proposed final land uses for the site are consistent with the objectives of existing strategic plans applicable to the site in that it increases the land area identified for ecological restoration and will significantly enhance regional biodiversity linkages. Importantly, the site also provides a number of opportunities for alternative land uses with employment opportunities which can occur concurrently with the proposed biodiversity outcomes.

As described in Section 7.9 of the EIS, the approach to rehabilitation and the extensive revegetation and conservation program proposed is consistent with the Singleton Council strategic land use objectives for the area and the conceptual final land use plan enhances local and regional biodiversity corridors through linkages with remnant vegetation, offset areas and rehabilitation commitments at other mining operations. Additionally, the conceptual final land use has been prepared with consideration of strategic long-term land use planning options within the greater Ravensworth area. As identified in Section 7.9 of the EIS, parts of the Mount Owen Complex, including the Glendell Mine and associated infrastructure and final void, have significant potential for high value land uses in the future.

As stated in the previous response, Glencore has committed to ongoing consultation to assist with the development of strategic land use planning that will help to provide a sustainable future for the community of Singleton post-mining.

4. Final void management actions that will be taken to ensure highwall stability during and post mining, including contingencies for final landform design and rehabilitation outcomes should the highwall destabilise during and/or post mining;

Glencore implement a series of Standards across all operations in NSW and QLD. This includes the Glencore Mine Closure Planning Protocol which provides guidance for closure planning for various stages of mine life from exploration through to post-closure management.

As a general principle, highwalls retained in the final landform will be designed to be geotechnically stable for the long-term having regard to a range hydrostatic scenarios.

Analysis was undertaken by engineering consultants PSM who completed a geotechnical assessment (PSM 2019) to assess the stability of the Glendell Pit Extension design. These studies are based of the current understanding of the geology and geotechnical conditions in the areas surrounding the voids. In the case of the Glendell Pit Extension, the studies identified no significant highwall stability risks for the northern and eastern highwalls of the final void, and that a Factor of Safety (FoS) of greater or equal to 1.2 is achievable. Geotechnical drilling and testing was undertaken at the proposed western highwall location, due to its presence within the Block Fault Zone and analysis indicated that a FoS of 1.5 is achievable for the western highwall through the implementation of an appropriate slope design that will result in a safe and stable final void. This level of FoS is consistent with Glencore Mine Closure Planning Protocols.

In accordance with the principles of the Glencore Mine Closure Planning Protocol, the Project mine plan and conceptual final landform, including the final highwalls, will be subject to ongoing geotechnical investigation and refinement by Glencore over the life of the operation, providing a safe and stable final landform. A Final Void Management Plan will also be included in the Mine Closure Plan.

5. Assessment of the suitability, permissibility and sustainability of the final land use(s) proposed by area or domain, including actual feasibility and economic viability, as well as linkage between final landform and final land use(s) (that is, will be (sic) landform proposed actually provide for the uses identified);

A high level analysis of potential post mining land uses for the Project Area and more broadly the Mount Owen Complex was presented in Section 7.9.5.2 of the EIS. This analysis further identifies the land characteristics which would be consistent with sustainable operations of these land uses and the extent to which these beneficial land characteristics or values are present or could be present at the Mount Owen Complex as mine closure and rehabilitation proceed.

The analysis indicated that there are a number of potential options for beneficial use of final voids. The presence of the void and associated pit lake is considered to provide significant opportunities for high value (and high employment generating) land use options providing economic diversity into the future beyond mining. Whether or not the void is directly used as an asset as part of the final land use (e.g. pumped hydro electricity generation, extreme recreation activities, aquaculture etc.), the existence of the void should not constrain the range of potential land uses, provided appropriate access, landform stability and safety considerations are in place.

The Project and, more broadly, the Mount Owen Complex provides a range of opportunities for a variety of potential land uses, given the extensive infrastructure and accessibility. The final land use options identified are considered as potential land uses. Additional review and consideration will be undertaken closer to mine closure and will be dependent on demand and technology available at the time.

6. Analysis of the climate changing risks (temperature, rainfall, fire) on the success of rehabilitation, including the contingency measures that would be implemented in the event rehabilitation fails;

Projected changes to the climate associated with climate change are unlikely to have a significant impact on rehabilitation practices over the life of the Project. Increased climatic variability does present a risk to rehabilitation success however existing contingency measures contained in the currently approved MOP/RMP already contain provision for these effects and have been successfully implemented over the recent drought period which is considered to represent a good example of the more extreme adverse climatic conditions that could be expected over the life of the Project. The RMP/MOP for the Mount Owen Complex is reviewed on a regular basis and these reviews will consider any risks to rehabilitation success associated with forecast climatic changes.

The target vegetation communities identified in the Rehabilitation and Mine Closure Strategy (Appendix 24 of EIS) are considered to have a high degree of resilience to lower rainfall, higher evaporation climate conditions in the future. Existing rehabilitation at the Mount Owen Complex consistent with the target communities identified in the Rehabilitation and Mine Closure Strategy is considered to have performed well during the recent drought period.

7. Viability of the proposed final land uses, including where on the lease or buffer areas these uses could be applied, the relationship between the proposed final land uses and final landform, the integration of these uses with other existing and proposed land uses in the region, including the compatibility and viability of potentially competing uses;

As described in Section 7.9.3 of the EIS, the key land use changes in the final landform associated with the Project is the movement of the Glendell Pit void further to the north, modifications to the Glendell overburden emplacement area (including increased height of emplacement), the increased extent of native revegetation in the final landform and the realignment of part of Yorks Creek. The realignment of part of Hebden Road will remove approximately 13 ha of land from grazing and potential cropping use.

The increased native vegetation areas in the rehabilitated landscape are designed to improve regional habitat connectivity. Some of the areas targeted for native vegetation rehabilitation are currently available for grazing uses. However, these areas are currently low productivity grazing lands which have been heavily disturbed and degraded by past clearing and agricultural uses. Flatter areas in the final landform have been targeted for open grassland uses. These flatter areas are considered the most likely to be able to support sustainable grazing practices into the future with reduced erosion risks.

The location of the native vegetation in the final landform is designed to establish and enhance native vegetation corridors to promote regional fauna movements across the Mount Owen Complex and surrounding region. These corridors will be developed throughout the life of operations at the Mount Owen Complex through progressive rehabilitation of emplacement areas. These corridors are proposed to achieve improved linkages to existing remnant vegetated areas of Ravensworth State Forest as well as the significant areas of woodland area being planted and regenerated in offset areas associated with Mount Owen Complex and approved offset lands for other mining projects in the area (e.g. Liddell Coal Operations offsets to the north west).

The proposed linkages are also focussed on enhancing biodiversity connectivity between major creek systems (in particular Glennies Creek and Bowmans Creek) and addressing 'missing gaps' in the local and regional biodiversity corridors. The biodiversity corridors established will be suitable for a range of threatened fauna species including but not limited to the spotted-tailed quoll (*Dasyurus maculatus*). The development and enhancement of habitat corridors proposed as part of the conceptual find land uses is consistent with the intent of the broader regional corridor system outlined within the Synoptic Plan.

The proposed final land uses for the site are consistent with the objectives of each of the strategic plans in that it increases the land area identified for ecological restoration and will significantly enhance regional biodiversity linkages. Importantly, the site also provides a number of opportunities for alternative land uses with employment opportunities which can occur concurrently with the proposed biodiversity outcomes.

The final land use strategy will be developed as part of the mine closure process and will consider alignment with local strategic planning instruments, provision of a sustainable future for the community, utilisation of existing infrastructure and ecological rehabilitation requirements.

8. The consequences of the final land use options, including the final use of the void, on the principles of ecologically sustainable development, in particular, inter-generational equity;

An assessment of the Project in relation to the principles of ecologically sustainable development (ESD) including intergenerational equity was completed as part of the EIS (refer to Section 8.3 of EIS).

Intergenerational equity is based on the principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The principles of intergenerational equity are addressed by the proposed final land use options through the identification of the land characteristics which would be consistent with sustainable operations of the proposed land uses and the extent to which these beneficial land characteristics or values are present or could be present at the Mount Owen Complex as mine closure and rehabilitation proceed, and into the future.

As a final void will remain in the landform as a result of the Project, consideration of the potential options for beneficial use of final voids has also been undertaken. The presence of the void and associated pit lake is considered to provide significant opportunities for high value (and high employment generating) land use options providing economic diversity into the future beyond mining. Whether or not the void is directly used as an asset as part of the final land use (e.g. pumped hydro electricity generation, extreme recreation activities, aquaculture etc.), the existence of the void should not constrain the range of potential land uses, provided appropriate access, landform stability and safety considerations are in place.

It is also noted that the currently approved Glendell operations will retain a final void in the landscape. In this regard, the intergeneration consequences of the void proposed as part of the Project (both positive and negative) are similar to those of the currently approved operations.

9. safety, stability, pollution potential and sustainability of the proposed final land uses in the context of the final landform; and

Analysis of potential final land uses was completed as part of the EIS (refer to Section 7.9.5 of EIS) which considered the viability of each option in relation to the context of the proposed final landform for the Project. The options presented as part of this analysis provide a range of opportunities for a variety of potential land uses, given the extensive infrastructure and accessibility of the Mount Owen Complex. One of the Project's objectives is to establish a final landform that is safe, stable, non-polluting and sympathetic with surrounding landforms and which provides for a range of sustainable post mining land use options. Conceptual final landforms and potential final land uses will continue to be reviewed on a five-yearly basis, with more detailed mine closure planning commenced within five years of planned closure, consistent with the current Mount Owen Consent.

In regard to final void, pit lakes will form in the final voids following the cessation of mining across the Mount Owen Complex. The final voids, including the final void resulting from the Project, have been designed to ensure they will be hydraulic sinks such that the pit lakes and level of saturation within the spoil do not result in discharge to downstream catchments. As a general principle, highwalls retained in the final landform will be designed to be stable in the long term. This will require consideration of the geotechnical stability of the highwalls. The conceptual final landform, including the highwalls, will be subject to ongoing geotechnical investigation and refinement by Glencore over the life of the operation, providing a safe and stable final landform.

10. Timeframe/timetable for investigation and implementation of one or more option(s) through to feasibility, including a post mining use for the Ravensworth Homestead, in the event Option 1 is implemented.

As discussed in Section 7.8.7.1 of the EIS, if the Ravensworth Homestead is moved to Ravensworth Farm, for the duration of mining (approximately 20 years), the relocated homestead buildings would be used by Glencore as an administration centre consisting of office space, meeting facilities and training rooms. Refer to Appendix 23g of the EIS for conceptual adaptation drawings for the proposed use at the Ravensworth Farm location.

The relocated Men's Quarters would be used to store and display the history (Aboriginal and historical) of Ravensworth Estate and the associated building group. Additionally, selected artefacts salvaged from the archaeological (Aboriginal and historical) investigations would be displayed and incorporated into the new grounds.

As outlined in Appendix 5 of the EIS, as part of mine closure planning, Glencore will:

- undertake a final land use assessment that considers alternate uses for the homestead with regard to:
    - land use in the area at the time of mine closure including return to use as a farmstead with an attached landholding
    - the potential viability of any future enterprise.
- for the post-mining use identified for the homestead as part of the final land use assessment provide:
    - the entity that would be responsible for the management, use, treatment and maintenance of the relocated buildings
    - a management plan for the management, use, treatment and maintenance of the relocated buildings and adjacent landscape including the implementation of the cyclical maintenance plan

- details of the proposed alterations of the buildings and the adjacent landscape to be carried out post-mining to suit the proposed use
- identify existing commitments to rehabilitate overburden on the periphery of the visual catchment by Glendell and make supplementary proposals for further visual mitigation
- update the Conservation Management Plan and a proposal as to how it is to be implemented.

Voluntary Planning Agreement

To date, no agreement has been reached on a VPA quantum, as such council would ask that the Project not be determined until such time as an agreement is reached and endorsed by Council.

Discussions have commenced with Singleton Council regarding a Voluntary Planning Agreement that is commensurate with the level of impact associated with the Project. Discussions will continue in good faith to establish an agreement is reached with Council.

The capital expenditure of the Project as reported in the Economic Impact Assessment is $515.3M, or $869.6M undiscounted (where most capital expenditure is expected in Year 2). Appendix 23e states that the capital expenditure for the proposed Project will be $230M. Council would like clarity on the actual value of capital investment required to realise the proposed Project.

The calculation of capital expenditure for the purposes of the Economic Impact Assessment is different to the calculation of capital investment value (CIV) for the purposes of development application fees under the EP&A Regulations (for example, economic impact assessment calculations include replacement costs for fleet during the life of the Project as a capital expense), and for which Singleton Council use as the basis for determining an appropriate VPA amount for mining projects.

The capital investment value of the Project, as assessed in accordance with the EP&A Regulations, is approximately $229 million and includes the capital amounts for all infrastructure works associated with the Project.

The CIV has been reviewed and verified by a quantity surveyor and a copy of their report is included in **Appendix 3**. The CIV estimate excludes mobile mining equipment as the project is a brownfield continuation of an existing operation and will utilise existing mining equipment from Liddell and the Mount Owen Complex. The Project requires no additional equipment capacity beyond that currently available through existing installed equipment. New equipment will be purchased throughout the Project to replace existing equipment once it reaches the end of its life with these capital requirements included in the life of mine capital estimate.

The capital amount of $515.3 million (discounted) or $869.6 million (discounted) documented in the Economic Impact Assessment is the total capital requirement for the life of the Project and includes the infrastructure works captured in the CIV as well as capital associated with the purchase of replacement mobile mining equipment and other sustaining capital spend required to support the mining operation.

Acquisition

The social impact assessment does not consider the affordability impacts of property acquisition. Acquisition does not equate to equitable relocation. That is, the intrinsic values identified in the social impact assessment of any individual whose property has been acquired because of a mining related impact may not be accessible due to cost, loss of connection or availability. In a world where a social licence to operate is essential for Project approval, if acquisition is the only option to enable mining, then it should be complemented with relocation in a manner that is sympathetic to the intrinsic values being sought. The consequences of this are not assessed in the social impact assessment.

The Project does not result in any additional properties having acquisition rights that do not presently have acquisition rights under other development consents.

The acquisition processes, where acquisition is requested by the property owner, is managed in accordance with the procedures prescribed by NSW Government Policy. The calculation of acquisition value is based on, at a minimum, independent valuations of the property which assume the property is unaffected by the development and, based on Mount Owen Consent conditions, include costs associated with relocating to another area within the Singleton, Cessnock or Muswellbrook LGAs and reasonable compensation for any disturbance associated with the land acquisition process.

Feedback from the consultation undertaken for the Project as part of the EIS indicated that near neighbours, in particular Camberwell residents, raised concern that acquisition processes of surrounding mines over the past 20 years of operations had resulted in population change, and negatively impacted sense of community and culture, and this is discussed further in the Social Impact Assessment, Appendix 11 of EIS. Glencore have taken this feedback into account as part of the EIS process and have committed to minimise additional impacts on the surrounding community as part of the Project so as to not trigger any additional community loss beyond that already contemplated under existing approvals. The Project will also be managed to ensure that noise impacts from the Project do not exceed the project noise trigger levels, calculated in accordance with the NSW Noise Policy for Industry, at any time during the Project with noise impacts at residences currently impacted by noise from Glendell generally decreasing over the life of the Project. In this regard, the Project has a similar or reduced impact on residences having acquisition rights as currently approved under existing operations.

Biodiversity

Council is seeking clarification on the total area of existing disturbance at both the Mount Owen and Glendell Mine, where the offsets would be located, including the tenure of land offsets, the areas of ecological rehabilitation proposed on site, the longterm tenure of ecological rehabilitation and whether the required credits are available for purchase.

The total area of approved disturbance at Mount Owen is 2837.6 ha and approved disturbance at Glendell is 829.8 ha.

As described in Section 7.6.4 of the EIS the biodiversity offset strategy will be developed during the assessment process in consultation with the BCD and DPIE . The strategy will be based on the credits required to be retired to offset the impacts of the Project as specified in the BDAR and the offset options available under the BC Act and BC Regulation including:

- land based offsets (Glencore would retire the required number and class of credits (determined in accordance with the BDAR and the offset rules in the BC Regulation) through the establishment of new Stewardship Sites (and the subsequent retirement of credits) or by retiring credits from existing Stewardship Sites)
- ecological rehabilitation (allowable for mining projects)
- purchasing credits from the market, and/or
- paying into the Biodiversity Conservation Fund.

Refer to Section 7.6.4 and Appendix 20 of the EIS for further detail.

Greenhouse Gas Assessment

Additionally, Appendix 29 identifies actions undertaken by Glencore to offset the impacts of its global emissions, including participation in such programs as Coal21. However, the report does not quantify the reductions achieved, the reduction in impact that resulted from the action, nor does it establish whether these actions would mitigate the emissions from the Project.

Section 6.3 of Appendix 28 of the EIS identifies that Glencore participates in a suite of projects and programs that support the development and demonstration of low emissions technologies with Coal21 being just one example of such a program. As explained in Appendix 28, these are examples of projects and programs which Glencore is involved in and are not expressed as, and are not intended, to directly offset or mitigate emissions from the Project.

Glencore published its climate change position statement in February 2019, *Furthering our commitment to the transition of a low-carbon economy*, this statement is available on the Glenore website and provides further detail on the actions Glencore proposes to offset and reduce the impacts of current global emissions. This included a commitment to impose a cap on Glencore's global coal production.

In February 2020 a review of Glencore's performance against the position statement was undertaken, the key outcomes of this review included:

- Glencore is projecting a ~30% reduction in absolute Scope 3 emissions by 2035. This includes natural depletion of the current Glencore oil and coal resource base over time.
- Glencore's 2019 capital expenditure was weighted towards energy transition materials.
- Glencore is on track to achieve a ~10% reduction in Scope 1 and 2 emissions, double the first GHG reduction target of reducing emissions intensity by at least 5%, by 2020 compared to the 2016 base line. Note new longer-term scope 1 and 2 targets that support the Paris goals will be announced by end 2020.

Glencore is committed to incorporating climate change into operational planning, most recently this has been applied to the development of the Tailings Storage Facilities Protocol, which required operations to assess the impact of climate change on the design, operation, maintenance and closure of tailings storage facilities.

The current Glencore scenarios regarding global responses to climate change were developed in 2017 and took into account energy market projections developed by organisations such as the IEA and World Energy Council (WEC), leading climate science projections from the IPCC and likely shifts in policy and other conditions corresponding to scientific technology and economic changes.

Glencore acknowledge that national policies play a critical role in shaping the response to climate change. National Governments are expected to reaffirm or update their national commitments and climate pledges in 2020. When this occurs, Glencore will consider these developments and provide an update on our carbon scenarios analysis for achieving the goals of the Paris Agreement and use this to test the resilience of the business.

Air Quality

Council seeks further clarification from the Applicant on the:

1. impact of a changing climate (as per AdaptNSW projections) on air quality impacts for the life of the proposed Project, including post closure; and

AdaptNSW provides model projections for both the near future (2020-2039) and far future (2060-2079) changes in climate for the Hunter Region. The Hunter Region is projected to continue to warm (on average) in both the near future (around 0.7 degrees) and the far future (around 2 degrees). The number of high temperature days is also projected to increase in parts of the region. The Hunter Valley currently experiences considerable rainfall variability across the region; projections indicate this variability will continue however modelling indicates that autumn rainfall will increase.

Based on long-term (1910-2011) climatic data, temperatures in the Hunter Region have been increasing since approximately 1960 with higher temperatures experienced in recent decades. Mining at the Mount Owen Complex dates back to the 1960s with operations increasing and evolving over this time through the development of operational management measures and implementation of new technology in order to adapt to the changing climatic conditions.

Projected climate change with increasing temperatures and increasing number of hot days (and resultant increases in evaporation) and variable rainfall will influence the ability to operate the Glendell Mine in accordance with relevant air quality criteria over the life of the Project. Glencore is committed to effectively managing the air quality impacts associated with the Project and will implement a range of air quality management measures for the key dust generating activities. These measures are currently implemented as part of the existing Mount Owen Complex Air Quality and Greenhouse Gas Management Plan (AQGHGMP) and will be continually reviewed and improved, where feasible, over the life of the Project; these revisions will necessarily have regard to climatic changes.

Material handling (blasting, digging, and haulage) is the primary contribution to particulate matter emissions from mining operations with wind erosion from disturbed areas representing approximately 12% and 7% of modelled particulate emissions (TSP) from the Project in years 6 and 13 of the Project respectively. Rehabilitated areas, including recently revegetated areas, are not significant sources of wind erosion. Post closure, only minor reshaping works would be a source of particulate matter emissions with these emissions effectively ceasing once revegetated. Accordingly, the Project is not considered likely to have any material air quality impacts post closure and this conclusion is unaffected by different climate scenarios.

2. the effectiveness of existing controls in reducing impacts of air quality, in particular the generation of PM10 and PM2.5.

The Mount Owen Complex currently operates in accordance with the approved AQGHGMP, which has demonstrated the ability to actively manage operations through the implementation of both proactive and reactive controls in order to demonstrate compliance with relevant air quality criteria.

The potential air quality impacts associated with the Project will continue to be managed in accordance with the approved Mount Owen Complex AQGHGMP, which will be updated as required to address the requirements of the Project. As outlined in the AQGHGMP, air quality is managed by using a combination of automated daily forecasting, visual monitoring, meteorological monitoring and ambient air quality monitoring data (refer to **Figure 4.11**). The Mount Owen Complex air quality monitoring network includes a series of real time continuous Tapered Element Oscillating Microbalance (TEOM) monitoring units and Environmental Beta Attenuation Monitors (EBAMs) that are used to assess operations on a real time basis and provide data that is utilised for reactive management. Each unit records real time PM_{10} and $PM_{2.5}$ $\mu g/m^3$, 24 hour PM_{10} and $PM_{2.5}$ $\mu g/m^3$ as a rolling average, wind direction, wind speed and rainfall. In the event that alarms are triggered due to an exceedance being recorded at the real-time air quality monitors, reactive controls are implemented including relocating, modifying or ceasing operations as necessary to maintain compliance with relevant air quality criteria.

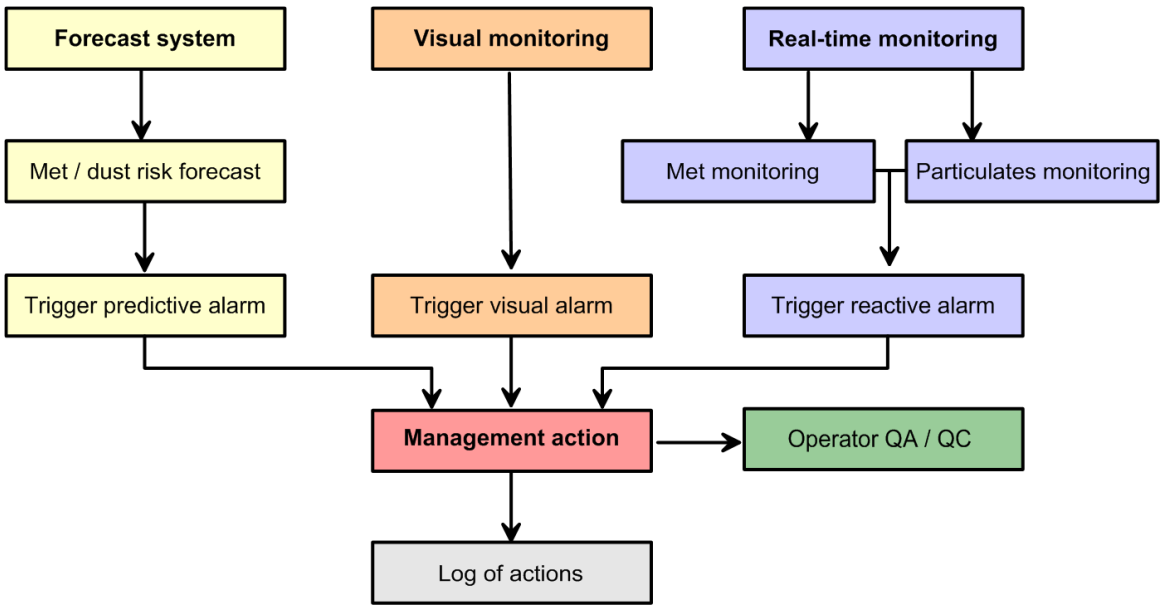


Figure 4.11 Reactive Air Quality Management Flowchart (Source: Mount Owen Complex Air Quality Management Plan Figure 3-1)

The site Air Quality Control System (AQCS) comprises daily automated dispersion modelling of site dust (and air) emissions using forecast meteorological conditions. This system provides an early warning of potential adverse weather conditions and dust risk. Forecasts are sent to all relevant site personnel daily via email and can be accessed directly via the website. The daily meteorological and dust risk forecast are reviewed prior to each shift change and operational activities are planned accordingly.

Real time dust monitors record directional dust sources and are set up to trigger advising mining personnel that air quality at the monitor is approaching the relevant air quality criteria, the level of reactive control required to be implemented is dependent on the level of the alarm triggered (as per extract below). Alarms consider wind direction and calculate the site-specific contribution to air quality and are only triggered when impact/exceedance is attributed to the Mount Owen operations.

Table 4.6 Air quality trigger level definitions (Source: Mount Owen Complex Air Quality Management Plan Table 3-2)

Normal State	Reasonably expected conditions in day to day operations No cause for action, but routine dust management to be continued
Yellow Triggers	Change from normal indicating a potential risk Not of a serious nature, but acts as an alert and requires monitoring to detect further trends
Orange Triggers	Moderate risk of dust related impacts occurring Remedial action needs to be planned and executed
Red Triggers	High risk of dust related impacts occurring A situation has occurred that poses an immediate risk and remedial action must be undertaken

The operations are visually monitored on a regular basis to identify sources of dust and reactive management is taken (if required) according to the Mount Owen Visual Dust Trigger Action Response Plan (TARP). During periods of adverse weather conditions (e.g. strong, west/north-westerly winds), regular monitoring of the continuous dust network monitoring data is undertaken to identify trends in dust levels. All personnel have an obligation to report instances of elevated dust levels.

The TARP has been developed to assist with the investigation of potential dust sources associated with the operations and outlines the actions to be taken if the alarms are triggered.

Depending on the level of the alarm received, actions which may be taken include:

- Ensuring water suppression devices are active on machinery
- Directing water suppression vehicles to an area of management
- Hot-seating water suppression vehicles
- Minimising haul distances
- Minimise drop height when loading
- Minimising double handling of material
- Reducing dozer and truck speed
- Relocation of operations to protected areas within the pit
- Restriction of crusher operations
- Cease activity in exposed areas, and
- Shutdown of equipment.

The level of reactive management control applied varies and is monitored closely in order to avoid an exceedance of the relevant air quality criteria. It is noted that in 2018, five and in 2019, nine community complaints in relation to air quality were recorded. So far in 2020 no community complaints in relation to air quality have been received. The complaints received were actioned appropriately through the implementation of reactive management measures or through appropriate investigation and reporting to the EPA and DPIE.

Monitoring data collected during 2018 and 2019 indicates only one exceedance of the PM_{10} 24 hour average criteria (50 µg/m^3) during 2018 and two occurring during 2019. It should be noted that these exceedances were recorded during a period of below average rainfall which contributed to dry conditions throughout the Hunter Valley and in 2019 during bushfire events. DPIE was notified of the exceedances and no further action was required. Given the air quality monitoring results across the broader Hunter Valley during the same time period (discussed further below), this demonstrates the existing reactive air quality management measures are effective in minimising the exceedance of air quality criteria. As previously discussed the proactive and reactive air quality management measures implemented at the Mount Owen Complex will continue to be adopted for the Project.

Waste

The Project proposes to manage waste generated by the development as per the current approval. The volumes of waste material generated by the current operation and proposed to be generated by the Project are not quantified, including projected volumes of tailings (and the subsequent impact of this on management and

rehabilitation of tailings disposal areas). The EIS does not consider the objectives of the NSW EPA Waste Strategy and the targets set within the Strategy, nor does it identify waste streams and how the management of these waste streams will contribute to meeting State and local waste targets.

Tailings from the Mt Owen CHPP will continue to be emplaced within existing voids within the Mount Owen Complex under the GRAWTS and coarse rejects will be co-disposed of with overburden in emplacement areas. As described in Section 3.3.4 of the EIS, approximately 21 Mm^3 of coarse rejects and 30 Mm^3 of tailings will be generated by the Project. Consistent with the current strategy, tailings will be initially emplaced in West Pit. Tailings are also approved to be emplaced in Bayswater North Pit, cells constructed within North Pit and for transfer to operations within the GRAWTS (subject to relevant approvals for the transport to and receipt of tailings from those facilities being in place).

Figure 3.19 in the EIS (reproduced as **Figure 4.12**) plots the tailings storage capacity within the GRAWTS and provides a comparison of projected fine tailings volumes under approved and proposed operating scenarios. Based on current approvals for operations within the GRAWTS, there is sufficient void capacity available to store tailings associated with all approved operations plus the Project.

As identified in Section 5.2.2.1 of EIS, the disposal of tailings in former mining voids falls within the *Coal washery rejects (coal mine void) exemption 2014* Resource Recovery Exemption and the C*oal washery rejects (coal mine void) Order 2014* Resources Recovery Order issued under clauses 91, 92 and 93 of the *Protection of the Environment Operations (Waste) Regulation 2014*.

The rehabilitation risks associated with tailings facilities are discussed in Section 7.9.4.5 of the EIS.

The rehabilitation of tailings facilities presents technical challenges associated with the drying and consolidation of tailings material. These issues are common to the existing operations and are not exacerbated by the Project. The ability to transfer tailings between the operations linked by the GRAWTS provides a range of concurrent tailings disposal options; this flexibility enables the progressive consolidation of tailings through the use of alternate emplacement areas during the consolidation period. This process has been used successfully at the Mount Owen Complex in the past and is described in further detail in Section 5.8.1 of the Rehabilitation and Mine Closure Strategy (Appendix 24 of the EIS). The Mount Owen Complex is currently in the process of capping three former tailings facilities and learnings from the capping process for these facilities will be incorporated into future updates to the RMP/MOP for the Mount Owen Complex which will apply to the Project.

Other predicted waste streams relevant to the Project are discussed in Section 7.15.2 of the EIS and further detailed in **Section 4.4.2** in response to EPA's queries in relation to waste.

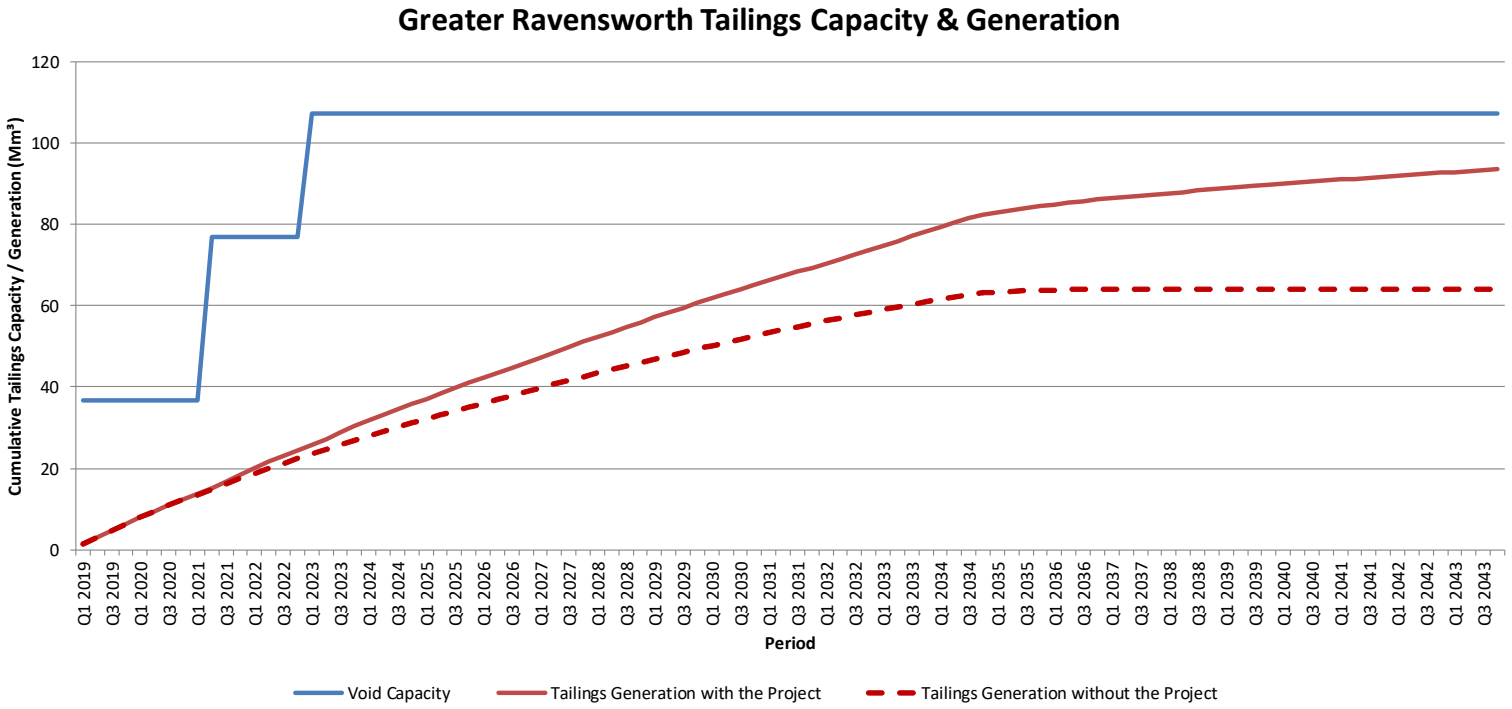


FIGURE 4.12

GRAWTS Tailings Capacity and Generation over the Life of the Project

The EIS does not consider how demolition waste will be managed, including asbestos and other contaminated materials. Demolition waste will be generated from Hebden Road and the Mine Infrastructure Area. The Applicant does not have approval to dispose of any waste on site, including waste tyres. Council is seeking clarification on the current and future waste management volumes generated at the Project (including, but not limited to, reject and tailings materials and their management), as well as how waste tyres are proposed to be managed.

Waste will continue to be managed on site in accordance with the Mount Owen Complex Waste Management Plan. Quantities of waste produced will vary dependent on production, however, it is expected that during peak production at Glendell Mine these quantities will be similar to the current Mount Owen Complex given reduced production at Mount Owen Mine.

As discussed in **Section 4.4.2**, heavy vehicle tyres will continue to be disposed of on site in accordance with the Mine Tyre Disposal, consistent with the approved operations. Appropriate and feasible recycling of heavy vehicle tyres is currently not available at an accessible location. Light vehicle tyres will continue to be repaired by an appropriate tyre contractor or disposed of at an appropriately licenced facility when required.

In relation to the construction activities associated with the Project, the demolition of the Glendell Mine Infrastructure Area (MIA) and the Hebden Road realignment will generate waste. Construction works will be subject to a Construction Environmental Management Plan which will document the waste management measures required during the construction phase of the Project.

The demolition of the existing Glendell MIA will be undertaken by a licenced demolition contractor and will include re-use of selected components (e.g. fuel tanks and other select fixed plant and buildings), recovery and recycling of materials such as steel, concrete and pavement materials and disposal of general waste.

A full hazardous materials assessment will be completed as part of the works to determine any special treatment required for hazardous waste. However, no asbestos containing materials are currently registered at the MIA and are not expected to be encountered during demolition, however if found, they will be sent to a suitably licenced disposal facility.

It is anticipated that in the order of 200 tonnes of steel, 2,000 tonnes of concrete and 40,000 tonnes of pavement materials will recovered during the demolition works. Steel and concrete material will be disposed of at a suitable recycling facility. Pavement materials recovered during the demolition works will be re-used on site in construction of roads and hardstand areas.

The redundant length of the existing Hebden Road will be progressively removed as the Glendell Pit Extension advances north. A length of 4.1 km of Hebden Road will be removed, 0.9 km of road will be constructed over the existing alignment and widened as part of the relocation works. The remaining 3.2 km of road will contain in the order of 20,000 tonnes of pavement materials that will be recovered, stockpiled and re-used on site as required for pavement construction for service tracks, light vehicle access roads and other mining roads and hardstand areas. Other road structures such as guardrails, culverts and signage will either be re-used on site if possible or will be sent to a suitable recycling facility. Guideposts and other non-recyclable items will be sent to a licenced disposal facility.

As part of the Ravensworth Homestead relocation works, a full hazardous materials assessment will be completed and hazardous materials at the homestead site will be removed prior to relocation under either option (Ravensworth Farm or Broke Village). This will involve the removal of asbestos containing materials as well as lead based paint, contaminated soil impacted by past land practices (e.g. agricultural chemicals) and other materials as identified by the assessment.

A suitably qualified hazardous materials contractor will be engaged to complete the sensitive removal of the hazardous materials, in consultation with the heritage architect and a heritage building contractor. Removed hazardous materials will be disposed of at a suitably licenced facility.

The Project proposes to demolish existing buildings, construct new ones and relocate a locally significant heritage item that includes buildings and out buildings. In order to do so, the Applicant will require, amongst other things, construction certificates, fire safety certificates and an approval to install and operate on site sewerage management systems. No details have been provided in the EIS on the buildings proposed as part of the Mine Infrastructure Area or the Ravensworth Homestead, or the associated waste water treatment. As such it is not possible for council to assess whether the proposed buildings meet the relevant statutory requirements.

The certificates relating to the construction, relocation or demolition of buildings and other services for the Project, including for the Ravensworth Homestead, are post-approval requirements and will be prepared at an appropriate time following the SSD approval. In order for these certificates to be issued, the buildings will need to comply with all applicable regulations, including compliance with the Building Code of Australia. This includes the necessary licensing and certification for the installation and operation of onsite sewage treatment plants for the new MIA and relocated homestead to Ravensworth Farm.

As stated in Section 5.2.1.2 of the EIS, the relocation of Ravensworth Homestead under proposed Option 2 to Broke Village will require secondary Council Approvals (in the form of a new development application) and building certification processes as the recipient site is not included in the proposed Project approval area nor have the requisite environmental assessments been completed.

4.8 Crown Lands

1. **Crown Land and Crown Roads subject to the Project Approval Area require any existing or proposed occupation to be authorized under the Crown Land Management Act 2016 or Roads Act 1993.**
2. **The exception to the above condition applies where the Crown Land and Crown Roads are located within a Mining Lease. All Crown Land and Crown Roads within a Mining Lease must be subject to a Compensation Agreement issued under Section 265 of the Mining Act 1992, to be agreed and executed prior to any mining activity taking place and within 12 months of Project/ Modification Approval. The Compensation Agreement may include conditions requiring the Mining Lease Holder to purchase Crown land impacted on by mining activity.**

As discussed in Section 4.3.4 of the EIS, a small parcel (3.99 ha) of Crown land (Crown Reserve 752470, Lot 4 DP 232149) is located within the proposed Glendell Pit Extension (refer Figure 4.15 of EIS) and native title has been extinguished over this reserve. A claim (Aboriginal Land Claim No. 38796) under the *Aboriginal Land Rights Act 1983* has been lodged over this parcel of Crown land and is currently undergoing assessment by NSW Crown Lands. Glencore has commenced early discussions with NSW Crown Lands regarding the development of a compensation agreement for accessing the Crown Reserve for the purpose of open cut mining.

In relation to the road reserve of Hebden Road, once the Hebden Road realignment has been constructed, the existing Hebden Road will be decommissioned and a formal road closure process will be initiated under the *Roads Act 1993* in consultation with Singleton Council.

4.9 Hunter New England Local Health District

4.9.1 Air Quality

The EIS states that there are a number of private residences that are expected to experience exceedances of the annual average PM_{10} criteria of 25 µg/m^3, though it is noted that all affected properties have existing acquisition rights.

As described in Section 7.2.5 of the EIS, the Project is not predicted to result in any exceedance of the applicable annual average PM_{10} or $PM_{2.5}$ criteria at any private residences that do not currently have acquisition rights under existing development consents.

A review of the data from the Upper Hunter Air Quality Monitoring Network for the past three calendar years 2017 – 2019, indicates that at two monitors nearest the Project, Muswellbrook to the north and Camberwell to the south, the annual average PM_{10} levels have exceeded the criteria of 25 µg/m^3 in two out of three years, and three out of three years respectively. In addition, in those three years Muswellbrook experienced exceedances of the 24 hour average PM10 criteria of 50 µg/m^3 on 2, 13, and 58 occasions, while Camberwell experienced exceedances on 33, 44 and 87 occasions. While the results from late 2019 would have been heavily influenced by high levels of bushfire smoke and all years may have been influenced by dust and dust storms from afar associated with dry conditions and drought, it is still clear that the local area is regularly experiencing levels of air particulates exceeding criteria. It is recommended that this be taken into account during the decision making process.

PM_{10} and $PM_{2.5}$ are the components of air borne particulate matter that are relevant to human health impacts. As discussed in Section 7.14.1 of the EIS, the NSW Government adopted National Environmental Protection Measures (NEPM) criteria for PM_{10} and $PM_{2.5}$. These criteria have been set based on research related to human health impacts associated with fine particulates and are identified as an appropriate balance between community health and particulate emissions from a range of natural and anthropongenic sources. The EPA *Approved Methods for the modelling and assessment of air pollutants in NSW* (Approved Methods) have set assessment criteria based on the NEPM criteria.

The predicted maximum 24-hour PM_{10} and $PM_{2.5}$concentrations for the Project, when considered alone, meet the relevant EPA assessment criteria at all private sensitive receptors. However, cumulative maximum 24-hour PM_{10} concentrations are expected to continue to exceed the EPA's 50 µg/m^3 cumulative impact assessment criteria. Modelling results predict that most areas within the model domain will experience at least one day each year when PM10 concentrations exceed 50 µg/m^3 due to the contributions of mining operations in the vicinity and other sources. All private properties in Camberwell hold acquisition rights under existing consents.

As discussed throughout the EIS, the area surrounding Camberwell is dominated by existing mining operations and the air quality modelling includes predictions of contributions from all existing operations in the vicinity of Glendell Mine as well as approved Project's where the operation is yet to commence (e.g. Ashton's SEOC). Additional investigation of the cumulative predictions at Camberwell were completed as these are the nearest private sensitive receptors to the Project. This investigation showed that property ID 156 is likely to experience a number of days above 50 µg/m^3 due to combined contributions of mining operations. The maximum contribution of the Project to this location is predicted to be up to 26 µg/m^3. This analysis indicates that Camberwell is experiencing adverse air quality impacts with respect to 24-hour average PM_{10} concentrations due to the combined contributions of all mining operations in the region, based on comparisons between model results and EPA criteria.

As discussed in Section 7.2.5 of the EIS, it is anticipated that 24-hour average PM_{10} concentrations will continue to be variable from day-to-day, due to existing conditions and sources as well as extreme events.

The proposed operations will continue to be managed in a way that minimises the contribution to off-site PM10 levels.

Cumulative annual average PM_{10} and $PM_{2.5}$concentrations with the Project are predicted to comply with the EPA cumulative air quality criteria of 25 µg/m^3 and 8 µg/m^3 (respectively) at all surrounding private residences that are not subject to acquisition rights under other consents. Air quality monitoring data has indicated that annual average PM_{10} concentrations have exceeded 25 µg/m^3 at Camberwell in four of the past seven years, and at two other locations in 2018 due to drought conditions.

It should be noted that the modelling indicates that the Project will have similar air quality impacts to the existing approved Glendell Mine with cumulative impacts in Camberwell and the Middle Falbrook area declining over time as operations move to the north.

There is no evidence of a threshold below which PM is not associated with health effects and so HNELHD strongly recommends the implementation of proactive and reactive dust control strategies, along with all best-practice interventions to minimise PM emissions.

Glencore is committed to effectively managing the air quality impacts associated with the Project and will implement a range of air quality management measures for the key dust generating activities. These measures are currently implemented as part of the existing Mount Owen Complex Air Quality and Greenhouse Gas Management Plan and will continue to be implemented and continually reviewed and improved, where feasible, as part of the Project.

As described in Section 7.2.7 of the EIS, the key management measures that will continue to be implemented and that have been incorporated into the air quality modelling for the Project include:

- minimising the area of disturbed land at any one time, in line with the approved Mining Operations Plan
- continued implementation of timely progressive rehabilitation and the use of temporary rehabilitation and stabilisation measures on disturbed land.
- adopting controls for haul road dust emissions
- review of meteorological conditions prior to blasting
- consideration of meteorological conditions in planning the loading and unloading of overburden and minimising fall distance during loading and unloading of overburden
- applying water and using dust curtains when drilling overburden for the purposes of blasting
- utilising water sprays and water carts on ROM coal stockpile areas
- maintaining the existing covered conveyors and belt cleaning
- maintaining and servicing machinery, exhaust systems and plant equipment in accordance with contemporary maintenance practices
- using dust cameras to monitor dust
- continued implementation of the Trigger Action Response Plan (TARP) process and investigating dust levels when the TARP process is enacted to identify likely sources of dust from any complaints or potential compliance issues.

In addition to the measures listed above both proactive and reactive dust control strategies informed by real-time air quality and meteorological monitoring systems will continue to be implemented at Glendell Mine.

Proactive air quality management includes the discussion and planning of activities in advance of potentially adverse conditions. Specifically, the proactive air quality management approach includes:

- a system that provides environmental personnel with a daily forecast of expected air quality conditions in the vicinity of the operation
- discussion of the dust forecast at daily operational meetings
- modifying the planned mining activities, as appropriate, to minimise or avoid the potential dust impacts.

4.9.2 Noise

The Noise Impact Assessment in the EIS predicts that the Project can meet all noise criteria and will not increase noise impacts at private residences.

It is important that residents have access to a complaints mechanism which enables both rapid assessment and corrective measures (if required) to be implemented.

The Mount Owen Complex operates a dedicated Community Contact Line which is in operation 24 hours per day, seven days a week. The details of this are advertised in local newspapers at least quarterly, via the Mount Owen Complex Community Newsletter and on the Mount Owen Complex website.

All complaints are thoroughly investigated, including use of environmental and meteorological monitoring data, in conjunction with operating records to determine any likely cause and feedback to the complainant is provided in a timely manner. Details of complaints are communicated to the relevant personnel to assist in the improvement of management processes.

This complaints mechanism will continue to be available to residents throughout the Project.

4.9.3 Potable Water

The EIS mentions both a piped potable water supply as well as potable water supply tanks. So the source of the potable water supply is unclear.

If the site is not connected to a reticulated town water supply, then the applicant must demonstrate that the drinking water supplied at the premises will consistently meet the Australian Drinking Water Guidelines 2011 and any subsequent amendments of the Guidelines.

The Public Health Act 2010 and the Public Health Regulation 2012 require drinking water suppliers to:

- **have a quality assurance program (QAP) that complies with the Regulation**
- **comply with (i.e. implement) their QAP**
- **provide a copy of the QAP to the local Public Health Unit**
- **keep records relating to managing the safety of their drinking water supply.**

The proponent is encouraged to contact Hunter New England Local Health District with respect to developing a Quality Assurance Program.

Potable water for the existing Glendell MIA has historically been sourced through water transported to the site, sourced from the Singleton reticulated town water supply. Potable water for the Mount Owen Mine is currently sourced via licensed extractions from Glennies Creek which is then treated as necessary to meet applicable potable use guidelines.

Under the Project, potable water will continue to be supplied to the existing Glendell MIA via water sourced from the Singleton reticulated water supply, transported to site.

The Project proposes the construction of a raw water pipeline from Mount Owen's existing Fresh Water Dam, which is filled using water pumped from Glennies Creek under licence, to dams situated at the new MIA and Ravensworth Farm. This water will be used to wash down plant at the MIA and some domestic uses including garden watering.

4.10 NSW Rural Fire Service

The NSW RFS has no objection to the development proposal(s) and recommends the following condition be attached to any consent(s) granted:

- **A Fire Management Plan (FMP) shall be prepared in consultation with NSW RFS Upper Hunter Fire Control Centre. The FMP shall include:**
- **24 hour emergency contact details including alternative telephone contact;**
- **Site infrastructure plan;**
- **Fire fighting water supply plan;**
- **Site access and internal road plan;**
- **Construction of any Asset Protection Zones (APZ) and their continued maintenance;**
- **Location of hazards (Physical, Chemical and Electrical) that will impact on fire fighting operations and procedures to manage identified hazards during fire fighting operations;**
- **Work involving risk of ignition that should not be carried out during total fire bans;**
- **Availability of fire-suppression equipment; and storage and maintenance of fuels and other flammable materials;**
- **Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during the bus-fire danger period to ensure weather conditions are appropriate;**
- **Bushfire emergency management planning**
- **Such additional matters as required by the NSW RFS District Office (FMP review and updates).**

Glencore will develop and implement a site-specific Fire Management Plan for the Project in consultation with the RFS to manage bushfire threat and to document emergency response procedures.

4.11 Subsidence Advisory NSW

The application acknowledges approval is required for development within a Mine Subsidence District under Section 22 of the Coal Mine Subsidence Compensation Act 2017. Subsidence Advisory NSW considers no further comment is necessary.

Since the EIS exhibition period, Glencore has received approval of proposed works within the Mine Subsidence District subject to conditions under Section 22 of the Coal Mine Subsidence Compensation Act 2017. The notice of determination received on 7 May 2020 from Subsidence Advisory NSW is provided as **Appendix 4**

4.12 Transport for NSW

The proponent shall ensure that the realigned section of Hebden Road will be maintained for 25/26m B-Double (current access level).

There is no proposed change to the access level of Hebden Road as part of the Project, including the new realigned section.

The Hebden Road realignment will be designed to meet relevant standards for use by 25/26 m B-Double vehicles and will improve upon the existing road geometry.

The type of heavy vehicles has not been mentioned in the EIS or Transport and Traffic Impact Assessment, so the assumption is that the existing type of heavy vehicles will be used for the continued operations and are included in the assessment and modelling process.

Correct. There is no proposed change to the type of heavy vehicles from those currently used on site at the Mount Owen Complex. For the purposes of modelling for the Traffic Impact Assessment, construction vehicle movements were assumed as one vehicle per construction employee which included 80% light vehicles and 20% heavy vehicles, which was considered a conservative approach.

It is noted that transportation of dangerous goods such as fuel and explosive are not mentioned in the EIS, however, hazardous waste transportation has been considered.

A preliminary risk screening was completed as part of the hazard assessment for the Project, as outlined in Section 7.14.2 of the EIS. The preliminary risk screening involved identification and assessment of the storage of specific dangerous goods classes that have the potential for significant off-site effects and includes an assessment of traffic movements for the transport of hazardous materials if the movements exceed the relevant criteria outlined in *Applying SEPP 33* (DoP, 2011).

As discussed in Section 7.14.2 of the EIS, although the inventories of hazardous materials to be stored on-site for the Project are likely to increase, the transport quantities and frequencies of hazardous materials to the Mount Owen Complex will be unchanged compared to the existing scenario. This is due to the proportional reduction in ROM production at the Mount Owen Mine as production from the Project increases. Therefore, the risks associated with transport of hazardous materials to the Mount Owen Complex will be consistent with the existing approved operation and no further assessment of the transportation of dangerous goods was required.

Clarification is required in regards to the Mount Owen Rail Loop upgrade work. This SSD application mentioned the realignment of the existing loop, however, the Mount Owen Coal Complex Modification 2 mentioned an additional rail line that will connect to the existing rail loop and the Main North Rail Line.

The Mount Owen Rail Loop works were approved under the Mount Owen Consent (SSD-5850) in 2016. The Project does not involve any change to the currently approved rail loop upgrade works.

4.13 Dams Safety NSW

The proposed northern extension of the Glendell open cut pit does not appear to overlap with Notification Areas around Dams Safety NSW declared dams.

Therefore Dams Safety NSW has no comment on the proposed mining.

Noted.

4.14 Commonwealth Authorities

4.14.1 Department of Environment and Energy

The Department has reviewed EIS documents to ensure protected matters identified through the referral decision are being considered. The Department has not undertaken a merit based assessment and has no comments at this time as the project is being assessed under accredited assessment through NSW.

Noted.

A response to issues raised by the Independent Expert Scientific Committee is being prepared and will be provided separately.

5.0 Response to Community and Interest Group Submissions

As outlined in **Section 2.0**, 128 individual community submissions and 11 interest group submissions were received providing comment or objecting to the Project. A response to issues raised in these submissions is included in the following sections grouped by categories outlined in **Section 2.3**.

A number of community and interest group submissions received were similar or had consistent themes. Where this is the case, the theme of concern has been provided in bold in the text boxes below with some examples of specific concerns quoted from the submissions provided in normal type to assist the reader. Specific issues, that is, where an issue is raised only once have also been provided.

5.1 Environmental, Social and Economic Issues

5.1.1 Project Emissions

Issues relating to project emissions were raised in 45 community submissions and five interest group submissions.

Operational impacts of the Project may affect the social amenity of nearby residents and communities. Impacts can relate to the effects on people's way of life, including how people live, work, play and interact with each other on a daily basis (SIA Guideline, 2017). Social amenity impacts raised during SIA consultations considered the operational impacts of dust, noise, blasting, visual and odour on social amenity and way of life.

During the EIS/SIA consultation program, dust and the cumulative impacts of dust affecting air quality were of high concern for stakeholders (Section 6.2.1 of Appendix 11 of EIS). Amenity concerns raised associated with dust centred around the daily changes to their usual routine, including having to hang washing indoors, keeping windows and doors closed and increased domestic cleaning. Confinement to the home, due to dust, resulted in a decrease of amenity associated with living in a rural community. Although some proximal landholders noted immediate dust impacts should lessen as the Project moves away from their rural community, cumulative dust from neighbouring mines, quarries, woodsmoke in winter months and drought year-round, remained a central concern.

No objections were raised during the course of submissions in relation to the particular amenity concerns raised during the EIS/SIA consultations as stated above, rather themes that emerged were more broad, centring on the cumulative impacts of dust and decreases to air quality, affecting the Hunter Valley region. This is evident as the majority of submissions relating to cumulative impacts received were from the Newcastle region, NSW (including Sydney) and Cessnock region. A large proportion of concerns related to cumulative dust impacts reported the health risks associated with decreased air quality conditions.

Responses to submissions relating to project emissions including air quality, blasting, noise and cumulative impacts are provided in the following sections with health impacts of these issues (physical and mental) addressed in **Section 5.1.2.1**.

5.1.1.1 Air Quality

Issues relating to air quality were raised in 44 community submissions and six community interest group submissions. Of these submissions, four submissions were received in direct proximity to the Project, 32 submissions were received from regional areas and four submissions were from broader areas.

A detailed Air Quality Impact Assessment (AQIA) was undertaken as part of the EIS and was included in Section 7.2 and Appendix 13 of the EIS. The assessment has been undertaken in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA 2016) and the assessment was also peer reviewed by ERM. Where relevant the findings from the AQIA have been used to inform the below response.

Cumulative dust impacts

A total of 35 community submissions and six interest group submissions raised issues related to cumulative air quality impacts associated with the Project. Cumulative issues formed the majority of the air quality impact issues raised in both the interest group submissions and the community submissions. The general theme of these comments relate to the contribution of emissions associated with the Project to the air shed, the utilisation of the 2014 meteorological data for the AQIA and recent exceedances of PM_{10} and $PM_{2.5}$ air quality criteria in the Hunter Valley. Given these themes are related a consolidated response has been prepared in relation to the Project. The comments from both the interest groups and examples of the comments from the community submissions and the consolidated response is provided below.

Community Submissions

"This will also add to the air pollution levels in Camberwell Singleton and surrounding areas." S-120622

"The air quality assessment in app 13 has used the reference to material related to acquisitions related Camberwell village and this highlights the area is significantly impacted related to pollution of number of elements, but fails to do a comprehensive cumulative impact beyond a couple of mines surrounding the project and therefore it inadequately highlights the true comprehensive cumulative impact related to pollution of the hunter valley." S-120750

"There is a clear inadequacy of cumulative impact assessment related to air quality and even to make comment to 2010 Camberwell cumulative assessment just proves how out of date the assessment is to look at a report which is ten years old as a reference, especially when there has been more approvals, the cumulative study must look at beyond the boundaries of the project but to the whole hunter air shed." S-120837

"Air pollution from coal dust causes respiratory disease, including lung cancer, and will directly impact on the communities of Camberwell and Singleton Heights." S-120708

"Just because a village is in the acquisition zone does not mean the proponent has the right to cause harm and by their own omission the air quality is already in exceedance, so therefore the ability to mitigate is not achievable and if the environment continues to extreme droughts and the reliance of dams for water, this has the potential to have a negative impact on the economy." S-120750

"the EIS uses a low pollution year, 2014, as its base year, setting background air pollution levels at less than half of the pollution concentrations experienced in the vicinity more recently. Nevertheless, the assessment shows intensification of PM2.5 and PM10 air pollution in Camberwell and surrounding areas" S-120781

"The mine assessment admits that most air quality monitoring sites in the vicinity of Glendell Mine have experienced at least one day above the national standards for PM10 particulate pollution in the past seven years and some exceeded annual average thresholds in the last two years. Camberwell and Singleton also exceeded the PM2.5 criterion last year." S-120902

"This project will add to the dreadful air pollution in the Hunter Valley." S-120671

"The Upper Hunter air quality monitoring network has recorded more than 1000 exceedances in the last calendar year. This project would substantially contribute to further deterioration of air quality in the local vicinity of the mine and in the Hunter Valley generally which is becoming increasingly urbanised. Westerly winds deposit these PM2.5 and PM10 particles over Camberwell and urban areas as far as the coast contributing to respiratory illness over a vast area. If the cost of treating this respiratory illness were added to the costs of mining, this mine would already not be viable." S-120867

"There is a cumulative issue relating to air quality in the Upper Hunter that needs attention. Average levels of coarse particle pollution in the Hunter Valley have increased at a rate higher than the rest of NSW

Air quality in the local area has been deteriorating over time, reaching 470 air quality alerts in 2019 prior to the bushfires. The top three for PM10 particulate levels of air pollution in NSW are in the local area." S-120937

"The fact the proponent has referenced reports from 2014 for the basis of the assessment highlights the failure to incorporate the impacts of climatic changes" S-120750

"The Hunter Valley already has the worst PM10 air pollution in NSW and more than 95% results from coal mining. This is despite dust control programs." S-120726

"the extension and increased production of the Glendell coal mine will further decrease air quality and poses serious health risks. Glendell and Ravensworth East alone produces more than 215, 453 of PM2.5 pollution prior to this proposed extension. The current standard set for air quality monitoring are inadequate to protect the population from particulate pollution." S-120612

Community Interest Groups

Lock the Gate Alliance

"This project is going to worsen already-unacceptably poor air quality in the central part of the Hunter Valley. Instead of measuring the mine's air pollution impact on present air quality, the environmental assessment chose 2014 for its base year, stating that "Conditions in 2014 were representative of the longer-term air quality and meteorological conditions." No evidence is presented for this, but the assessment mentions bushfires and drought as contributors to poor air quality in 2013 and 2017-19 without acknowledging how much the extent of open cut mining in the district has changed in the same period. The bushfires and droughts that have added to the air pollution burden in the Hunter are not aberrations that can fairly be ignored. Rather, they are environmental conditions that the community has to live with and are in fact fuelled by the climate change that this mine will further exacerbate. Bushfire and drought are part of the environmental context for the project and the purpose of the air quality assessment is to predict the environmental impacts of the project in its context. These predictions will not be accurate if they ignore the environmental conditions affecting the region.

As a result of this choice, the model assumptions in Table 11 of the air quality assessment include background levels of PM10 that are less than half of what was actually experienced in the area last year. This is unacceptable and needs amendment so that the assessment actually reflects what people in the district will experience. We refer the proponent to the Approved Methods for assessment of air quality impacts, which specifies that "the existing background concentrations of the pollutants in the vicinity of the proposal" must be used in the assessment. There is no basis for the proponent to select five-year-old background concentrations except to underestimate the number of exceedances of air pollution thresholds that this project will cause. The Approved Methods notes that "In some locations, existing ambient air pollutant concentrations may exceed the impact assessment criteria from time to time. In such circumstances, a licensee must demonstrate that no additional exceedances of the impact assessment criteria will occur as a result of the proposed activity…" We urge the EPA and the Department to ensure the proponent revises the air quality assessment so that its baseline reflects the current environment of the district in which the project is proposed. If the project will contribute to worsening air quality, then that is grounds for it to be refused consent."

EcoNetwork Port Stephens

"Responses to this monitoring will include modifying operations when required, such as relocating exposed equipment to less exposed locations, slowing or stopping specific equipment during high winds or increasing dust suppression activities through increased road watering. Air quality monitoring around Singleton has shown that these provisions are not adhered to with current operations and that doctors in the area are very concerned about the health of those who live there because of poor air quality. In 2019 there were over 800 air quality alerts in the area"

Doctors for the Environment Australia

"In 2018 nine of 43 sites in NSW exceeded the coarse particle annual standard of 25 µg/m3 and 8 of these were in the Hunter Valley. This was a deterioration in comparison to the previous year when there were only 2 such exceedances. In 2018 every site in the Hunter valley also exceeded the one-day standard of 50 µg/m3, ranging from 5 exceedances at Wallsend to 44 exceedances at Camberwell."

Hunter Environment Lobby

"The Upper Hunter air quality monitoring network has recorded more than 1000 exceedences in the last calender year. This project would substantially contribute to further deterioration of air quality in the local vicinity of the mine and in the Hunter Valley generally which is becoming increasingly urbanised."

Hunter Environment Lobby Inc.

"Poor air has been the reality for years for people living close to coal mines, and despite lip service to dust control the trend has been that the problem is getting worse in the Hunter Valley.'

The DEA said the Hunter has the worst coarse particle PM10 pollution in NSW, after monitoring showed eight of nine NSW sites that exceeded the coarse particle annual standard in 2018 were in the Hunter. Every Hunter site exceeded the one-day standard in 2018 and Camberwell, near the Glendell mine and the massive Mount Owen mine site, registered 44 daily exceedances.

Monitoring since October shows Camberwell exceeded the daily standard 41 times and Singleton Heights, which is 15 kilometres from Glendell and with a population of more than 4000, recorded 21 days exceeding the PM10 standard."

The AQIA (Jacobs 2019) has been prepared in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA 2006) (Approved Methods). In terms of the concerns raised above the Approved Methods include guidance on the following:

- Selection of a meteorological year for modelling,
- Inclusion of background concentrations in the vicinity of the proposal, and
- Assessment of the potential impacts.

Selection of meteorological year

The Approved Methods requires that impact assessments are *"conducted using at least one year of site-specific meteorological data"*. In addition, the Approved Methods states that the data should be *"correlated against a longer-duration site-representative meteorological database of at least five years (preferably five consecutive years) to be deemed acceptable"*. The meteorological data used for the assessment were selected from a review of seven consecutive full years of data available at the time of assessment (2012 to 2018). Section 5.1 of the AQIA provides this analysis.

The AQIA process followed the EPA requirements and the 2014 data were subsequently selected based on:

- high data capture rate, meeting the EPA's requirement for a 90% complete dataset
- similar wind patterns to other years
- rainfall being slightly below the long-term average, and the preference was for a slightly drier than average year (for a potentially more conservative approach)
- air quality conditions that were not adversely influenced by extraordinary events (such as dust storms and bushfires). This is because in this context, extraordinary does not imply representative.

The deterioration in air quality conditions observed in recent years is not unique to the Hunter Valley. In their "Annual Air Quality Statement 2018" the Office of Environment and Heritage (OEH, now DPIE) concluded that particle levels increased across the State due to dust from the widespread, intense drought and smoke from bushfires and hazard reduction burning (OEH, 2019).

In addition, late 2019 coincided with a period of unprecedented bushfires in Australia, which affected air quality across many parts of NSW and a total of 66 days in 2019 (predominantly in October, November and December) were subsequently declared as extraordinary events. The impact of the dust storms and bushfires on PM_{10} concentrations in Camberwell in 2019 are shown in **Figure 5.1**. In 2019 the average PM_{10} concentration in Camberwell was 30 µg/m^3, not including extraordinary events.

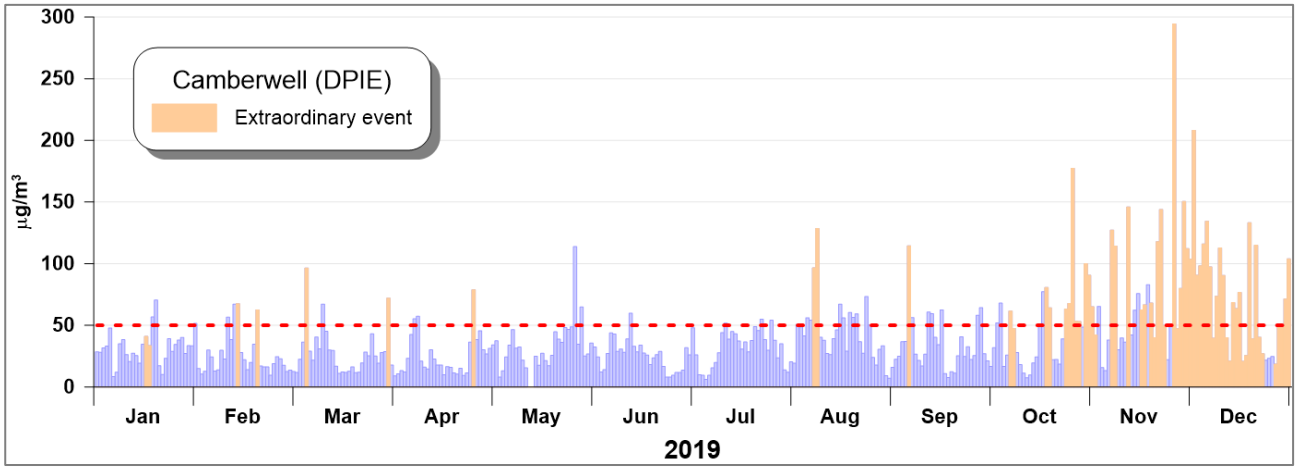


Figure 5.1 Measured PM_{10} concentrations in Camberwell in 2019

Additional detail can be found at: https://www.environment.nsw.gov.au/topics/air/air-quality-statement.

The DPIE has a network of air quality monitors across NSW and data from this network can be used to identify historical air quality trends. **Figure 5.2** shows the rolling annual average PM_{10} concentrations from data collected at various rural and urban air quality monitoring sites since 2011. These data clearly show an increase in PM_{10} concentrations at both rural and urban locations from 2017 onwards, reflecting the onset of drought conditions, increased areas of exposed land across many parts of NSW, and unprecedented bushfire activity in 2019. In addition, these data do not support the statement that 2014 was a "low pollution year". A review of the 2014 data at each of the Camberwell, Muswellbrook, Singleton and Singleton NW Stations indicate that PM_{10} levels in this year are closest to the mean of the 2012 to 2017 period than any other year.

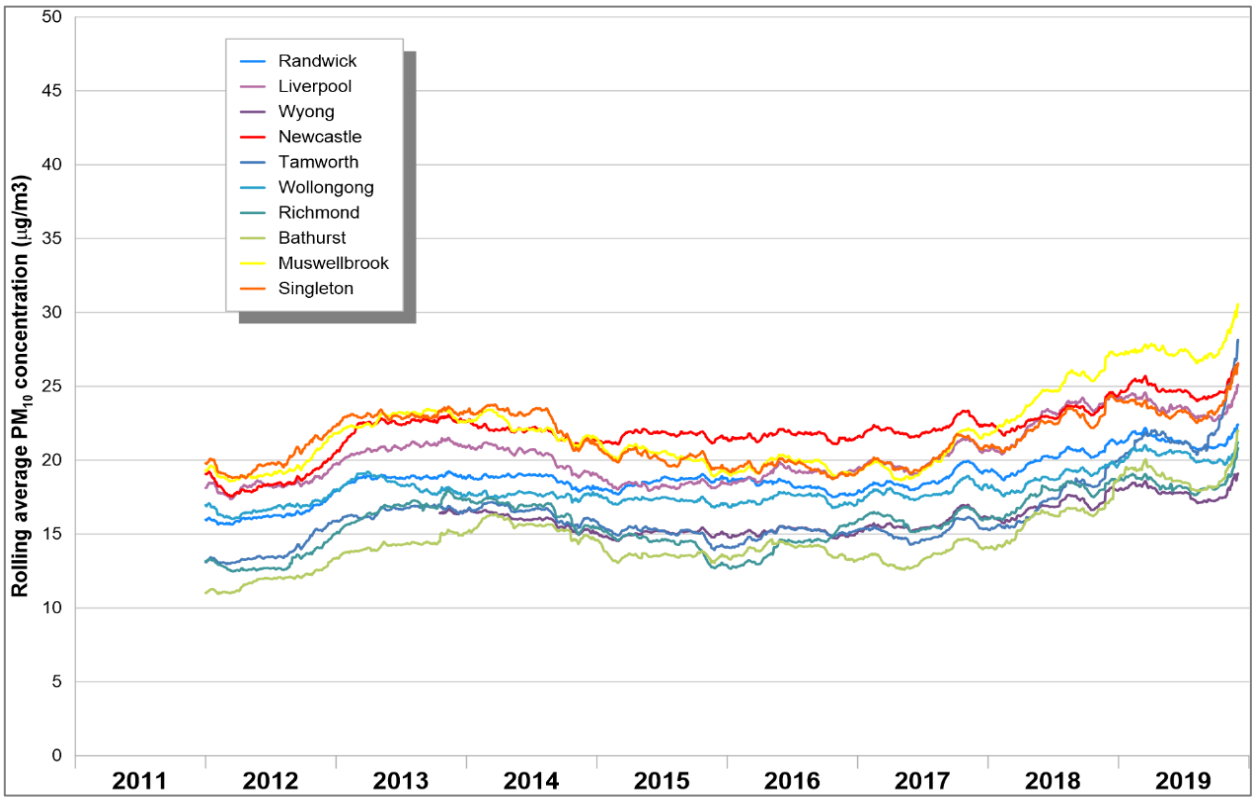


Figure 5.2 Annual average PM_{10} concentrations at various NSW air quality monitoring sites

The use of years with elevated air quality levels, largely driven by extraordinary events or extreme climatic conditions (or both) are avoided in modelling primarily because they do not address the definition of representative. In addition, extraordinary events cannot be reliably simulated in air dispersion models as it is not possible to identify all possible factors that lead to these events, for example, the factors that influence the time, location and intensity of bushfires.

An analysis of annual average PM_{10} and $PM_{2.5}$ data from all of the NSW Upper Hunter and other rural NSW air quality monitoring sites (Merriwa, Tamworth, Narrabri and Gunnedah), as well as lower Hunter sites (Newcastle and Beresfield) confirms the significant increases in annual average particulate matter levels in 2018 and 2019 relative to the 2012 to 2017 period. Where data were available in five or more years in the 2012 to 2017 period, the analysis of 2019 annual average data indicated that $PM_{2.5}$ and PM_{10} levels at all sites exceeded the 2012 to 2017 mean for these sites by at least five standard deviations. $PM_{2.5}$ and PM_{10} levels in 2018 exceeded the 2012 to 2017 mean for these sites by at least two standard deviations at 16 of the 21 sites, including both the Muswellbrook and Camberwell sites.

A review of the data does not suggest the increases observed in the Hunter Valley close to mining operations are higher than the increases observed at other sites in 2019 in either relative or absolute terms. This analysis indicated that particulate matter levels across the State in comparable areas were significantly higher than average in 2018 and 2019. Due to the air quality levels in these years representing significant departures from the preceding five to six years observed in the State, they are therefore not considered to be appropriate for use in assessment of representative background conditions. Both the meteorological and air quality conditions in 2014 were determined to satisfy the definition of "site-representative" from the "Approved Methods" as they described the expected patterns of the site under investigation. The years with documented extraordinary events were not determined to be representative. The peer review of the AQIA also agreed that the calendar year 2014 selected as the meteorological modelling year is representative of longer-term conditions.

In addition, it is noted that the observed changes in air quality in 2018 and 2019 do not correlate with changes in coal activity. **Table 5.1** shows the annual tonnes of coal shipped from the Port of Newcastle for the period between 2014 and 2019. While these data do not differentiate between the Hunter Valley Coal Mines, Western Coal fields and Gunnedah basin, it can be seen that there has not been any significant change in coal production between 2014 and 2019 which might drive differences in particulate matter emissions from coal mining. The data for the 2014 calendar year is near the average coal activity level over this period.

Table 5.1 Coal shipped from the Port of Newcastle between 2014 and 2019

Year	Coal shipped per year (Mt)
2014	159
2015	161.4
2016	158.1
2017	159
2018	158.6
2019	165.3
Average (2014-2019)	**160.2**

Source: Port of Newcastle Annual and Monthly Reports

As previously noted (for example **Figure 5.2**), increases in particulate matter levels in 2018 and 2019 have been measured across the state and these increases are of a similar scale to that observed in the Hunter Valley. The monitoring data provide strong evidence to suggest that factors other than coal mining related impacts have primarily driven the recent changes in air quality.

The approach to modelling and assessment acknowledges the extent of open-cut mining for the representative meteorological year as well as for future operational years of assessment. For 2014, the reported actual coal production data from mines considered in the cumulative model were used in the model calibration process. In addition, the background levels were determined from data collected in the vicinity of Glendell Mine, therefore satisfying the requirement that the "existing background concentrations of the pollutants in the vicinity of the proposal should be included in the assessment".

Section 8 of the AQIA provided information on the performance of the model for predicting air quality conditions. In summary, the model predictions were typically within 20% of the measured results. This result was well within the factor-of-two accuracy that has been recognised for these types of models (DEFRA, 2010) and did not highlight any significant under-prediction as a result of the assessment approach, including assumed background levels.

Best management practices will be implemented as part of the Project to minimise emissions of air pollutants as far as is practical. The AQIA has addressed the requirements of the Approved Methods by:

- Providing a comparison between the number of existing exceedances and the number of potential future exceedances. As an example of this comparison, the historical air quality monitoring data showed that Camberwell has experienced between 11 and 44 days above 50 µg/m^3 (PM_{10}) in each of the past seven years and the predictions of future conditions represented a similar range of potential impacts. The assessment acknowledges that PM_{10} concentrations will continue to be variable from day-to-day, due to existing conditions and sources in the Hunter Valley as well as extraordinary events, including the potential for exceedances in the future; and

- Evaluating the Project in terms of best practice management. This evaluation confirmed that the proposed measures were consistent with best practice dust mitigation measures.

Note, the issues addressed in this response are also discussed in the response prepared to address the submission from the EPA submission, refer to **Section 4.4** for further information.

Singleton Shire Healthy Environment Group

"It is also clear that this "Project Super Pit" Glendell Project will combine the Mine Operations of Liddell Coal, Mount Owen, Ravensworth East and West with the central Glendell Mine through to the final landform, further compounding the Camberwell Resident's Mine Air Pollution Disease Risk drifting from the NNE through NNW to NW quadrants towards Camberwell as detailed in Attachment 1. This raises the Question of the changes to Conditions of Consent and Mine Management Plans across all these interconnected and interoperational Mine Sites"

As described in the EIS, the Glendell, Mount Owen and Ravensworth East mines currently operate under two separate consents but form the Mount Owen Complex. The Mount Owen Complex operates under an integrated approach to environmental management through an overarching Environmental Management System (EMS) which includes detailed environmental management plans and monitoring programs to minimise impacts on the surrounding environment and community.

The Liddell Coal Operations operates under a separate consent and does not form part of the Project.

The AQIA has assessed the potential air quality impacts associated with the Project and the potential cumulative impacts as detailed in the EIS.

It is also worth noting that the commencement of the Project will coincide with the completion of mining at Ravensworth East and Liddell Coal Operations.

Assessment Methodology

Community Submission

"We wish to make a submission to the Glendell Continued Operations Project Our property is identified as 7b.

We opposed the project in regard to Noise and Air Quality. We do not trust or believe that the predictions for both are correct, we understand that the overburden dump will be up to 60 meters higher than it currently is we believe that at that increased height that the noise from mining activity will be herd from a much greater distance than the predictions made in the EIS" S-120792

The AQIA (Jacobs 2019) has followed the Approved Methods, the modelling results are presented in the AQIA and EIS. Issues raised in relation to noise impacts are addressed in **Section 5.1.1.3**.

Singleton Shire Healthy Environment Group

"Specifically, the Question Residents ask is: "Will NSW Planning Authorities recognise here that Glendell Mine's locality (and its incremental Air Pollution Drifting Patterns) are mostly responsible for Camberwell Residents UHAQMN Reported Exceedances; and if approved, will Planning set and enforce for 25 years Conditions of Consent (along with all Glendell Mine Undertakings), and of all other contributing Valley Mines to protect Camberwell Residents Health."? (Further detailing, along with other related Air Quality related Community Disease issues, for Glencore Mining and applicable here are contained in Attachment 1 Mine Pollution Mitigation Controls, Minimisation and Dispersion & Attachment 2 10 Year Review UHAQMN Proposal 2019 & Attachment 3 NSW Resident's Health Protection Planning.)

What the Community of Singleton Shire is asking of NSW Planning and the Mining Industry is that at all times for Resident's PM_{10} not to exceed the NEPM 50ug/m^3 limit, and that Mine further operate well below this upper limit to "Minimise the PM_{10} and $PM_{2.5}$ Rate of Rise frequency" at UHAQMN Continuous Monitoring localities where Residents are being excessively exposed to Mine Air Pollution Drifting Patterns.

This Mining Dialogue Project targets to identify over two Stages, a Suite of Mine Pollution evolving Mitigation Options, preferable targeting Pollution Emission Sources and their Air Pollution Drifting Patterns and Cumulative Air Pollution Expanse influences that daily expose Near Neighbour Residents: and thus provide the basis for Pollution Mitigation Strategies that can be progressively incorporated by Hunter Valley Mining Industry Companies such as Glendell Mine 25 year life to achieve the ever reducing and emerging Human Health Air Quality Standards and Community demands, and as detailed by the United Nations, WHO and IARC since 2013 for Mortality, Morbidity, and Loss of Life Expectancy."

As discussed in the EIS, comprehensive air quality management controls have been incorporated into the design of the Project to minimise the contribution of the Project to impacts on local and regional air quality. Modelling results indicate the Project will comply with the relevant applicable annual average and incremental 24-hour average air quality criteria at all private residences that do not currently have acquisition rights under existing development consents. Additionally, the proposed operations will have similar air quality impacts to the existing approved Glendell Mine with Project specific impacts in Camberwell and the Middle Falbrook area declining as operations progress towards the north and away from these receiver areas.

The potential air quality impacts associated with the Project will continue to be managed in accordance with the existing management processes currently implemented at the Mount Owen Complex, in accordance with the existing Mount Owen Complex AQGHGMP, which will be reviewed and updated as part of the implementation of the Project.

Management and Mitigation

Community Submission

"Concerning air quality, we are told that "Responses to this monitoring will include modifying operations when required, such as relocating exposed equipment to less exposed locations, slowing or stopping specific equipment during high winds or increasing dust suppression activities through increased road watering." Is it actually possible to slow or stop the trucks from leaving the pit with the production more than doubled? Is it possible to fit enough water cart runs in between the trucks to keep the dust down? Is there even enough water available for the additional watering required for more than double the production and hence more than double the truck movements?" S-120714

While the Project involves the progressive increase in production from the Glendell Pit, this increase coincides with a decline in production from other mining areas within the Mount Owen Complex with the overall production rate from the Mount Owen Complex remaining at or below currently approved levels.

Glencore currently manage the operations at the Mount Owen Complex through the implementation of proactive and reactive management measures in order to comply with relevant air quality criteria, Glencore is committed to continue these management measures to effectively manage the air quality impacts associated with the Project. These measures are currently implemented as part of the existing Mount Owen Complex AQGHGMP and will continue to be implemented and continually reviewed and improved, where feasible, as part of the Project.

Proactive air quality management includes the implementation of engineering controls through the mine plan design, source specific controls such as water spraying of haul roads and progressive rehabilitation and daily forecasting and planning. The level of reactive control required will vary from moving machinery to complete shutdown, depending on meteorological conditions at the time. The level of control and length of time the control is required will vary and will affect production levels, however mine planning and scheduling includes an allowance for the implementation of reactive controls.

As discussed in the EIS, the Project will form part of the Mount Owen Complex Water Management System (WMS) which is an integrated system managing the water from the Mount Owen, Ravensworth East and Glendell Mines. Additionally, through the linkage with the Mount Owen Complex WMS, the Project will be connected with Glencore's Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) which enables the transfer of water and tailings between the mining operations linked to the GRAWTS. At present, the Mount Owen Complex, Integra Underground, Liddell Coal Operations and Ravensworth Coal Operations are all linked via this scheme. Water demands associated with dust suppression have been considered in the site water balance undertaken for the Surface Water Impact Assessment (Appendix 17 of EIS). The site water balance has been prepared based on an assumption that there is no change to existing licence allocations for operational purposes. The site water balance assessment for the project identified that the cumulative demands of operations forming part of the GRAWTS can be met throughout the life of the project without any need to increase existing water licences.

Dust control programs

Community Submissions

"The dust control programs currently implemented by the mines do not work, and Glendell would be no better."

S-120717

"Previous dust control programs have been shown to be ineffective." S-120708

"Current dust control programmes are ineffective, & using the best data from 2014 is ingenious" S-120901

The NSW Coal Mining Benchmarking Study was commissioned to review coal mining activities in NSW, this report informed a range of activities and initiatives that the EPA has undertaken to minimise particle pollution from coal mines. One of the key recommendations of the NSW Coal Mining Benchmarking Report was that all coal mines should carry out a site-specific determination of best practice management to reduce particle emissions.

As discussed in the EIS, coal mines in the Hunter Valley have been working in close consultation with the EPA over the past decade to improve air quality management at their existing mining operations. These actions have included the implementation of Pollution Reduction Plans related to dust management at all operating coal mines which included a review of operations against what is considered 'best practice' management measures. All coal mines in the Hunter Valley are required to implement all reasonable and feasible management measures to mitigate air quality impacts from mining operations.

The approved mining operations at the Mount Owen Complex operate pursuant to an Air Quality and Greenhouse Gas Management Plan (AQGHGMP) (Glencore, 2019b), which has been approved by the DPIE, and covers the open cut mining operations, coal handing and transport systems. The AQGHGMP includes a range of management practices including proactive and reactive management of operations in response to both predicted meteorological conditions and measured air quality levels in the surrounding environment.

As discussed in **Section 1.1**, monitoring results indicate the existing reactive air quality management measures are effective in minimising the exceedance of air quality criteria. The existing proactive and reactive air quality management measures implemented at the Mount Owen Complex will continue to be adopted for the Project.

Dust impacts on domestic water tanks

Community Submissions

"Water quality of tank water of rural residences - the fact stands there is no town water to rural properties and the importance of the collection system for each residence to collect water is impacted from pollution air shed, this has a major impact on health and financial burden for continual tank cleaning and filtration systems and yet this seems to be overlooked on the rights of others to have clean water, the severity of drought should open up the discussion related to water and the importance of collection for drinking and not have polluted water due to poor air quality, just note the dust in the gutters is grey and the source is clear where it comes from." S- 120837

"Tank water on my property is severely impacted by mining due to air pollution. The poor air quality contaminants are collected in the gutters of the house and and flashed into the water tank by rainfall events. The contaminants impact the water quality in the tank, and this becomes a health issue. There is no responsibility on the industry to clean the tanks and provide clean water." S-120795

"Poor air quality and the increase in pollution air shed, has a negative impact on Camberwell's drinking water system to the house water tank, with numerous issues with water quality and reluctance of the proponent to manage the problem via tank cleaning or filters through the original consent as per the comment it was not in their consent conditions but they have been fined for covering the village in dust from blasting operations, yet the situation still exists related to water quality of the tank" S-120753

As discussed in Section 7.2.5.4 of the EIS, no private sensitive receptors (being dwellings or other buildings regularly occupied on a daily basis) are predicted to experience exceedances of the cumulative annual average dust deposition criterion at any stage of the Project.

As part of the Mount Owen Continued Operations Project, Mount Owen committed to the ongoing inspection of rainwater tanks as requested at privately owned residences within 4 km of the approved mining limit at Mount Owen at least every 2 years, with cleaning being carried out should the inspection identify that this is required. This current commitment will continue to apply to the Mount Owen operations regulated under the Mount Owen Consent.

There is no current requirement under the DA 80/952 for the approved Glendell Mine to inspect and clean rainwater tanks. However, as part of the Project, Glencore will develop a Social Impact Management Plan (SIMP) that will define and guide the monitoring and evaluation activities for the Project. The SIMP will be developed in accordance with the SIA Guideline and will detail adaptive management and mitigation strategies to address all potential impacts of the Project including air quality impacts.

Impacts on biodiversity

Community Submission

"For this completely misguided aim this projects expects the local community and in fact environment and ecosystems to put up with diminished air quality and all of the adverse health effects this leads to as well as jeopardising the ground water. There is no good reason to risks the health and environment for this project" S-121096

As discussed in Section 5.2.4 of the BDAR, air quality impacts have the potential to adversely impact native species from dust generating activities during ground disturbing works, including blasting, fumes (NOx emissions) from blasting and diesel exhaust emission from the operation of machinery. Potential impacts include dust covering vegetation thereby potentially reducing vegetation health and growth and increased air pollutants for native species (flora and fauna) making them more susceptible to environmental stresses.

The design of the Project will include inherent measures to minimise the potential for adverse air quality impacts. These include:

- progressive rehabilitation and stabilisation of disturbed land
- dust suppression on haul roads and other operational areas to reduce vehicle generated dust emissions
- a range of other dust control measures as discussed in the main text of the Biodiversity and Offset Management Plan and the Air Quality and Greenhouse Gas Management Plan.

In regard to potential impacts on biodiversity, there will be no substantial change to air quality impacts (refer to Appendix 11 of EIS for the Air Quality Impact Assessment) given that the proposed mine is part of, and adjacent to, an already existing operation with existing impacts and that the predicted air quality impacts from the Project are similar to those from the existing Glendell Mine. Any additional air quality impacts are not expected to be of any level of significance in relation to threatened species, populations and communities.

This submission also raises health impacts and impacts on groundwater. These issues are addressed in **Sections 5.1.2.2** and **5.1.6.1** respectively.

5.1.1.2 Blasting

Issues relating to blast impacts were raised in three community submissions. Two of these submissions were received from direct proximity to the Project and one submission was a general comment received from the broader area.

A Blasting Impact Assessment (BIA) was undertaken as part of the EIS and is provided in Section 7.4 and Appendix 15 of the EIS. The assessment was undertaken in accordance with the SEARs for the Project which required an assessment of the likely blasting impacts of the development (including ground vibrations, overpressure, flyrock, visual and fumes/odour) on people, animals, buildings/structures, infrastructure and significant natural features, having regard to the relevant ANZECC guidelines.

Submissions received from Direct Proximity to the Project

Community Submissions

"Blasting is another major concern related to the health impact of the residence, will this cause harm to the home and burden of cost for repairs, the assessment fails to identify the cumulative impact of blasting from several sources on the residence. The number of blasts at cumulative level and the impact on air shed has not been addressed over a day or annually." S-120837

"The failure to incorporate the number of blast emissions per day in the hunter at a cumulative level and annually on the air pollution or air quality." S-120750

The BIA was undertaken in accordance with ANZECC guidelines Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990). The guideline includes criteria which minimise amenity impacts on residential receivers from blasting due to ground vibration and blast overpressure.

The nearest residence to the proposed Glendell Pit Extension is approximately 3.5 km away. The blasting operations for the Project will meet the residential blasting amenity criteria for all private residences and therefore, blasting is not predicted to cause structural damage to residential receivers. Glencore will implement the appropriate blast management controls necessary to meet the relevant amenity criteria for private residential receivers. A detailed blast design process that considers operational, geological and environmental constraints will be undertaken prior to each blast event. The detailed blast design process will seek to maximise blast efficiency, and minimise potential vibration, overpressure, dust and fume impacts.

As described in Section 7.4.3 of the EIS, the existing Glendell Mine operates a successful blast notification and management system with nearby mines in relation to the coordination of blasts to avoid concurrent blasting and therefore reduce the potential for cumulative airblast overpressure and ground vibration impacts and this will continue throughout the life of the Project.

Submission received from Broader Area

Community Submission

"The coal mine produces harmful local pollution, bother dust and blast fumes." S-121099

As described in Section 7.2.5 of the EIS, a blast fume assessment was completed as part of the Air Quality Impact Assessment for the Project. Modelling results from this assessment show that, under worst-case meteorological conditions with a rated level 3 fume (visible orange gas), the maximum 1-hour average nitrogen dioxide (NO_2) concentrations will not exceed the assessment criterion of 246 µg/m^3 at any off-site sensitive receptor locations.

Glencore also conduct a pre-blasting procedure which covers fume management which will continue to be implemented as part of the Project. The procedure includes key fume management actions, 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.

Based on the dispersion modelling (with predominantly worst-case assumptions applied) and proposed implementation of site-specific pre-blast procedures it has therefore been concluded that the Project will not lead to any adverse air quality impacts with respect to post blast fume.

Further, since the mines commencement in 2008, post blast plume has not been an issue with no reportable blast fume events.

5.1.1.3 Noise

Issues relating to noise impacts were received in two individual submissions, both of which were from direct proximity to the Project.

A detailed Noise Impact Assessment (NIA) was undertaken as part of the EIS and is included in Section 7.3 and Appendix 14 of the EIS. The NIA was prepared in accordance with the SEARs for the Project which required a detailed assessment of the likely impacts of the Project in accordance with the Interim Construction Noise Guideline, NSW Noise Policy for Industry (NPfI) and the NSW Road Noise Policy respectively, and having regard to the Voluntary Land Acquisition and Mitigation Policy.

Submissions received from Direct Proximity to the Project

Specific Noise Issues

Community Submission

"We wish to make a submission to the Glendell Continued Operations Project Our property is identified as 7b. We opposed the project in regards to Noise and Air Quality. We do not trust or believe that the predictions for both are correct, we understand that the overburden dump will be up to 60 meters higher than it currently is. We believe that at that increased height that the noise from mining activity will be herd from a much greater distance than the predictions made in the EIS" S-120792

As discussed above, the NIA was prepared in accordance with the SEARs and the requirements of the NPfI. The modelling provides for full consideration and assessment of the proposed mine plans including the proposed emplacement areas.

To avoid the need for large out of pit emplacement areas, and the associated disturbance of new areas, the Project will require an increase in the maximum emplacement height within the Glendell in-pit emplacement areas from approximately 160 mAHD (currently approved) to approximately 185 mAHD with selected areas up to approximately 200 mAHD to achieve a more natural landform. The Project will also include emplacement on the Ravensworth East emplacement area which will increase the height of emplacement in this area from approximately 160 mAHD to approximately 185 mAHD in places. The variation in height in the Glendell and Ravensworth East emplacement areas will result in increased landform variability which will provide a more natural looking final landform for these areas.

The NIA includes modelling of the Year 6 mine plan to specifically assess the worst case impacts associated with emplacement occurring at 200 mAHD at Glendell and the Year 13 model represents operations at maximum production and elevated emplacement. Consistent with expectations that this elevated dumping and increased production rate will increase noise levels from Glendell in the Middle Falbrook area, the noise model predicts higher noise impacts in this area during these stages of the Project relative to the other years modelled. Despite the predicted increase, the maximum modelled noise levels at Property 7b remain at least 3dB below the relevant Project Noise Trigger Levels (refer to Table F1 in the NIA).

Glencore is committed to the continued implementation of operational controls over the life of the Project during adverse meteorological conditions in order to manage noise impacts. These controls largely relate to operational measures that are implemented in response to the real-time noise monitoring system surrounding the Mount Owen Complex. These controls have been factored into the noise model for the Project in order to demonstrate the proposed mining operation can meet the project noise trigger levels. The controls include the management of mobile machines during adverse weather conditions when wind conditions or inversion conditions enhance noise propagation towards sensitive receivers, particularly at height from overburden emplacement areas. There operational controls would likely include:

- Providing alternative dumping locations,
- Moving parts of the fleet to shielded locations, and/or
- Revising mining operations to reduce noise impacts including the implementation of a hierarchy of controls ranging from review of equipment locations and nature of activities through to shut down of equipment as required to maintain compliance with noise criteria.

Community Submission

"Noise is another factor that has impact on the mental health of others and the failure to identify noise levels in the village due to location of inversions, but more importantly the increase of traffic that comes from outside the district, which adds to the noise shed, the modelling has inadequately addressed the topography of the village to noise through different conditions." S-120837

The noise modelling utilises terrain data, source and receptor locations and heights, source sound power levels for mining equipment and input meteorological conditions to predict noise levels. Meteorological data was assessed in accordance with NPfI methodology to determine the significance of noise-enhancing conditions including the likelihood of temperature inversions. The NIA included an assessment of the existing background noise levels (which considers all contributing noise sources including traffic noise) in order to determine the project noise trigger levels applicable to the Project. The modelling results presented in the NIA demonstrate the project noise trigger levels can be achieved under all noise enhancing conditions, including in Camberwell.

As discussed in Section 7.3.4.3 of the EIS, there will be no increase in traffic associated with the ongoing operations as part of the Project, however there will be a temporary increase in traffic volumes associated with the construction phase of the Project peaking in approximately Year 1-2 of the Project.

The road noise impacts associated with traffic movements generated by the construction phase of the Project were modelled using the US Federal Highway Administration (FHWA) Traffic Noise Model (TNM) Version 2.5 Look-Up Tables (U.S. Department of Transportation, 2004). TNM is a highway traffic noise prediction and analysis model used to analyse highway geometries including vehicle speeds, vehicle type, setback distances and the effectiveness of barriers.

Residential receivers (147 and 150), located in Camberwell in close proximity to the New England Highway, were considered to be representative of the receivers that could be affected by the changes to traffic levels. The relative increases in the road traffic noise levels associated with the construction phase of the Project at property 147 are 0.5 dB(A) for the AM peak period and 0.4 dB(A) for the PM peak period which are well within 2 dB(A) of the existing traffic noise levels. This increase will not be discernible from existing road traffic noise levels.

5.1.1.4 Cumulative impacts

Five submissions raised issues relating to cumulative impacts more generally. Responses to these concerns are provided below. All submissions were received from regional areas.

Community Submissions

"The cumulative impacts need to be taken into consideration. I do not believe that any proposed offset would be acceptable for a project of this nature" S-120649

"The cumulative impacts of this have not been adequately determined." S-120671

"Minimal attention has been given to cumulative environmental impacts associated with the project, and the proper consideration of these impacts." S-120894

"The cumulative impacts of all mines operating in the Hunter Valley have not been adequately accounted for by the New South Wales government; and have now reached an untenable point - for water systems, for the conservation of native fauna and their habitats, for native vegetation conservation, and for the remaining people in communities within the Upper Hunter mine zone. • The people of the Hunter do not want their land and home to be a sacrifice zone for an outdated sector that should be urgently replaced – for the sake of both our communities and workers." S-121197

As provided in Appendix 4 of the Project EIS, the SEARs for the Project required 'an assessment of the likely impacts of the development on the environment, focusing on the key issues identified below including: an assessment of the likely impacts for all stages of the development, including any cumulative impacts'.

Glencore understands that the Project is located in an area which is heavily dominated by mining and therefore the assessment of cumulative impacts of the Project are important for the community to understand the impacts.

In accordance with the SEARs, the cumulative impacts of the Project have been assessed as part of the detailed environmental assessments completed and summarised throughout the EIS. More specifically, cumulative impacts of key environmental issues of the Project can be found in the following EIS sections and appendices including, but not limited to:

- Air quality (Section 7.2 and Appendix 13 of the EIS)
- Noise (Section 7.3 and Appendix 14 of the EIS)
- Blasting (Section 7.4 and Appendix 15 of the EIS)
- Surface water and Groundwater (Section 7.5, Appendix 16 and 17 of the EIS)
- Biodiversity (Section 7.6 and Appendix 20 of the EIS)
- Aboriginal Cultural Heritage (Section 7.7 and Appendix 22 of the EIS).

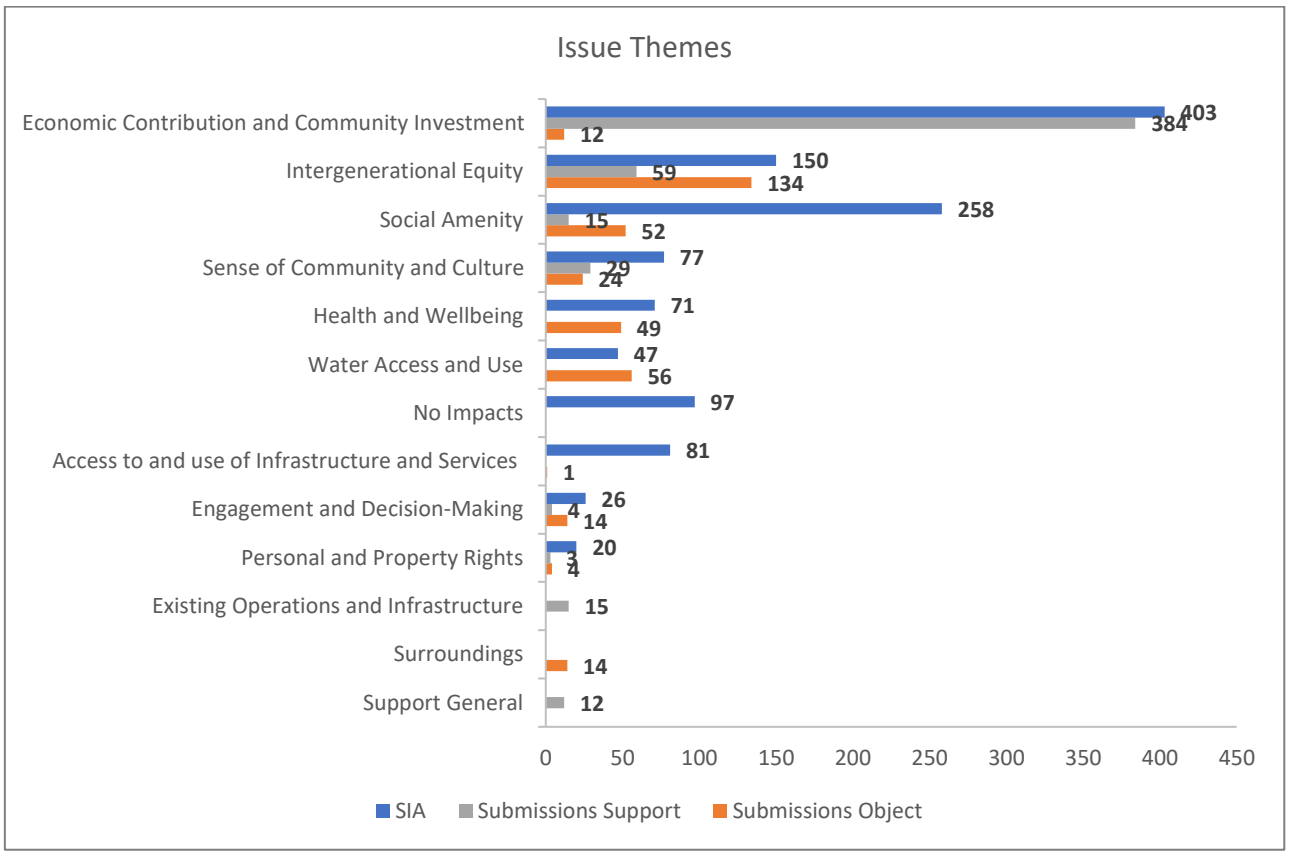
5.1.2 Impacts on the Community

A detailed Social Impact Assessment (SIA) was undertaken in accordance with the SEARs for the Project and the *Social Impact Assessment Guideline for State Significant mining, petroleum production and extractive industry development* (DPE, 2017a) (SIA Guideline) and is included in Appendix 11 of the EIS.

Following the public exhibition of the EIS, a number of submissions were received from members of the community relating to the social impacts of the Project, primarily the social impacts on intergenerational equity, social amenity (as a result of dust, noise and blasting impacts), use and access to water and impacts on health and wellbeing. Responses to these submissions are provided in the following sections, however, it should be noted that many of the submissions identify the linkages that exist between social impacts, given that social impacts are often highly interrelated and not mutually exclusive.

Where common issues have been raised in multiple submissions, selected comments have been used to highlight issue sentiment and may not reflect all the comments received in relation to each social impact theme.

The following responses have been prepared with the assistance of the Umwelt Social Team who completed the Social Impact Assessment (SIA) for the Project. A comparative analysis was conducted of the social impacts raised during the SIA (Appendix 11 of EIS) and those raised during the public submissions phase, to establish the continuity of impacts and to identify any new impacts of interest to local and regional communities. Graph 5.1 outlines the issues raised in the support and objection submissions and compares the frequency of response to the frequency of issue raised during the SIA. Graph 5.1 highlights that economic contributions and community investment has remained a significant positive impact raised both during the SIA and through submissions in support of the Project. Issues themes such as intergenerational equity and impacts to social amenity have also remained prominent issues across the SIA and Submissions phase.



Graph 5.1 Impacts comparative analysis raised during the SIA and Submissions Phases of Project Assessment

Other issues that were consistent themes across each phase included impacts to sense of community and culture, health and wellbeing, and impacts relating to the access and use of water. Issues that were more prominent in the SIA included access to and use of infrastructure and services and concerns surrounding personal and property rights. Emerging issues from the submission analysis included benefits of the Project utilising existing infrastructure on-site and impacts to surroundings, including ecological impacts and impacts on public safety and security post-mining, given remaining voids.

These themes as identified in **Graph 5.1** are addressed in sections throughout this report in accordance with the draft guideline, with sub-themes relating to impacts on community addressed in the following sections.

5.1.2.1 Sense of Community and Culture

Population Change, Sense of Community and Culture

Community identity and sense of place can contribute to the cohesion and connection of residents within a locality. During SIA consultations (Appendix 11 of the EIS), some stakeholders (particularly near neighbours) noted significant changes to their communities over the last two decades, as a result of population loss, mining acquisitions and a move to more transient home ownership and increased rentals (refer to **Graph 5.1** above). These concerns were noted in one objection submission received.

In response to a misunderstanding regarding acquisition noted in submission S-120792, no properties were recommended for acquisition as part of the Project. The criteria to become eligible for acquisition are determined by exceedance of relevant air quality and noise criteria and Glencore have committed to manage all impacts associated within the Project within the relevant assessment criteria. Where exceedances have been predicted, these properties already have existing acquisition rights under existing consents.

Community Submission

"We spoke to representatives from Mt Owen when their last modification was submitted regarding acquisition areas and was assured that no additional area adjacent to us would be included.at that stage We owned property 7a on the maps, we now find that properties 21, 22, 23 adjoining 7a to the north are included in acquisition zones, also property 112 to the west of 7a and properties 4 and 5 to the south of 7a how can a property be surrounded on three boundaries by acquisition not be included in acquisition zones. Also properties 112 and 5 were not recommended by the EIS for acquisition so how do they become entitled to acquisition in the approval process.

Our community of permanent residents has been reduced severely buy the purchase of properties by Glencore, Ashton and Rixes Creek coal mines that apart from the Glennies Creek Rural Fire Brigade which has moved they Station to Mt Olive have all closed and no longer exist. This includes the Glennies Creek Public Hall which has not been used for six years, We feel that the hall should be purchased by Glencore as it is surrounded by mine owned properties and the funds from the sale be distributed to Mt Olive Hall. With the purchase of some properties the buildings have been partially removed leaving the unsightly residue to lay unattended for years making our community look uncared for and a community of neglect since mining in our area the roadside rubbish is terrible with workers not caring where they throw their litter." S-120792

Sense of community issues raised in Submission S-120792, included opportunities for community enhancement through purchase of the Glennies Creek Hall. Should the project be approved, Glencore will continue their commitment to a community investment program in order to retain a sense of place and community connectedness for local residents and as outlined in Section 8.0 of the SIA (Appendix 11 of EIS), management and enhancement measures will also be implemented. In addition to the existing Stakeholder Engagement Strategy and Community Investment Policy, a community enhancement project/planning agreement may also be established (Section 8.2 of Appendix 11 of EIS) to target specific community identified projects, such as maintenance of existing local community halls. It is likely that if approved, the project will require the development of a Social Impact Management Plan (SIMP) to guide future community engagement and management of any social impacts predicted as a result of the Project.

5.1.2.2 Health and Wellbeing

Health and wellbeing impacts raised in the SIA (Appendix 11 of EIS), centred around the physical impacts of dust on human health, including exacerbation of respiratory illness and the potential for dust to impact animal health. Drinking water quality was also noted to be of concern, with suggestions that dust and pollution entering rainwater systems contaminated personal drinking water supply.

Mental health impacts were also raised, with stakeholders indicating increased stresses and anxieties affecting daily living for those residing in close proximity to coal mines, with the Project having the potential to exacerbate these concerns.

A total of 49 submissions received, referred to health and wellbeing impacts, eight of which were received from stakeholders less than 5 km from the project, five from Cessnock and Singleton localities, four from Maitland, two from interstate and the majority from Newcastle (19) and the wider state of NSW (11).

Consultation with potentially impacted stakeholders was undertaken as part of a comprehensive stakeholder engagement program for the Project EIS. Glendell will continue to engage with impacted residents as the project progresses though the assessment and determination process and will ensure that residents are aware of the predicted impacts on their residence and available mitigation options.

Physical Health

A total of 44 objection submissions raised physical health impacts associated with the Project, with majority of submissions outlining the potential physical health impacts and reduced tolerance of community residents to deteriorating air quality. Two submissions related to the potential health impacts associated with the potential exposure to blasting fume for nearby residents, as discussed in **Section 5.1.1.2**.

Community Submissions

"Additionally, the extension and increased production of the Glendell coal mine will further decrease air quality and poses serious health risks. Glendell and Ravensworth East alone produces more than 215, 453 of PM2.5 pollution prior to this proposed extension. The current standard set for air quality monitoring are inadequate to protect the population from particulate pollution. Burning coal for heat or power is a known chief source of particulate pollution and this poses a significant health risk for communities both in the Hunter valley region and surrounding residents." S-120612

"This proposed expansion over the life time of the project will also impact the health of those in the Hunter because of an increase in air pollution by particulate matter and in water loss." S-120643

"PM10 air pollution causes respiratory disease, including lung cancer, so is a public health burden for communities of Camberwell and Singleton Heights. The scheduled closure of Glendell in 2024 when the current approval expires will bring a welcome reduction in air pollution exposure." S-120717

"This is despite dust control programs. We can expect more respiratory disease, more lung cancer and increasing extreme weather events, a result of climate change linked to continued dependence on fossil fuels." S-120726

"The fact is the number of exceedances of PM10 in Camberwell and Singleton North West is continually increasing in the last three years, proves problems related to pollution levels and exposure rate. The concern now is the continual exposure levels to exceedances on future health of the young and the community at large who should be accountable, it should not be the tax payer to foot the bill but the source of the hazard and that is the industry itself, as the report states the levels will be exceeded." S-120750

"Air quality is highlighted in relation to the health impact from breathing but there is also the concern related to poor water quality in the tank water system in the village or surrounding private residences, that has neglected in the impacts in the hunter rural community." S-120753

"Ignores that the public tolerance of air pollution is less following increased awareness of its damaging health effects in the 2019-2020 fire season. Recent high levels of hazardous exposure to carcinogenic PM10 particles due to the fires makes it even more unethical to increase PM10 exposure for Hunter residents further burdening our families and health services." S-120826

"Major respiratory health problems associated with illness & the complications of respiratory illness particularly cardiac involvement leads to financial hardship & early unpleasant death. Coupled with the economic cost of respiratory, cardiac & currently unknown effects of the ongoing bushfire so this will be an untenable cost to the community, not an advantage." S-120901

A number of these submissions have also been addressed in **Section 5.1.1** in relation to Project Emissions.

The SIA for the Project included an examination of health indicators pertaining to asthma and hospitalisations as a result of respiratory illnesses. This section acknowledged contradictory evidence pertaining to the rates of respiratory diseases from 2008 to 2015 in the Singleton LGA, with the rates of hospitalisations, due to asthma, illustrating several peaks and troughs above and below NSW state averages: with current levels higher than average being possibly linked to the recent poor air quality associated with drought conditions and bushfires. Section 6.2.6 of the SIA reflects stakeholders perceived risk to health through the consumption of water that has been exposed to particulates, for example in rainwater tanks and animal watering troughs. Concerns relating to dust impacts on domestic water tanks are addressed in **Section 5.1.1.1**.

A health risk assessment was completed (Section 7.4 of the EIS) which included consideration of the adverse effects from human exposure to acute and cumulative project environmental hazards, in accordance with *Environmental Health Risk Assessment – Guidelines for Assessing Human Health Risks from Environmental Hazards* (enHealth 2012). As part of this health risk assessment, an assessment on human exposure to particulates ($PM_{2.5}$ and PM_{10}) was completed. Results indicated the predicted maximum 24-hour PM_{10} and $PM_{2.5}$ concentrations for the Project, when considered alone, meet the relevant criteria at all private sensitive receptors. However, cumulative maximum 24-hour PM_{10} concentrations are expected to continue to exceed the EPA's 50 µg/m^3.

Additional investigation of the cumulative predictions at Camberwell were completed as these are the nearest private sensitive receptors to the Project. All private properties in Camberwell hold acquisition rights under existing consents. Results from the additional investigation indicated that Camberwell is experiencing adverse air quality impacts with respect to 24-hour average PM_{10} concentrations due to the combined contributions of all mining operations in the region, based on comparisons between model results and EPA criteria.

Cumulative annual average PM_{10} and $PM_{2.5}$ concentrations with the Project are predicted to comply with the EPA cumulative air quality criteria of 25 µg/m^3 and 8 µg/m^3 (respectively) at all surrounding private residences that are not subject to acquisition rights under other consents. Air quality monitoring data has indicated that annual average PM_{10} concentrations have exceeded 25 µg/m^3 at Camberwell in four of the past seven years, and at two other locations in 2018 due to drought conditions.

It should be noted that the modelling indicates that the Project will have similar air quality impacts to the existing approved Glendell Mine with cumulative impacts in Camberwell and the Middle Falbrook area declining over time as operations extend towards the north. Further detail of this assessment is provided in Section 7.14.1.1 of the EIS.

Mental Health

Community Submissions

"Being a psychiatrist, I am painfully aware of the psychological distress caused to our young with a guaranteed end to the world as we know it, & to our old, filled with anger, despair & helplessness in the face of our government's outstanding lack of appropriate action." S-120901

"The failure to identify mental health impacts related to poor air quality and recommendation to stay home with air conditioning, causes isolation and possible social behaviour problems." S-120750

"Global heating has negative health impacts on populations around the world, including New South Wales. These include the direct effects of heat stress, loss of arable land to grow healthful food, water loss and contamination, natural disaster, and mental health impacts." S-121013

"Noise is another factor that has impact on the mental health of others and the failure to identify noise levels in the village due to location of inversions, but more importantly the increase of traffic that comes from outside the district, which adds to the noise shed, the modelling has inadequately addressed the topography of the village to noise through different conditions." S-120837

"The carbon released by the combustion of coal from this mine will exacerbate global heating, worsening the crisis that has led to the current bushfire emergency. Global heating has negative health impacts on populations around the world, including New South Wales. These include the direct effects of heat stress, loss of arable land to grow healthful food, water loss and contamination, natural disaster, and mental health impacts." S-121013

As assessed in sections 7.7.1 and 7.7.2 of the SIA, the SIA (Appendix 11 of EIS) acknowledges the interrelationship between the presence of an operation and potential social impacts on individual health and wellbeing, resulting in some stakeholders identifying that they experience mental health issues such as stress and anxiety.

Section 7.2.1 of the SIA specifically outlines the community's need to enjoy their rural amenity and the subsequent feelings of captivity associated with staying indoors that was experienced by some stakeholders. During consultation as part of the SIA, no stakeholders reported social behaviour problems associated with indoor confinement, so this was not discussed further in the SIA. Similarly, although one submission raised mental health concerns relating to operational noise, no such relationships were explicitly drawn by stakeholders through the EIS/SIA consultation process.

Although mental and/or physical health impacts were not specifically discussed in the SIA (Appendix 11 of EIS) in relation to greenhouse gas emissions and global warming, Section 7.5 and 7.5.3 of the SIA (Appendix 11 of the EIS) acknowledge issues around intergenerational equity and climate change more broadly.

5.1.2.3 Personal and Property Rights

Livelihood and Property Value Impacts

Personal and property rights were raised as concern for near neighbours (11) primarily during round two of the SIA consultations in 2019. The main concern centred around the presence of mining and its ability to affect property values and property sales, should residents wish to leave the area. Blasting impacts causing property damage resulting in reduced property values were also discussed.

Issues relating to personal and property rights were raised less frequently during the public submission phase, with three individual submissions outlining concerns regarding impacts of changing property values and potential increased costs to households e.g. insurances as a result of climate change impacts and subsequent bushfire events.

Community Submissions

"Profits (for the very few) and the very modest number of jobs that will be created directly or indirectly by the project can no longer be justified given the effects which are now being experienced as a result of global warming. This is particularly so given that the negative effects of global warming are being borne by an overwhelming majority of those in the community that gain no direct financial or other benefit from coal mining. Those negative effects include: i) Destruction to property and the interruption of business by extreme weather events coming at enormous cost (the financial cost of the recent bushfires still be determined) whilst the emotional costs and personal suffering will not even be considered. Firefighters have not only suffered financial loss; they all have risked, and some have lost their lives. ii) Consequential increases in insurance premiums which for many have either become or are becoming unaffordable. iii) General insecurity as to the future because of extreme climatic events with the consequence that many (including many aged and vulnerable persons) are considering uprooting and relocating to areas perceived to be safe havens which in turn will lead to increase in the cost of housing and cause strain on infrastructure." S-120663

"Blasting is another major concern related to the health impact of the residence, will this cause harm to the home and burden of cost for repairs, the assessment fails to identify the cumulative impact of blasting from several sources on the residence. The number of blasts at cumulative level and the impact on air shed has not been addressed over a day or annually." S-120837

"The people of the Hunter do not want their land and home to be a sacrifice zone for an outdated sector that should be urgently replaced – for the sake of both our communities and workers." S-121197

As outlined in Section 5.5.8 of the SIA (Appendix 11 of EIS), Tew Property Consultants undertook a comprehensive analysis of rural properties within Muswellbrook and Singleton LGAs in 2019 to determine the evidence in relation to property sales and the impacts of mining in the Hunter Valley. The report stated that the majority of rural assets in the Hunter Valley increased in value, with the most significant changes in market value decreases coinciding with the mining downturn in 2012 and property sales and median values increasing for 2016-17, when consumer confidence in the coal sector was reinstated. It was also noted that the drop in property prices in 2019 in Singleton and Singleton Heights (Table 5.26 and Table 5.27 in Appendix 11 of EIS) aligned with the broader decrease in housing prices in the Hunter and across the state (Tew, 2019).

5.1.2.4 Impacts on surroundings

Impacts on Public Safety and Security

A new theme that emerged during the collation and analysis of submissions related to impacts to public safety and security in relation to final voids was raised in four submissions. According to the SIA Guideline (DPIE, 2017), public safety and security impacts fall under the social impact category surroundings.

Submitter ID S-120620

"The fact there is going only one final void which will be a pit lake is a concern for the environment in relation to the impacts on the water network, but no-where is there in the report on the cumulative impacts of final voids in the hunter region and the management of these voids in the future when mining is completed, the cost of monitoring, the cost of rehabilitation which will be required over the existence through erosion and environmental forces, the maintenance of fencing for the protection of human and fauna to enter the void related to health and safety. There is no report of the land value of the final void in the landform and the strategies for the use of the final void and the surrounding landform or how they the proponent is going to ensure the area would become enterprise for employment in the future."

There will be no additional void as a result of the Project relative to current approved operations. Consistent with the approved final landform, the proposed void has been designed with retained highwalls, designed to be stable in the long term. The Project will not affect the range of different final land use options that could be suitable for the Mount Owen Complex. The existing and proposed infrastructure lends itself to a multitude of potential different industrial and agricultural land uses. The void also has the potential to provide viable options (e.g. water storage), and the complex also has potential tourism and recreational uses. Alternative final land uses will be investigated in detail during the development of the Mine Closure Plan.

An investigation into final void options was undertaken as part of the EIS and considered factors such as potential destruction of established rehabilitation, post mining land use options through utilisation of the void and delay in rehabilitation of disturbed land and can be found in Appendix 1 of the EIS.

Further, the management of a self-contained final void is discussed in Section 7.5.1 of the SIA (Appendix 11 of EIS), with no surface spills to downstream watercourses predicted to occur. The Upper Hunter Mining Dialogue (2018) is conducting investigations into possible beneficial land use for communities within the Hunter Valley and will be taking a participatory approach to include community stakeholders in the discussions related to post mining uses for final voids. Research of void use worldwide will contribute to these discussions.

Community Submission

"This project would only worsen the state of the already fragile environment and lead to the destruction of even more Australian homes and families." S-120620

In response to submission S-120620, detailed assessment of the social impacts of the project have been undertaken, with key stakeholders contributing to the identification of social impacts relating to the Project. Social impacts have been assessed on a range of criteria, including impact severity and duration and considers the consequences and likelihood of occurrence of impacts relating to the Project.

Community Submission

"Food and water insecurity as a result of increased frequency, intensity and duration of droughts." S-120663

The impacts of drought across the Hunter Region was discussed in Section 5.4.1 of the SIA (Appendix 11 of EIS), with these issues raised by stakeholders during the consultation program, particularly in discussions around water use and access (Section 6.2.7 and 7.8 of the SIA).

5.1.3 Climate Change and GHG emissions

Issues relating to climate change were raised in 98 community submissions and seven interest group submissions residing in regional areas (5-100km from the Project) as well as the broader community (>100km from the Project). A large majority of objections relating to climate change were from the region of Newcastle (57) and broader areas such as Sydney (25) and appeared to be less of an issue for those communities closer to the Project, with only four submissions received from the Singleton area and no submissions received from those in direct proximity to the Project (under 5 km from the Project). Climate change and greenhouse gas emissions were also frequently raised throughout the SIA.

A detailed Greenhouse Gas and Energy Assessment (GHGEA) was undertaken as part of the EIS and is included in Section 7.13 and Appendix 28 of the Project EIS. As stated in **Section 3.1.1**, a revised GHGEA has been completed and is provided in **Appendix 2**. The GHGEA includes a quantitative assessment of greenhouse gas emissions from the Project and identifies the potential impacts of these emissions on the environment. Additionally, Section 8.3 of the EIS reviews the proposed Project against the principles of ecologically sustainable development (ESD) including intergenerational equity.

5.1.3.1 Project Specific Green house Gas Emissions

Modelling and Alignment with IPCC A2 Emissions Scenario

Community Submission

"The Proponent claims that "the so-called carbon budget approach which is sometimes used by scientists" is not required in this case. Yet, it refers to the NARCliM modelling and claims that the project's expected emissions fit in with the supersed A2 emission scenario (IPCC-SRES, 2010) which is based on a carbon-budget approach and which results in extreme warming of about 3.4 oC by 2100!" S-120847

The above submission suggests that the EIS argues against using a carbon budget approach, while referencing data which is based on a carbon budget approach. The submission also suggests that the A2 emissions scenario is outdated, and the Project aligns with a high emissions trajectory scenario.

The greenhouse gas and energy use assessment (GHGEA) completed for the Project (Appendix 28 of the EIS) is required to assess how the Project's greenhouse gas emissions may impact the environment. The GHGEA states that the Project's primary impact is the accumulation of carbon in carbon sinks. The GHGEA also states that the accumulation of carbon in carbon sinks will drive global warming, sea level rise, climate change and ocean acidification.

The GHGEA provides a description of the climate change impacts forecast for NSW, using regionally scaled data developed by the NSW and ACT Regional Climate Modelling (NARCLiM) Project. The NARCliM projections are based on a mid to high emissions scenario developed by the Intergovernmental Panel on Climate Change (IPCC) (the A2 SRES emissions scenario).

The decision to use the A2 SRES emissions scenario by NARCLiM, and the subsequent assessment included in Appendix 28 of the EIS and revised assessment included in **Appendix 2**, requires some historical context. In 1996 the IPCC was tasked with developing greenhouse gas emission forecasts for the 21st century (2000 – 2100). To manage the significant uncertainty associated with forecasting emissions over such a long time scale, the IPCC developed a set of four narrative scenario "storylines", which described alternative potential global scale developments for the 21st century. Each IPCC storyline reflected a unique combination of greenhouse gas emissions drivers (largely demographic, social, economic, policy and technological change). The IPCC then used a range of different modelling approaches to quantify the impacts of the alternative narrative storylines. The interpretation of the four storylines generated 40 different emission scenarios, which are known as the Special Report on Emissions Scenarios (SRES scenarios). Of the 40 SRES scenarios developed, only six SRES scenarios were regularly used for climate change analysis.

The six commonly used SRES scenarios were:

- A1F1 - assumes rapid economic growth, a mid-century peak in global population, and the rapid introduction of more efficient technologies. Energy technologies are fossil fuel intensive.
- A1T – assumes rapid economic growth, a mid-century peak in global population, and the rapid introduction of more efficient technologies. Energy is sourced from non-fossil fuel sources.
- A1B - A1T – assumes rapid economic growth, a mid-century peak in global population, and the rapid introduction of more efficient technologies. Energy is sourced from both fossil fuel and non-fossil fuel sources.
- A2 - a very heterogeneous world with high population growth, slow economic development and slow technological change.
- B1 - assumes a technologically convergent world (i.e. a globally coordinated response), a mid-century peak in global population, and economic structures geared towards services and information.
- B2 - is oriented toward environmental protection and social equity, and assumes an intermediate growth rate for populations and economies.

The GHGEA acknowledges that the Project is consistent with the A2 SRES emissions scenario, that is, the Project aligns better with the A2 SRES emissions scenario than other alternative SRES scenarios. The A2 SRES emissions scenario is considered to be a reasonable and conservative basis for future climate change projections. The alternative SRES scenarios (A1, B1 and B2), include assumptions which require significant global disruption.

Stating that the Project is consistent with the A2 SRES emissions scenario, does not mean the Project will generate the emission outcomes associated with that scenario. Future emission trajectories will largely be influenced by global scale issues such as, technology, population growth, economic development and greenhouse gas mitigation and carbon polies.

The SRES scenarios considered by NARCLiM have now been superseded by analysis contained in the IPCC 5th assessment report (AR5) (2014). AR5 contains a new set of scenarios, which span a range of radiative forcing scenarios called representative concentration pathways (RCPs). AR5 includes upper (RCP8.5) and lower (RCP2.6) emission scenarios, and two intermediate emission scenarios (RCP4.5 and RCP6). The A2 SRES emissions scenario generates an emission trajectory approximately midway between RCP6 and RCP8.5, however, the A2 SRES scenario is likely to generate radiative forcing outcomes closer to RCP8.5 (worst case emission scenario).

While AR5 has generated a range of new potential emission trajectories, all SRES scenarios (except A1F1) track somewhere between RCP2.6 and RCP8.5 (i.e. the best and worst case AR5 scenarios). The A2 SRES scenario has now been superseded, however, it is still within the range of AR5 RCP scenarios and it still generates a plausible and conservative emissions trajectory. AdaptNSW still supports the NARCLiM climate change projections, and AdaptNSW claims that the NARCLiM projections are "currently the largest and most robust set of dynamically downscaled regional climate projections available for NSW and the ACT".

Much of the submission can be addressed by improving the definition of a carbon budget approach. Appendix 29 of the EIS, a paper prepared by Glencore called Glencore Observations on Recent Climate Change and GHG emissions litigation, discusses climate change and greenhouse gas emissions litigation, including the carbon budget approach, as it was an important concept used during the Rocky Hill Coal Project appeal. This paper defines the carbon budget approach as "the maximum amount of CO2 (i.e. the budget of CO2) that can be released from human sources globally into the atmosphere to limit global warming to a desired level above pre-industrialised levels".

As described in Appendix 29 of the EIS, during the Rocky Hill Coal Project appeal, Professor Steffen illustrated how a carbon budget approach can be developed, and how the approach may inform policy makers. Professor Steffen submitted IPCC modelling, which estimates that the increase in average global temperature will exceed 2°C, if cumulative human emissions2 exceed 790 Gt of CO2. To keep temperature increase below 2°C, the total cumulative human emissions (or carbon budget) must not exceed 790 Gt CO2. Professor Steffen also submitted that cumulative human emissions from 1870 to 2017 were approximately 575 Gt of CO2. The difference between the total carbon budget and emissions to date provides policy makers with an upper guide for future emissions. Using the data provided by Professor Steffen, the carbon budget approach forecasts that the global economy can only emit a further 215 Gt of CO2 (790-575 Gt), before global warming will exceed 2°C. The carbon budget approach provides a useful indicative tool to plan mitigation effort and transformation timescales.

Appendix 29 of the EIS states that the carbon budget approach "is not an approach that is required to be followed under the Paris Agreement, or Australian domestic laws in the context of implementing, or measuring progress towards, achievement of Australia's NDC". Appendix 29 of the EIS states that "it would be inappropriate for the consent authority to either have regard to or apply the "carbon budget" approach in determining the development application for the Project".

The A2 SRES emissions scenario referenced in Appendix 28 of the EIS and **Appendix 2** is not a carbon budget approach. The IPCC defines its SRES scenarios as "alternative images of how the future might unfold and are an appropriate tool with which to analyse how driving forces may influence future emission outcomes and to assess the associated uncertainties. They assist in climate change analysis, including climate modelling and the assessment of impacts, adaptation, and mitigation". The A2 SRES emissions scenario is a family of greenhouse gas emission forecasts, and they do not attempt to identify a cumulative emissions cap to manage global warming.

The GHGEA completed for the Project (Appendix 28 of the EIS) and revised GHGEA provided as **Appendix 2** assesses how the Project's greenhouse gas emissions may impact the environment and this assessment is not, and is to required to be, undertaken using a carbon budget approach. Furthermore, while a carbon budget is a policy and communication tool, which can be useful for raising awareness, scenario planning and driving action, the carbon budget approach is not required to be used by a consent authority during the Project assessment and approvals process.

[2] since 1870

Recommended Concentration Pathways

Community Submission

"IPCC in its Fifth Assessment Report (2013) uses a range of Recommended Concentration Pathways (RCPs) which provide a much wider span of possibilities. For example, RCP 2.6 which represents radiative forcing of 2.6 W/m² by 2100 and a corresponding greenhouse gas concentrations in 2100 equivalent to 490 ppm CO2-e would have been a much more realistic, desirable and necessary target to aim for in this EIS in line with the Paris Accord …Note that RCP2.6 assumes 'aggressive' mitigation strategies that cause global greenhouse gas emissions to start decreasing after about a decade and to reach near zero levels around 60 years from now. This scenario is unlikely to exceed a 2°C increase in global mean temperature since pre-industrial times with at least a 66% chance. Accepting RCP2.6 as a desirable pathway would clearly make this Proposal unacceptable." S-120847

The GHGEA acknowledges that the Project is consistent with the A2 SRES emissions scenario, that is, the Project aligns better with the A2 SRES emissions scenario than other alternative SRES scenarios. The A2 SRES emissions scenario is considered to be a reasonable and conservative basis for future climate change projections. The alternative SRES scenarios (A1, B1 and B2), include assumptions which require significant global disruption.

While AR5 has generated a range of new potential emission trajectories, all SRES scenarios (except A1F1) track somewhere between RCP2.6 and RCP8.5 (i.e. the best and worst case AR5 scenarios). The A2 SRES scenario has now been superseded, however, it is still within the range of AR5 RCP scenarios and it still generates a plausible and conservative emissions trajectory. AdaptNSW still supports the NARCLiM climate change projections, and AdaptNSW claims that the NARCLiM projections are "currently the largest and most robust set of dynamically downscaled regional climate projections available for NSW and the ACT".

Future greenhouse gas emissions generated by RCP2.6 are likely to become the most relevant benchmark of global emissions, once all signatories to the Paris Agreement develop and implement policies that can achieve the targets of the Paris Agreement. The current suite of NDCs are not forecast to generate an emissions trajectory like RCP2.6, or keep global temperature increase to below 2°C by 2100.

5.1.3.2 International, National and State Climate Policy

Community Submissions

"With NSW Government policy being to achieve carbon neutrality by 2050, it is unacceptable to give approval to development that will at least maintain carbon emissions to 2045 and directly contradict the objective of this policy… Similarly, statements made in Appendix 28 Greenhouse Gas and Energy Assessment that "the Project is unlikely to materially increase the national effort required to reach Australia's 2030 greenhouse gas mitigation target", and "in isolation is unlikely to limit Australia achieving its national mitigation targets" are misleading, disingenous and irresponsible. It is inevitable that national mitigation targets and limits on greenhouse gas emissions will increase substantially over the next 25 years." S-120894

"It is not consistent with NSW's climate change policy, the principle of inter-generational equity nor the public interest, as it clearly assumes failure to meet the Paris Agreement temperature goals and worsening climate change impacts for New South Wales. The project would extend mining operations at the site to 2044 – well beyond the date after which coal burning for electricity is supposed to have ceased if we are to meet our climate change goals." S-120902

Doctors for the Environment Australia

"The current international context for this mine is that Australia has signed the Paris accord, agreeing with the international consensus that we should take action to limit global temperature increases to well below 2 degrees Celsius above the pre-industrial mean. The concept of the "Carbon Budget" was developed to express the amount of carbon reserves that, if combusted, humanity must be limited to in order to keep the goal of a 1.5-2 degree temperature rise. The global modern era carbon budget which must not be breached is 790Gt, of which 575Gt have already been released leaving 215 Gt."

International Paris Agreement

Under the Paris Agreement, the Australian Government has committed to reducing GHG emissions by 26 to 28%, on 2005 levels, by 2030 (Commonwealth of Australia, 2015). Australia is obliged to prepare, communicate and maintain a Nationally Determined Contribution (NDC). Australia's NDC prescribes an unconditional economy-wide target to reduce greenhouse gas emissions. Australia's NDC does not contain sector or state based targets, nor does it make any reference to the mining sector.

Glencore has reviewed the Project's forecast GHG emissions inventory and believes that the Project is unlikely to materially increase the national effort required to reach Australia's 2030 GHG mitigation target as a range of measures have been incorporated into the Project's design to minimise GHG emissions and improve energy efficiency, such as limiting the length of material haulage routes to minimise transport distances and associated fuel consumption. As part of implementing the Project, Glencore will continue to seek to mitigate GHG emissions through ongoing energy efficiency initiatives and optimising productivity.

Glencore also notes that the policy framework provides little assistance to the consent authority (and cannot meaningfully guide the task of the consent authority) in determining the development application. The policy framework does not include any objectives capable of being applied by the consent authority in the context of this Project. The policy also does not prescribe the mechanisms by which reductions in GHG emissions are to occur as there are no set prescriptive emission reduction criteria. In addition, there is currently no Government policy prohibiting the approval of new or expanded coal mines. The Project itself does not result in the combustion of the product coal, nor does it drive demand for coal. That is, the global demand for coal will be unaffected by whether or not the Project proceeds.

National Climate Policy

Australia's national climate change policy has a number of components, this includes the Emissions Reduction Fund (ERF) and the Safeguard Mechanism. The ERF provides financial incentive for the deployment of abatement projects in Australia. Under the safeguard mechanism, the Project will be assigned an emissions baseline that it will need to maintain emission levels to. It is only when the mine exceeds this emission baseline that there is any carbon cost incurred and then it is only for the portion of total emissions which exceed the assigned baseline. It should be noted that baselines under the safeguard mechanism are calibrated to align with Australia's national emission reduction target and commitments under the Paris Agreement.

NSW Climate Change Policy Framework

The NSW Government has developed its NSW Climate Change Policy Framework, which aims to deliver net zero emissions by 2050, and a State that is more resilient and responsive to climate change (OEH 2016). Under the NSW Climate Change Policy Framework, NSW has committed to both follow the Paris Agreement and to work to complement national action. The key policy directions under the NSW Climate Change Policy Framework are summarised in **Table 5.2**.

Table 5.2 A Summary of the NSW Climate Change Policy Framework

Policy Direction	Rationale/Goals
Creating an investment environment that manages the emissions reduction transition	Energy will be transformed and investment/job opportunities will be created in emerging industries of advanced energy, transport and carbon farming and environmental services
Boost energy productivity and put downward pressure on energy bills	Boosting energy and resource productivity will help reduce prices and the cost of transitions to net-zero emissions
Grow new industries and capitalise on competitive advantages	Capitalising on the competitive advantage and growth of industries in professional services, advanced energy technology, property management and financial services

Policy Direction	Rationale/Goals
Reduce risks and damage to public and private assets arising from climate change	Embed climate change considerations into asset and risk management as well as support the private sector by providing information and supportive regulatory frameworks for adaptation
Reduce climate change impacts on health and wellbeing	Recognise the increased demand for health and emergency services due to climate change and identify ways to better support more vulnerable communities to health impacts
Manage impacts on natural resources and communities	Coordinate efforts to increase resilience of primary industries and rural communities as climate change impacts water availability, water quality, habitats, weeds and air pollution

The Project is unlikely to affect the objectives of the NSW Climate Change Policy Framework in a material way due to the Project's design inherently minimising GHG emissions from the mining operations, primarily through energy use reduction initiatives and maximising the utilisation of existing infrastructure. In addition, the NSW Climate Change Policy Framework does not set prescriptive emission reduction criteria to be applied by a consent authority in assessing or determining a particular development proposal, nor does it prohibit the approval of new or expanded coal mines.

Glencore continues to work with policy makers and others to promote the development of a least cost pathway to reducing global emissions while at the same time meeting the needs for affordable energy in developing nations. Additionally, Glencore has a demonstrated track record of managing GHG emissions from its mining operations. Since 2010, Glencore's coal business has invested in technology and projects to abate and avoid GHG emissions. Over that period, Glencore has achieved 28Mt CO2e of abated or avoided emissions. Glencore requires all mine sites to report greenhouse gas emissions on an annual basis through the National Greenhouse and Energy Reporting Scheme (NGERS), in accordance with the requirements of *National Greenhouse and Energy Reporting Act 2007*.

5.1.3.3 Scope 3 Greenhouse Gas Emissions

Community Submission

"The assessment does not take responsibility for scope 3 emissions that this project will directly impact. The direction impacts will have environmental damage, which will burden future generations with costs. The project should not be approved until the project demonstrates how they are taking financial responsibility for the environmental damage incurred, rather than just stating that the responsibility of scope 3 project emissions are the responsibility of others." S-120555

Climate Action Newcastle

"While the greenhouse gas accounting framework emissions under The Paris Agreement would ascribe this project as being under Scope 3 "downstream emissions" to be burned in other jurisdictions, Climate Action Newcastle does not accept that the New South Wales government which seeks to profit from this enterprise, should not also take responsibility for the contribution these emissions will make on global heating."

Scope 1 and 2 GHGEs, being emissions that are within the capacity of the applicant to control, have been adequately minimised as far as practicable. After fugitive emissions, diesel and electricity use comprise the main components of Scope 1 and Scope 2 emissions associated with the Project. As is noted in Section 8.3.4 of the EIS, improved efficiencies in diesel use and electricity consumption typically also result in improved costs structures for the operations meaning there are economic drivers to continue to implement measures at the operations which would further reduce these Scope 1 and 2 emissions.

Scope 3 emissions are indirect emissions that are associated with the Project but occur at sources owned or controlled by other entities. The Project's Scope 3 emissions are the Scope 1 emissions of the end users of the coal produced from the Project. The Project's Scope 3 emissions are forecast to be generated by electricity generators and steel manufacturers burning coal in countries such as China, Japan, South Korea and Taiwan, the majority of which are signatories to the Paris Agreement with their own NDCs and domestic policies for reducing the impacts of climate change and GHGEs.

The United Nations Framework Convention on Climate Change (UNFCCC) has a clear accounting framework that states that nations are responsible for their direct emissions not indirect scope 3 emissions which are another nation's emissions. These rules specify that all emissions associated with an activity within a nation's borders count towards that nation's emissions total. This means that emissions associated with Australian exports ('downstream' Scope 3 emissions) are accounted for in importing countries' greenhouse accounts. This approach avoids double counting and promotes complete, global coverage of emissions, as well as transparency, accuracy, and comparability across all countries.

As discussed in Section 3.3.1 of the revised GHGEA, the Project is forecast to generate approximately 6,057,000 t CO2-e of Scope 1 emissions and approximately 458,000 t CO2-e of Scope 2 emissions. The GHGEA also determined that end use consumption of coal products produced by the Project, had the potential to generate approximately 220,424,000 t CO2-e of Scope 3 emissions over the life of the Project (refer to **Appendix 2**).

The Scope 3 emissions will be generated by third parties who transport and consume coal products, and therefore the applicant has very limited ability to control or manage Scope 3 emissions that may be generated by the Project. Scope 2 and 3 emissions were included in the GHGEA for the Project to demonstrate the potential upstream and downstream impacts of the Project. All Scope 2 and 3 emissions identified in the GHGEA are attributable to and will be reported by other sectors. It is both appropriate, and consistent with the overarching international climate change framework, for the Project's Scope 3 emissions to be regulated and reported by the respective export destinations as Scope 1 emissions generated in those countries. Furthermore, improving the certainty of Scope 3 emissions forecasts requires site-based emission factors for every facility that consumes the Project's products. Further, there is an absence of any mechanism agreed by national or State governments to calculate the applicant's contribution to Scope 3 emissions.

The Australian Government has a comprehensive set of policies to track, report and reduce domestic emissions. The NGER scheme, established by the *National Greenhouse and Energy Reporting Act 2007,* is designed to support the Government's international reporting obligations and does not require reporting of Scope 3 emissions. This scheme is consistent with reporting systems in operation in the United States, the European Union and South Korea. Further, in its recent review of the NGER scheme, the Climate Change Authority (CCA) considered a requirement to report scope 3 emissions. The CCA concluded that the challenges and burden of reporting Scope 3 emissions outweigh any benefits, because the accurate estimation of Scope 3 emissions associated with a specific economic activity is inherently complex and uncertain, involving many value chains across multiple economies.

Most of the product coal generated by the Project will be exported to countries who are parties to the Paris Agreement. These countries have, or are in the process of developing domestic laws, policies and measures to mitigate greenhouse gas emissions (to achieve their NDC targets or commensurate climate change policies).

Furthermore, Glencore manages a significant product stewardship and market development program which aims to mitigate the downstream impacts of its products. Glencore supports low-emission coal technology projects via the Australian coal industry's $1 billion COAL21 Fund. Projects supported by this fund include the Callide Oxyfuel project and the Otway Basin Carbon Capture and Storage project. In February 2020, Glencore announced that it projects an approximate 30% reduction in absolute Scope 3 emissions by 2035.

5.1.3.4 Climate Change and Climate Uncertainty

Community Submissions

"With the current fires in NSW, we need to take action on climate change immediately or lose all our indigenous flora and fauna. We also need to increase carbon sequestration to compensate for the release of carbon from the forests burnt. This project will have the opposite effect, increasing the likelihood of more, and bigger fires." S-120639

Port Stephens Greens

"We oppose this development on the grounds that any expansion or extension of fossil fuel use is incompatible with the imperative that we reduce global CO2 emissions. If we are to stand any chance of tackling human induced climate change and its adverse effects on global climate we need to transition out of fossil fuel use as soon a practically possible. To this end many of the countries our coal is exported to are reducing their reliance of imported fossil fuels." S-120931

Glencore acknowledges the accumulation of GHG in the atmosphere is an important driver of climate change. Further, Glencore recognises that climate change has the potential to drive intergenerational issues such as climate risk, loss of biodiversity, loss of natural resources, loss of industry, loss of infrastructure and loss of amenity.

Section 7.13.3.6 of the EIS considers the impact the Project may have on climate change. The Project, in isolation, is unlikely to influence global emission trajectories. The Project is forecast to generate a relatively insignificant proportion of global emissions, and future global emission trajectories will largely be influenced by global scale issues such as technology, population growth and greenhouse gas policy.

The Glencore Code of Conduct specifically requires ongoing consideration of GHG emissions and energy use. In accordance with the Glencore Code of Conduct, Glencore acknowledges the increasing societal and regulatory pressure to reduce carbon emissions to address climate change. Glencore works proactively to manage their energy and carbon footprint and support the development of low emission technologies.

5.1.3.5 Intergenerational Equity and Ecologically Sustainable Development

Community Submissions

"the inter-generational equity issue should be given the weight that is deserved so that young Australians can be guaranteed a future where air, water and land resources have not been further degraded but rather have been actively restored." S-120889

"The very nature of the proposal fails to "facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making". Extension of mining including extraction of an additional 140 million tonnes of ROM coal until 2044 at an increased rate of 10 million tonnes per annum is so directly appose to the intention of the objects it is laughable.' S-120631

Lock the Gate Alliance

"This state cannot afford to participate in pushing the world beyond 2°C and has a clear interest in working cooperatively to prevent warming over 1.5°C. We urge the Department to refuse this project and work with the proponent and the people of the Hunter Valley on a plan for the future of the region beyond coal."

Section 7.16.8 of the EIS discusses intergenerational equity and outlines the objectives of the Project that relate to intergenerational equity. Glencore acknowledges that greenhouse gas emissions associated with coal combustion, and the established links to climate change, may generate environmental impacts across generations. However, as discussed in the GHGEA, the Project, in isolation, is unlikely to materially influence global emission trajectories with future emission trajectories largely influenced by global scale issues such as technology, population growth and GHG mitigation policy. Irrespective of future policy options, high calorific value (high energy)/ low ash coal, such as that produced by the Project, is predicted to remain in high demand and will form part of any transition away from coal towards other, lower greenhouse gas intensive energy sources.

The principles of intergenerational equity are also addressed by the proposed final land use options through the identification of the land characteristics which would be consistent with sustainable operations of the proposed land uses and the extent to which these beneficial land characteristics or values are present or could be present at the Mount Owen Complex as mine closure and rehabilitation proceed, and into the future.

Analysis of potential final land uses was completed as part of the EIS (refer to Section 7.9.5) which considered the viability of each option in relation to the context of the proposed final landform for the Project. The options presented as part of this analysis provide a range of opportunities for a variety of potential land uses, given the extensive infrastructure and accessibility of the Mount Owen Complex. The presence of the void and associated pit lake is considered to provide significant opportunities for high value (and high employment generating) land use options providing economic diversity into the future beyond mining. Whether or not the void is directly used as an asset as part of the final land use (e.g. pumped hydro electricity generation, extreme recreation activities, aquaculture etc.), the existence of the voids should not constrain the range of potential land uses, provided appropriate access, landform stability and safety considerations are in place.

The proposed final land uses for the site are consistent with the objectives of each of the local and regional strategic planning instruments in that it increases the land area identified for ecological restoration and will significantly enhance regional biodiversity linkages. Importantly, the site also provides a number of opportunities for alternative land uses with employment opportunities which can occur concurrently with the proposed biodiversity outcomes. The final land use strategy will be developed as part of the mine closure process and will consider alignment with local strategic planning instruments, provision of a sustainable future for the community, utilisation of existing infrastructure and ecological rehabilitation requirements.

Furthermore, a range of environmental management and mitigation measures (discussed in Section 7.0 of the EIS) have been developed and evaluated to minimise the Project's impact on the environment as far as practicable. The design of the Project and commitment to the management of environmental issues as outlined in this EIS, will assist to maintain the health, diversity and productivity of the environment for future generations. Glencore believes the Project has the potential to assist in addressing intergenerational issues such as economic growth, infrastructure investment and regional development. The Project will generate significant economic benefits for both the State and local region which is expected to contribute to the wealth of both current and future generations. Intergenerational equity has also been addressed through maximising efficiency of the coal resource recovery and productivity on an existing brownfield site, utilising the existing Mount Owen CHPP and associated infrastructure providing further efficiencies.

5.1.3.6 Transition to Renewables and Alternative Economies

Community Submissions

"The future is renewable energy. The sooner we start investing in renewable power and training people for these industries, the better off Australia and Australians will be. Stop coal." S-121188

Singleton Shire Healthy Environment Group

"The mine will create further jobs in an industry the long-term future of which is increasingly becoming uncertain… should be encouraging employment towards those sectors that represent the future and not the past and which will provide workers with a sense of community pride rather than making them feel, through no fault of their own, like pariahs."

As discussed in Section 4.4.2.2 of the EIS, the NSW Government has developed a strategic long-term plan for guiding land use planning decisions for the Hunter Region until 2036 (Hunter Regional Plan 2036, DPE 2016). The plan acknowledges that coal mining will remain significant in the Hunter Region, as it is one of the mainstays of the economy. Coal has contributed to driving investment in transport and energy infrastructure in the Upper Hunter, and it will "continue to underpin the growth and diversification of the Hunter's economy and employment base" (DPE, 2016).

It is important to remember that minerals, including coal are part of our everyday life, not just electricity but also the many essential services like public transport and electronic devices we rely on. The building blocks and materials for renewable energy production come from mining and minerals, including coal. We acknowledge that it is necessary to transition towards a low emission future however this transition is unlikely to be uniform across global economies.

Glencore recognises that over the next 20 years the percentage of the global primary energy mix supplied by coal is likely to decline. Subject to timing of granting development consent, the Project would extend the life of mining operations at Glendell to approximately 2044. As the Project meets an existing and future demand and fits within Glencore's committed international production cap and the NSW Government's strategic regional plan for the Hunter region, Glencore considers that the development of the Project is currently aligned with the global energy market.

Coal remains one of the cheapest forms of energy and, while some countries are moving away from coal generated power production, industrialisation and urbanisation of developing economies, particularly in Asia, will continue to drive growth in global energy needs. Coal is expected to continue to be a key input to industrial processes as a competitive, safe, secure and reliable baseload source of energy for this time horizon.

Glencore is committed to sustainably sourcing commodities that are used in processes and products every day. Glencore supports and produces the minerals that go into renewable energy as well as providing coal which is the foundation for baseload energy in many developed and developing economies. Glencore also participates and supports a range of low emission technology initiatives that seek to reduce greenhouse gas emissions from mining operations and provide a pathway to reduce emissions from the use of its products. Glencore has also completed a number of research projects related to low emission technologies, including the Callide Oxyfuel Project, Carbon Transport Storage Company (CTSCo), direct injection coal engines, biochar, nanotechnology, chemical looping and membrane research for power station applications. Glencore is also a foundation member of the International Energy Centre with a number of Australian Universities which offers a Masters of Energy Studies.

Analysis of potential final land uses was completed as part of the EIS (refer to Section 7.9.5) which included opportunities to explore alternative land uses such as renewable energy production (pumped hydro electricity generation, solar farm etc). The post mining land use will be further developed as part of the closure planning process where additional review and consideration will be undertaken closer to mine closure and will be dependent on demand and technology available at the time.

5.1.4 Heritage

Sixty submissions were received relating to heritage. Of these heritage related submissions, there were nineteen objecting, eleven providing comment and thirty supporting submissions.

In addition to these submissions received, the relocation of the Ravensworth Homestead was also frequently raised during the SIA engagement program during the EIS preparation phase with stakeholders expressing a keen desire to see the history and heritage of the Homestead preserved.

As discussed in **Section 2.3.2**, nine submissions providing comment on heritage aspects of the Project were received, eight of which were in support of the relocation of Ravensworth Homestead to Broke largely due to community and economic benefits, and one comment submission was in support of the relocation of the Ravensworth Homestead to the Ravensworth Farm option which is focused on retaining the heritage values by relocating on the original Bowman land grant. However, one comment submission also questioned the financial cost of moving the homestead and its benefit.

Submissions in support of the relocation of the Ravensworth Homestead are discussed in **Section 2.3.3**. These supporting submissions referenced the importance of continued maintenance of the homestead, suggesting that if not relocated this may result in structural deterioration and damage. This view was consistent with the outcomes of SIA consultations, where 69% of stakeholders were concerned that if not relocated, the homestead may deteriorate like other buildings in the area (Appendix 11 of EIS).

29 supporting submissions received stated their support for the relocation of Ravensworth Homestead to Broke. All of these submissions were received from areas categorised as regional, which included Broke. The preference for the relocation of the Ravensworth Homestead to Broke centred around the ability of the Broke community to use and maintain the buildings, preserving the homestead as a historical landmark. Tourism opportunities were also identified as a prominent reason for the relocation to Broke given that the area is well frequented by tourists to the Hunter Valley.

Concerns raised in 12 objecting submissions related to Aboriginal heritage associated with the Ravensworth Homestead, including the location being a potential previous site of conflict and interactions between early settlers and Aboriginal people and objection to the removal of the Ravensworth Homestead due to its significance resulting in significant loss of heritage, including sense of place. Several objections also described the perceived loss of local community heritage, should relocation occur outside the Ravensworth community. Responses and examples of these objecting submissions are provided in the following sections.

As discussed in **Section 1.0**, at the time of preparation of this Part A report, ongoing consultation and assessment work is being undertaken to respond to the issues raised in relation to Heritage. This additional work is being undertaken to inform Glencore's response to the Plains Clans of the Wonnarua People (PCWP) submission and community submission (submitter ID S-121212). For this reason, responses to these submissions have not been provided in this Part A report. A separate Part B report will be provided following completion of this additional work and submitted to DPIE separately.

5.1.4.1 Ravensworth Homestead

Sixteen submissions received raised the significance of Ravensworth Homestead and their objection to its removal.

Relocation of Ravensworth Homestead and its Significance

Community Submissions

"Removing an extremely significant European heritage item contradicts the object "to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)," S-120631

"The conservation of local history has been ignored. Ravensworth homestead should not be relocated." S-120671

"Additionally the impacts to the Ravensworth homestead complex are unacceptable. The loss of place and context cannot be offset" S-120718

"The other option to relocate in another area owned by Glencore in the Ravensworth district would also remove the heritage value and more importantly the loss of place as referred to by Lucas Stapleton Johnson and the basic tenant of the Burra charter in the conservation of Australian Heritage. The Glencore option in the Ravensworth Area has the potential of exposure related to environmental damage due to rainfall events" S-120750

"The Ravensworth Homestead Complex is an important Heritage Site and archaeological landscape and should not be removed, as it is both of State and Local significance, according to Appendix 23, the Heritage Assessment, and the Burra Charter suggests it is a bad idea. It is already listed under the Singleton LEP 2013." S-121073

Interest Group Submission – EcoNetwork Port Stephens

"Relocating the Ravensworth Homestead is problematic for a number of reasons. There simply aren't that many buildings dating from the early 19th century and it is classed as having "State Significant Heritage Value". This property was also a significant site in the "frontier wars", with local Indigenous people massacred by settlers."

Interest Group Submission – Hunter Environment Lobby

"Relocating the Ravensworth Homestead is problematic for a number of reasons. There simply aren't that many buildings dating from the early 19th century and it is classed as having "State Significant Heritage Value". This property was also a significant site in the "frontier wars", with local Indigenous people being slaughtered when they resisted white people taking what was theirs. When the coal industry finally withers, regional Australia will need every tourist attraction it can find to get people to visit and pump money into their community."

Interest Group Submission - Singleton Shire Healthy Environment Group

"Suffice to say with our Focus on Residents Health – here as Sense of Place; that is: - "Ravensworth Homestead Estate is uniquely significant in its four Cultural Heritage Entities; namely, Aboriginal, Colonial, Convict and Emigrants Heritage"."

Extensive heritage studies, including archaeological studies and historical research have been undertaken to allow for a detailed understanding of the property and building group in terms of social history, historical land use and landscape, archaeology, architecture, structural and engineering assessments, land tenure and early interactions between Aboriginal people and colonial settlers. A Statement of Significance, prepared by Lucas Stapleton Johnson (LSJ), indicates that several component features of the Ravensworth Homestead Complex are of Exceptional Significance (Appendix 23a of the EIS) including the archaeological remains relating to the convict era, the spatial arrangement of the Homestead Complex building group, the "H" plan homestead layout and the stonework and timber rafters of the buildings. The Statement of Significance concludes that the archaeological landscape, sites and material culture of parts of the Core Estate Lands and Ravensworth Homestead Complex are of both State and local significance.

As described in Section 7.8.6 of the EIS, in recognition of this significance, in the context of the Project, and combined with other factors detailed further in the Ravensworth Homestead Relocation Justification Report (Appendix 23e of the EIS), Glencore is proposing to relocate the Ravensworth Homestead Complex to a new site. The relocation is required to allow recovery of the underlying coal resource which will provide substantial benefits to the State and Federal Governments as well as direct and indirect local and regional economic benefits to the community.

The Australia ICOMOS Burra Charter (2013), Article 9 (Location) states:

> *'Relocation is generally unacceptable unless this is the sole practical means of ensuring its survival.'*

In light of the principles within the Burra Charter, other heritage conservation philosophies, and given the heritage significance of the Homestead buildings, the relocation of the Homestead is considered a mitigation measure that substantially retains those key heritage values as much as possible with a focus on recreating the Homestead in the most appropriate manner for a future useful life. Other options such as demolition were not considered appropriate and if the Homestead buildings are not relocated the mine is not able to be developed. An additional mitigation measure includes detailed investigation, recording and salvage of the archaeological deposits to be undertaken as part of the relocation proposal.

Ability to relocate Ravensworth Homestead

Community Submissions

"We object to the relocating of Ravensworth Homestead simply because of its history. So much history and a mine is just going to move a 100 year old homestead made of sandstone, how is that even possible to move that." S-121078

"Glencore's options related to relocations of homestead to either Broke or another place in the Ravensworth area on Glencore land, would remove the heritage value of the Ravensworth Homestead Complex and the possibility of causing extreme harm to the buildings themselves." S-120750

As described in Section 7.8.6.4 of the EIS, two methods for relocating the buildings have been considered being: Option 1 - moving the buildings wholly intact (or in large intact sections), or Option 2 - dismantling and rebuilding the buildings at a new recipient site. A summary of each methodology is provided in **Table 5.3** below and further details on the move methodologies are contained In Appendix 23f, 23g and 23h of the EIS.

Table 5.3 Methods of Building Relocation

Option	Method
Intact Move (refer Appendix 23g for detailed move methodology prepared by specialist move contractor)	Involves the relocation of the buildings wholly intact (or in large intact sections) and requires pre-mobilisation works, design and foundation engineering, excavation of the buildings, placement of steel beams, and jacking and transferring the building onto dollies for transfer to the recipient site. This move methodology has minimal impact on the heritage fabric of the building. Detailed investigations completed by a specialist building relocation contractor have confirmed that the buildings are able to be moved in this manner with evidence of successful projects for relocation of buildings of similar construction worldwide. Relocation will require a road corridor that is sufficiently wide enough with appropriate grade to enable the weight and size of each building unit to be transported. Constraints in the existing public road network (width, grade, fixed infrastructure, duration of road occupancy) limit the distance over which the buildings can be transported and subsequent recipient site options. Generally, the larger the building (or building section), the shorter the viable distance is that can be travelled.

Option	Method
	The Project heritage architects, Lucas Stapleton Johnson, and heritage structural engineers Mott MacDonald, have scrutinised the intact move methodology of the specialist move contractor and are satisfied that the buildings could successfully be relocated without damage.
Dismantle and Rebuild (refer Appendix 23h for move methodology prepared by heritage contractor)	Involves the dismantling of the Homestead, transport and rebuilding at the recipient site. Some components such as roof trusses could be moved intact. The dismantle and rebuild method for moving the buildings negates the road network constraints that restrict the intact move methodology and allows for the buildings to be moved to recipient sites further afield (within economic and environmental constraints). Dismantling has a greater impact on the heritage fabric than an intact move, however would enable the buildings to be positioned in a location that allows greater community access and would also allow the buildings to be repurposed to form a facility that meets a community need. The dismantle and rebuild approach has been used to relocate many buildings successfully worldwide with established methods and processes available and contractors with experience in completing this work in Australia.

As described in Section 7.8.7 of the EIS, detailed investigations of eleven potential recipient sites and two relocation methods were undertaken to determine the two proposed relocation options (Ravensworth Farm option and Broke option) for the Ravensworth Homestead. Assessment of each of the proposed options considered key matters such as land zoning, cultural heritage, planning constraints and hazards (e.g. flood prone areas and bushfire). These detailed assessments determined the method of relocation chosen for each option. Appendix 23f of the EIS contains the detailed assessment of relocation option identification, assessment and selection process.

The Ravensworth Farm relocation option involves the intact relocation of Ravensworth Homestead using specialist moving equipment. The intact relocation of the buildings is considered the most sympathetic to the heritage significance of the buildings and would maximise the retention of the existing heritage fabric. The buildings would be transported along a purpose-built road of sufficient width to accommodate the relocation of the Main House and Kitchen Wing as whole buildings. Refer to Appendix 23g of the EIS for the detailed move methodology for the intact relocation of the buildings to the recipient site.

The Broke relocation option involves a dismantle and rebuild methodology. This methodology involves the dismantling of the Homestead buildings and relocation to Broke where the buildings would be rebuilt. A detailed dismantle and rebuild methodology is provided in Appendix 23h of the EIS.

Ravensworth Homestead Recipient Site Approval

One community submission raised the approval process for the chosen recipient site for the relocated Ravensworth Homestead.

Community Submissions

"No approval to remove and relocate Ravensworth Homestead should be given without an alternative site and approval already in place. This is a key matter in the determination of the application and the mine extension should not be given approval if the future of the Ravensworth Homestead remains unresolved or is subject to a consent condition or further approval." S-120894

As described in Section 5.2.1.2 of the EIS, approval is sought as part of this SSD application to relocate the Homestead on the basis that relocation will be either locally to Ravensworth Farm (Option 1) or alternatively to Broke Village (Option 2). In the event that relocation to Ravensworth Farm is approved by the consent authority, then approval for this relocation option would be included as part of the SSD development consent and would require no further statutory approvals as the Ravensworth Farm site is included in the Project area and all necessary environmental assessments for this option have been completed as part of the current SSD application.

In the event that Broke Village is approved by the consent authority then additional processes including land tenure needs to be agreed for the proposed location or an alternative location, and further secondary approvals for the reconstruction and use of the Homestead in this location will be required to be obtained. Based on the proposed mining schedule for the Project, all requisite statutory approvals for Option 2 are required to be obtained by the end of Year 2 of the Project. If the requisite approvals cannot be obtained within two years of commencement of development under the SSD development consent, then the Homestead will be relocated to the Ravensworth Farm (Option 1). The relocation and use of the Homestead at the Ravensworth Farm is therefore part of the development being assessed under the SSD development so that (assuming the Project is approved) relocation to the Ravensworth Farm location can occur if the Broke option is not available and fully approved within two years of commencement of the SSD. This approval pathway is summarised in **Figure 5.3**.

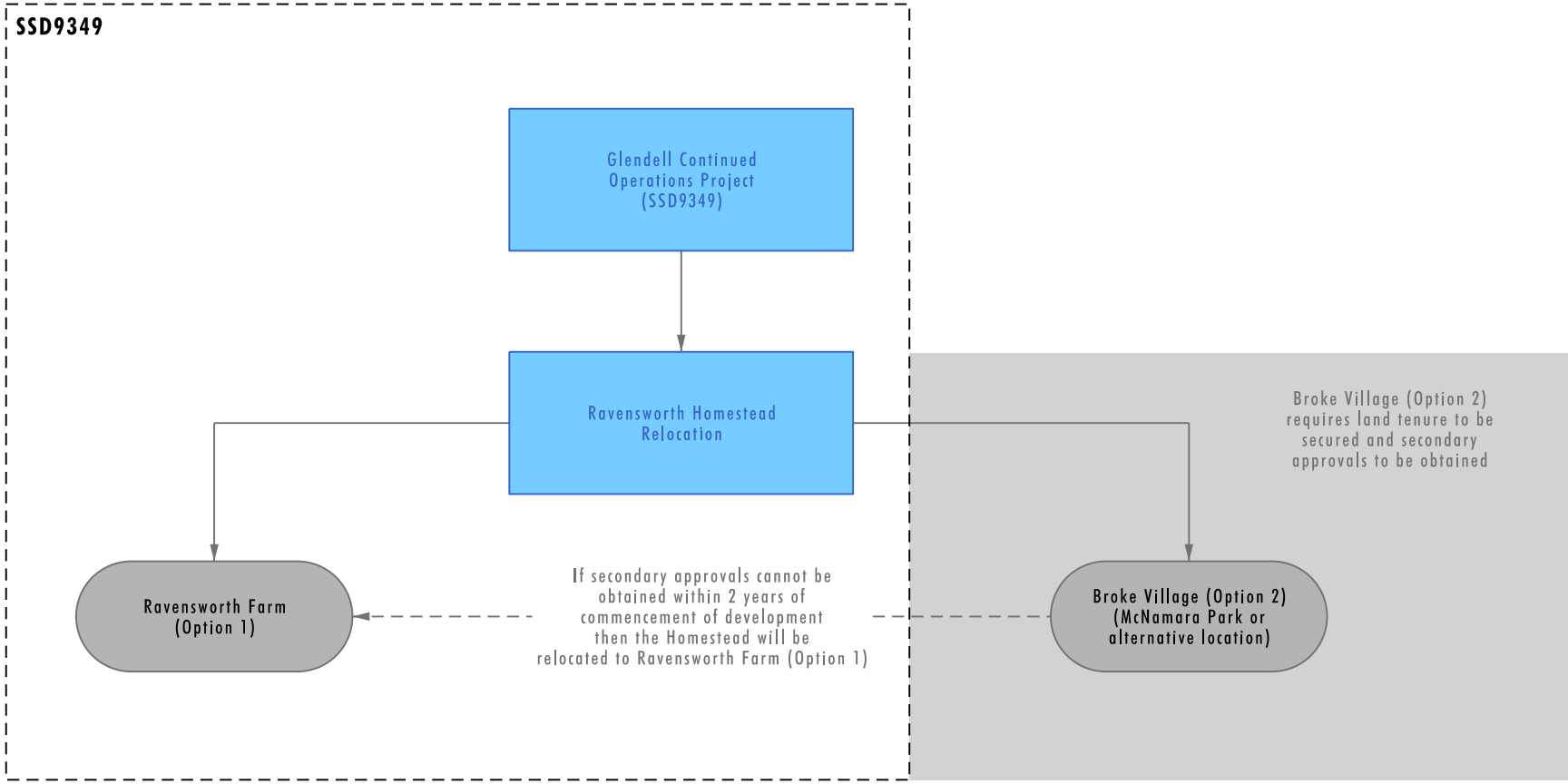


FIGURE 5.3

Ravensworth Homestead
Relocation Approvals Process

Ravensworth Homestead Relocation Options

Community Submissions

"The option of Broke would mean that the homestead could not be called Ravensworth Homestead complex as it is not located in the Ravensworth region but become just a building of no significance of heritage to local area."

"The other option to relocate in another area owned by Glencore in the Ravensworth district would also remove the heritage value and more importantly the loss of place as referred to by Lucas Stapleton Johnson and the basic tenant of the Burra charter in the conservation of Australian Heritage. The Glencore option in the Ravensworth Area has the potential of exposure related to environmental damage due to rainfall events." S-120750

As described in Section 7.8.7.2 of the EIS, the Broke relocation option's main focus is providing a useful ongoing life for the relocated building group through adaptive reuse in a location where they are publicly accessible and can provide an ongoing community benefit. The chosen location selected is appropriately positioned within Broke for the relocated buildings to function as the village square and provide a focal point for tourist driven opportunities including monthly and annual community events (Smoke in Broke, Broke Village Fair, Broke Community Markets). This outcome will provide lower preservation of heritage values, however, provides greater community benefits with a higher level of public accessibility. In recognition of the heritage significance of the buildings, the proposed concept is to relocate all the buildings to the new site in a configuration that is similar to their current configuration.

The Ravensworth Farm option is addressed in Section 7.8.7.1 of the EIS. The Ravensworth Farm relocation option has a strong focus on replicating the physical characteristics of the existing homestead site in order to maintain verisimilitude (the appearance of authenticity). This option will place all the buildings on land with a similar landscape and outlook to the current homestead site and will maximise the retention of building fabric and heritage values including the building complex layout. This option places an emphasis on conserving heritage significance by salvaging significant heritage features, to be achieved by moving the buildings wholly intact to a site situated on the original Bowman '10,000 acre' land grant in Ravensworth and replicating existing site features (approach direction, key historic garden features, landform, visual catchment) at the recipient site.

Undermining the Ravensworth Homestead

Community Submission

"To mine under the homestead is definite no, it is well known that land that has been exposed to underground mining eventually settles and the buildings will collapse." S-120795

No underground mining is proposed as part of the Project. The Project is an extension of the existing open cut operations at Glendell Mine. In addition, the existing geology makes underground mining not viable.

Colonial and Convict Cultural Heritage

Interest Group Submission - Singleton Shire Healthy Environment Group

"SSHEG in responding (Att. 6) to the earlier Mount Owen Continuation Operations Project 5850 on 17 Feb 2018 confirms that the then Historic Heritage Assessment Appendix 14 Section 4.4.1 of the Hunter Region Colonial Homesteads was more accurately provided in line with accepted Colonial Heritage Practices, as illustrated. This challenges the Glendell EIS credence, raising the question of bias, accuracy, suitable omissions, or apportioning claims which distorts outcomes.

The then clear Mining Company declarations of the State Significance of both Wambo and Ravensworth Homesteads with their long-recognised Heritage Significance by Authorities since 1997 and 2007 is self-evident in these Illustrations.

This also confirms our documented view that Patricks Plains Shire Cultural Heritage State Significance has not been the focus of successive Singleton Councils to date; this inaction on Patricks Plains Heritage Conservation is in contrast to the same way neighbouring Councils have embraced these aspects of Landscape Conservation and for Tourism Opportunities. (Refer Attachment 7 for details)

Of the Nine State Significant Homesteads Complexes identified in 1982 Sheedy, Wambo Homestead Estate has a Permanent Conservation Heritage Order of 1982, but this did not prevent Glencore to attempt to move this obstacle to Mining. Glencore however see an opportunity to swoop at Ravensworth Homestead Estate where on the surface it would appear that the only obstacle to mining is the Local LEP Heritage Protection controlled by the current Pro Mining Singleton Council."

Glencore were not associated with the proposed mining activities affecting the Wambo Homestead. This was a different mining company.

The more recent publication titled *A comparative Heritage Study of pre 1850s Homestead Complexes in the Hunter Region* (OEH, 2013), which included a review of the Ravensworth Homestead, was prepared for the NSW Heritage Council by the same heritage consultants who have prepared the Heritage Impact Assessment and Statement of Significance for the Ravensworth Homestead for the Glendell EIS. Other heritage specialists who contributed to the Heritage Impact Assessment for the Project are also highly regarded specialists in their fields of archaeology (both Aboriginal and European including convict era), heritage landscapes, heritage gardens and the history of Aboriginal/Settler conflict of the early 19th century.

Bowmans Garden

Interest Group Submission - Singleton Shire Healthy Environment Group

"Significance of Dr James Bowman's son James Bowman, 8 Acre Garden and the "creek Colonial Heritage Significance" has not been adequately detailed, map located, or Archival Research documented in the Glendell EIS."

Highly respected heritage planning and architectural specialists Lucas Stapleton Johnson (LSJ) and Geoffrey Britton prepared a detailed Heritage Analysis and Statement of Significance (Appendix 23a of the EIS) and Statement of Heritage Impact (Appendix 23d of the EIS) which included detailed analysis of the "8-acre Garden". The Heritage Analysis and Statement of Significance provides detailed history, physical evidence and analysis, as well as statement of significance of the 8-acre garden being of 'Exceptional' significance.

The 8-acre garden was also assessed in Casey and Lowe's Historic Archaeological Test Excavation Report and Impact Statement for the Core Estate Lands (Appendix 23c of the EIS) which found that the garden had 'Low' archaeological potential. Specific archaeological mitigation measures were provided as part of Casey and Lowe's assessment, focusing on areas within the Core Estate Lands, including the 8-acre garden, provided in Table 7.45 of the EIS. The specific mitigation measures in relation to the 8-acre garden have been extracted and reproduced in the below table. These mitigation measures are proposed as part of the Project approval.

Table 5.4 Archaeological Impact and Specific Mitigation Measures for the 8 Acre Garden

Archaeological Program Area	Impact of the Project	Specific Mitigation Measure
B -8 Acre Garden (Landscape Group 4)	High – all archaeology, State and Local, will be removed as a result of the Project.	Prior to any ground disturbance: a) Targeted open area stratigraphic excavation – archaeological salvage and archaeological sampling - machine and hand excavation.

Archaeological Program Area	Impact of the Project	Specific Mitigation Measure
		b) The remainder of Area B not subjected to targeted open area stratigraphic excavation would be managed through the unexpected finds protocol if deemed appropriate, by the archaeologist, at the end of the investigation.

Further detail on the 8-acre garden and the assessment of its significance is provided in Section 7.8, Appendix 23a and 23c of the EIS.

DPIE Requests relating to Heritage Assessments

Interest Group Submission - Singleton Shire Healthy Environment Group

'Many other hearsay and newspaper reports need to be substantiated with Archival Copy images rather than references or partial quotes. This is a key issue to be considered in relation to the veracity of Heritage Reports used and referenced in the Ravensworth Estate Cultural Heritage EIS Documents. One glaring example Quote is in Appendix 23h page 25 that dates John Blaxland in 1818 ahead of the Howe 1820 Explorers. Similarly, page 8 EIS dated John Howe reached the Hunter River in November 1818 not November 1819 at Jerrys Plains region as he recorded. Modern unresearched and Non-Archivally substantiated documents often used by Mining are not only misleading but can be mischievous when used unwittingly by Locals and especially Authorities with Approval Decision Making Authority. While an obvious error it would be prudent for Department of Planning to insist upon an Independent Peer Heritage Review of these EIS Documents especially for documents in the period of Dr James Bowman's ownership from his earliest approaches in England prior to arrival, the 1820's Grant through to the Estate subdivision into farmlets in the 1900's.'

This is a matter for DPIE.

Interest Group Submission - Singleton Shire Healthy Environment Group

'In view of the recent Wambo Homestead and now the Ravensworth Homestead Mining Proposals, it is appropriate that Historic Heritage Conditions of Consent should apply and be enacted across all Glencore Mine Operations similar to those which apply to RIO/Yancoal Mine Operations 26 Nov 2015 Approvals. This includes a Open access Community Group.'

Glencore's Development Consents for mining activities in the Hunter Valley require the preparation of a Heritage Management Plan (HMP) in consultation with relevant stakeholders (usually Council) and to the satisfaction of DPIE, in addition to any specific heritage related conditions. The HMP's outline how heritage matters must be managed including recording, maintenance and monitoring. Compliance with HMP's is reported annually and audited every three years.

Further, Appendix 5 of the EIS includes a detailed list of commitments related to heritage. These commitments were developed following the outcomes of the detailed assessments undertaken by the heritage specialists for the Project. Glencore is of the view that the extent of these commitments is commensurate with the level of impact resulting from the Project.

5.1.4.2 Aboriginal Heritage and Historical events related to Ravensworth Estate

Objections relating to the relocation of the Ravensworth Homestead from its original position were received in regard to the potential loss of Indigenous cultural heritage. Submissions received outlined the hostile interactions that had occurred between European and Indigenous people in and around the Ravensworth Homestead during the early 19th Century. These hostile interactions were also considered within Section 6.2.2.2 of the SIA (Appendix 11 of EIS), where community values associated with the Ravensworth Homestead were discussed.

Responses and examples of submissions raising these issues are provided below.

Interactions between Aboriginal people and early settlers

Community Submissions

"In relation to Ravensworth estate there is clearly documented reports of hostility between indigenous and the Europeans which resulted in the death. There is also report of hostility in the Lillian Noble story of the Glennies Creek area which resulted in deaths of Europeans and the indigenous people.

So therefore the Ravensworth Estate has been exposed to hostile interactions between two cultures which resulted in loss of life but these interactions rely on the written word of the media of the time and reports documented by the law authority or educated people to record the time of the events or their perception of what happened but there is always doubt that prevails of the numbers which were lost related to the hostility or the case of not reporting a death of an indigenous. As previously discussed, we dont know where Dr Bowman is laid to rest so there is reasonable doubt related to the number of incidents and the number of deaths resulted related to hostile interactions and the actual initiator." S-120750

"With a view to be able to seek further opportunity to articulate my reasoning and professional viewpoint that the Ravensworth Homestead and its surround is of National Aboriginal and Historic Heritage significance I note the following:

i. Attachment 1 includes pages 69-73 of the 'Beginning and Belonging: The traditional, historical and contemporary Aboriginal cultural landscape of the Mount Owen Continued Operations area: A plains clans of the Wonnarua Perspective' (Tocomwall, 2013);

ii. This document highlights that

a. The Ravensworth Estate was a focal point of frontier violence in the period 1825-1827.

b. One of these violent offences included the massacre (i.e. the brutal killing and dismemberment of a single individual) at or near the Ravensworth Homestead in 1826.

c. The events that lead to the death of 'Jacky Jacky' and the subsequent Australian precedent setting trial of Lieutenant Howe' arose at the Bowman's Estate.

5. In so far as the history of the Ravenworth Estate is a colonial history it is without doubt intrinsically linked to nationally historic events of immense impact and importance to the PCWP and other Indigenous Australians. This significance; and the importance of maintaining the situation of the Ravensworth Homestead Estate in its current and historical landscape context to reflect this colonial frontier; is not adequately documented, explored and/or addressed within any of the three heritage assessments provided in the Glendell Continued Operations EIS." S-121212

Interest Group Submission: EcoNetwork Port Stephens

"Relocating the Ravensworth Homestead is problematic for a number of reasons. There simply aren't that many buildings dating from the early 19th century and it is classed as having "State Significant Heritage Value". This property was also a significant site in the "frontier wars", with local Indigenous people massacred by settlers."

Interest Group Submission: Lock the Gate Alliance

"We are concerned about the conflicting information about the massacre site at Ravensworth estate and are not satisfied that the proponent has addressed this issue adequately. Evidence of a massacre at Ravensworth has been furnished and it is not appropriate for the proponent to dismiss this issue. We urge the Department to independently investigate and to accept the evidence being presented by Wonnarua people about the history of the site"

As described in Section 7.8.3.3, Appendix 22 and Appendix 23a of the EIS, an extensive body of research has been undertaken in relation to early interactions between Aboriginal people and early settlers by Dr Mark Dunn to inform the heritage assessment and investigate evidence of a reputed massacre of Aboriginal people thought to have occurred somewhere near Ravensworth. This work is contained in Section 2.3.3 of the HASS (refer to Appendix 23a of the EIS) and Section 11.6 of the ACHAR (refer to Appendix 22 of the EIS). Tensions between Aboriginal people and settlers had been apparent since the first land grants were made in the Hunter Valley in 1821-22, with attacks on isolated huts, fencing parties and raids recorded around Wallis Plains (Maitland) and Patricks Plains (Singleton) between 1822 and 1824. Most of the early incidents were concerned with the taking of maize crops with direct contact and violence being a rarity.

Dunn's research found that the most intense period of conflict between settlers and the Aboriginal people in the Upper Hunter valley occurred from 1825 to 1827 with numerous attacks and reprisals occurring, resulting in deaths and injuries being inflicted on both sides. Conflicts occurred widely across the Upper Hunter, including on the Ravensworth Estate, although no historical evidence was found for a reputed massacre having occurred on the Ravensworth Estate. In regards to the massacre event, findings from Dunn's historical research indicated that the massacre occurred at an unknown location situated approximately 20 miles (32 km) from Alcorn's hut on Glennies Creek. This description of the location of the massacre event places the event occurring well beyond Ravensworth and the Ravensworth Estate as stated in Section 7.8.3.3 of the EIS.

For further detail on the interactions between Aboriginal people and early settlers, refer to Section 7.8.3.3, Appendix 22 and Appendix 23 of the EIS.

5.1.5 Socio-economic

As discussed in **Section 2.2.3**, employment and training opportunities, economic livelihood and Glencore's contribution to community investments and partnerships were the main positive themes raised in supporting submissions. Twelve submissions stated that the proposed Project would not provide reliable economic stability for local or regional communities, with issues of climate change frequently noted in this regard. As previously discussed, there was also a desire to see a move towards more renewable and sustainable energy sources. However, these submissions in objection were received from regional and broader submissions, with none received from areas categorised as local.

5.1.5.1 Employment and Training Opportunities

Employment in the mining sector was questioned in six submissions, four of which were submissions from the Newcastle region, one from the Maitland region and one from interstate. Submissions related to the envisaged transition of mining personnel to alternative energy production methods or industry sectors. As described in Section 5.6.1 of the SIA (Appendix 11 of EIS), *The Upper Hunter Economic Diversification Project Action Plan* (NSW Government, 2017) for the Hunter Regional Plan 2036 intends to diversify and grow the energy sector and is set to navigate new employment and business opportunities over the next 20-25 years. The natural capital of the Hunter Valley region was discussed in Table 5.29 of the SIA and outlined the issues and opportunities associated with the resource sector in the Upper Hunter specifically. For example, the potential issue of retaining a resource base for mining, agricultural and energy industries to allow for ongoing opportunities for economic, and hence social, development was mentioned in Table 5.29, with an opportunity identified being that much of the region is underlain by the Hunter coalfield, a world class coal deposit with approximately 60 coal seams containing predominantly high quality thermal coals and lesser quantities of soft coking (steel making) coals.

Community Submissions

"We need to be thinking about creating sustainable jobs for the long term" SE-120739

"The mine will create further jobs in an industry the long-term future of which is increasingly becoming uncertain. As a long-term job security in the industry becomes more precarious, this will at some point cause significant financial detriment to those employed in the industry. In the circumstances rather than encouraging employment in the coal mining industry, the State should be encouraging employment towards those sectors that represent the future and not the past and which will provide workers with a sense of community pride rather than making them feel, through no fault of their own, like pariahs. In the circumstances approval of the project would not promote the social and economic welfare of the community." SE-120856

"Current workforce 199 out of a local workforce of 11,525. Maximum employment would be 600 and include workers from Mt. Owen and Ravensworth East mines when they close. This is not a significant number of workers over a 20 year period. No mention is made of the growing mechanisation and advance in robotics over that period. On what basis can this estimate be credible over a 20 year extended lifetime with advances in technology. The industry focuses on potential technological advances when commenting on emissions connected to climate change but describes employment prospects with confidence." SE-120874

"Yes jobs will be lost as this coal mine reaches the end of its life but our government needs to do some future planning working with miners and helping them move towards other industries offering them opportunities to Re skill." S-120623

"This proposal is not going to produce any new permanent jobs - which is what people actually need." S-121188

Interest Group Submission - Climate Action Newcastle

"Coal-exposed communities such as the Hunter Valley are left vulnerable to the risk of mass unemployment as coal mines become 'stranded assets' and employment in coal jobs drops away. Short-term jobs in coal mining and mining royalties can in no way justify the opportunity cost of mining and the immediate and escalating impacts of global heating. This mine extension poses an unacceptable risk to human safety and life on Earth and must be rejected."

This proposal will provide additional opportunities for employment of construction personnel at the start of the Project and ongoing operational employment opportunities throughout the Project until 2044, which will assist in maintaining local employment levels, underpinning the strength of the local community whilst government introduce initiatives to support the objectives of the Upper Hunter Economic Diversification Project Action Plan (2017). The Project will also contribute to the secondary employment of people in local and regional mining support industries through the monetary investment in procurement of materials and specialist personnel during the life of the Project.

Advances in diesel powered mining equipment design are predicted to continue to improve emissions from diesel powered mining equipment and will be adopted for replacement mining equipment throughout the life of the Project. The use of technology in mining is constantly evolving and Glencore reviews the applicability of these advances during the development and ongoing operation of our mines. Glencore will consider and assess the use of automated equipment at its mining operations on a case by case basis. Our current understanding is that in operations of similar size that are running automated equipment, overall employment numbers have remained similar to those without automated equipment. Additional roles are required to support, maintain and manage automated equipment together with additional personnel to operate loading equipment and ancillary equipment (dozers, graders, etc) required to match the increased productivity of automation. There is also an increase in secondary employment associated with the use of automated equipment through specialised training and support businesses.

5.1.5.2 Lack of Community Benefits

Several submissions (8) also stated that the economic benefits outlined within the EIS and supporting documents were not substantially received by communities.

Community Submission

"In the circumstances approval of the project would not benefit the economic welfare of the community." S-120663

Consistent with the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (DP&E, 2015) the Economic Impact Assessment undertaken for the Project (Appendix 30 of the EIS), contains a local effects analysis (LEA) which assesses the net economic impacts to the local community.

An economic assessment was also conducted as part of the SIA (Appendix 11 of EIS). The technique known as Town Resource Cluster (TRC) explores the socio-economic linkages that exist within communities both proximal and regional to the Project by considering the employee and supplier expenditure relating to the operation.

As stated in the EIS, the Project will provide $333.3 million in government revenue for NSW in NPV terms (not including corporate taxes), the largest component of this being royalties of $296.1 million in NPV terms. The NSW Government has initiative programs to utilise this revenue such as 'Resources for Regions' which has the objective of delivering improved local infrastructure and enhancing economic growth and productivity in mining impacted communities in NSW.

Community Submissions

"As always the EIS states that the benefits from continuing the Glendell Operation far exceed the negative impacts from mining, why should our community and ourselves suffer the negative impacts of mining for the benefit of others, there is a group of seven families living at Middle Falbrook that do not work in the mining industry, we receive no benefit from mining activity but are to accept the impacts of noise and dust on our lives and health." S-120792

"From the 2.2% return deduct the loss of State Revenue from rebate on diesel fuel, once reserved for primary producers, generous rail transport subsidies and huge discounts for electricity usage and the actual return to State Government is insignificant and hopefully not our greatest export earner as claimed by the Government. The ill-informed Singleton Shire Council continue to believe that land development and destruction of the landscape by open-cut mining, leading to the demise of the farming industry, would be salvation of the town of Singleton. This has not been realized as the population of the Shire is in decline and mining company reports indicate that more than 60% of local mine workers live outside of the Singleton LGA; and contribute very little to the economy of the town." S-121068

Both the TRC analysis (Appendix 11 of EIS) and the economic assessment report (Appendix 30 of the EIS) outline that if approved, the project will continue to positively contribute to the local and regional economy.

According to the TRC analysis conducted as part of the SIA (Section 4.3 of Appendix 11 of EIS), 81.5% of Glendell's employees reside within the Hunter Valley (excluding Newcastle) of which 32.3% reside within the Singleton LGA with employee expenditure of approximately $4,258M annually.

As described in Section 7.4.2 of the SIA, at a local government level, within the Singleton LGA, over $400 million was spent in wages and $380 million in local business expenditure, with total input at nearly $780 M. In the Muswellbrook LGA, surveyed mining companies spent over $437 million, including nearly $230 M in wages, and purchases with local businesses totalling nearly $208 million. Refer to Appendix 11 of EIS for further detail.

Given that the Project would prolong the life of the mine for an additional 20 years, the social and economic benefits associated with company, workforce and supplier expenditure are expected to continue for the proposed mine life, with a significant proportion of employment and business opportunities continuing to flow to the surrounding region. These benefits would not occur should the Project not proceed.

5.1.6 Water Resources

Water resource issues were raised in 45 community submissions and four interest group submissions. These submissions largely raised concerns around drawdown associated with the Project, with the majority of the submissions containing the same statement, however, water quality and water use, as well as impact on creeks were also raised. Of these submissions, two were received from landowners in direct proximity to the project, 32 were from regional areas such as Singleton and surrounds and 11 submissions were from broader categorised areas such as Sydney and interstate. Responses to the submissions relating to water resources are provided in the following sections.

During the consultation phases of the EIS/SIA, landholders raised concerns regarding the presence of mining affecting the groundwater systems and future water use. During consultation, communities were experiencing extended drought conditions, exacerbating water concerns and amplifying community fears that the Project would affect landholder water supply. The wider regional community stakeholders consulted, also expressed concerns of potential contamination and affects to the flow of neighbouring water sources.

5.1.6.1 Groundwater

Water Loss/Drawdown

Community Submissions

"The groundwater assessment shows a cumulative drawdown of over 2 metres. This will have a shocking affect. Stress is already being experienced in the area because of water loss." S-120622

"The mine's groundwater assessment shows that dramatic drawdown of the coal seam under the Bowman's Creek alluvium propagates upward into the alluvium and causes drawdown and loss of surface water. This adds to stress already being experienced in the area from other mines, and the groundwater assessment also shows cumulative draw down of over 2 metres in the alluvium during the proposed mining operations." S-120627

"The data shows that the alluvium would be affected by water draw-down as a result of extra mining in this location. The watercourses shown (very clearly in the Aboriginal heritage report also) run right through the additional pit area so as to interrupt natural water flow in the larger context. Water is too valuable for this to be allowed." S-120635

Interest Group Submission – Hunter Environment Lobby

"This project further extends mining in a heavily-mined area, exacerbating air pollution and water loss, as the Doctors for the Environment pointed out. The mine's groundwater assessment shows that dramatic drawdown of the coal seam under the Bowman's Creek alluvium propagates upward into the alluvium and causes drawdown and loss of surface water. This adds to stress already being experienced in the area from other mines, and the groundwater assessment also shows cumulative draw down of over 2 metres in the alluvium during the proposed mining operations."

As discussed in detail in Section 7.5 of the EIS, the Project's additional impacts on the water table in the Bowmans Creek alluvium are limited to the local area around the point of intersection of the Glendell Pit Extension with the alluvium associated with Swamp Creek and Yorks Creek. The Project has a negligible impact on the magnitude of cumulative impacts on drawdown within the Bowmans Creek alluvium outside of this area, with the maximum drawdown due to the Project being less than 1 metre limited to this small area of the Bowmans Creek alluvium. The Project's primary impact being a delay in the recovery of the system in areas close to the Glendell Pit Extension. The predicted drawdown impacts are within the thresholds for minimal impact considerations under the NSW Aquifer Interference Policy.

The Project's incremental impacts are not predicted to have an observable impact on stream flows or riparian vegetation that may be dependent on groundwater. The Project is not predicted to have any observable impact on the availability of water to other water users.

Community Submission

"The groundwater model uses hydraulic property data (refer Appendix B - table B9). These are not site-specific parameters and the model is probably very sensitive to these values (especially for the alluvium). The groundwater model is used to estimate the groundwater take and if the model parameters are not close to what they are in reality, then the water take is likely not correct." S-121192

The Groundwater Model used in the GWIA has been calibrated using hydraulic data from the site and broader area covered by the groundwater model, this includes pump, core and packer tests that determine site and regional specific values that have then been used to calibrate the model to hundreds of water level data observations. Uncertainty analysis has then been undertaken to test the potential changes to the predicted impacts for a range of credible hydraulic properties. This is documented in the groundwater technical appendix (Appendix 16 of the EIS).

The Groundwater model used in the assessment and the overall assessment has been peer reviewed by Dr Noel Merrick.

Consistent with existing operational commitments, every three years the validity of the groundwater model predictions will be assessed by comparing the extraction volumes and groundwater level data against model predictions. If the data indicates significant divergence from the model predictions, an updated groundwater model will be constructed for the simulation of mining.

Community Submission

"Section 7.3 talks about post mining conditions. Modelling shows that the "water level within the final void will slowly recover over a period of approximately 450 years stabilising at approximately -60 mAHD", which is 130m deeper than the natural water level in that area. This means that the groundwater will always be flowing toward the pit void and PERMANENTLY removing that water from the greater groundwater system. Such a long-term impact is not acceptable" S-121192

Mining will inevitably result in some impacts to groundwater systems. The GWIA has quantified the predicted impacts on groundwater systems associated with the Project and assessed these relative to approved operations (i.e incremental impacts due to the Project) and in terms of cumulative impact having regard to all operations in the area covered by the regional groundwater model. The Project is predicted to have some localised impacts on water tables but cumulative groundwater take, particularly from the alluvium, is predicted to reduce from around the time mining is completed as the regional groundwater system recovers.

The particular impacts referred to in the submission relate to impacts on the Permian aquifer systems; these aquifers are not considered to be highly productive due to their low production capacity and elevated salinity levels.

The Project's impacts on groundwater systems are within the minimal impact consideration thresholds prescribed under the NSW Aquifer Interference Policy. Predicted impacts on groundwater and surface water availability are considered to be small and within the available allocation under relevant water sharing plans. The Project is not predicted to have any adverse impacts on groundwater or surface water quality.

Community Submissions

"On the topic of alluvium drawdown in post mining recovery conditions, it is unclear how long it will take the Bowmans Creek to recovery and if it will even fully recover.

The post mining chapter states "the drawdown attributable to the Approved Operations and the Project within the Quaternary alluvium are therefore unlikely to be detectable from seasonal fluctuations and the recovering system." This does not say that there will be NO on-going impacts. The report shows that there will be impact the alluvium groundwater system for greater than 450 years!! This is unacceptable. Also this is just the report impacts from the Project and NOT the cumulative impact of the all of the surrounding mines!" S-121192

The presence of mining voids in the landscape will mean that Bowmans Creek is unlikely to completely return to pre-mining conditions. Figures 3.7, 3.8 and 3.9 of the Assessment of Commonwealth Matters Report (Appendix 10 of the EIS) show the modelled water table levels in 2019, 2046 (end of mining) and 2500 respectively with all impacts of mining (including the Project and approved surrounding operations for 2046 and 2500) modelled. A comparison of these figures shows that water tables within the Bowmans Creek Alluvium have recovered to levels at or above 2019 levels by at least 2500 in all areas except a restricted area close to the current location of the Yorks Creek and Bowmans Creek confluence (refer to Figure 3.15 of the EIS). The potential impacts on hydrological and ecological systems associated with this change is assessed in Section 3.4.4 and 3.4.5 of Appendix 10 of the EIS. The potential impacts on hydrological systems are not predicted to be observable against natural variability and any ecological impacts will be limited to the small area of predicted impacts and are not predicted to significantly impact any threatened species.

Cumulative loss of surface and groundwater flows within Bowmans Creek associated with mining related groundwater impacts is modelled as being less than 200 ML/year relative to 2009 levels in the peak (circa 2046) and declining after that (refer to Figure 7-14 of the GWIA). This level of take is not considered to be significant (equates to approximately 6 L/s) and is well within the available allocation within this water source under the *Water Management Act 2000*.

Community Submission

"The conclusions chapter states that the "The Project proposes to remove alluvium associated with Yorks Creek and Swamp Creek." The conclusion also states that seepage and water take will not increase significantly. How can a project of this size not increase the total impact significantly?" S-121192

The alluvium removed by the Glendell Pit Extension is largely unsaturated with the base of the alluvium at this location above the water table within the broader alluvium.

Past mining at Glendell has intercepted alluvium associated with the upper reaches of Swamp Creek and the lower reach of Bettys Creek. Despite the existing Glendell Pit being in close proximity to the lower reaches of the Swamp Creek Alluvium and Bowmans Creek alluvium, the impact of mining on these systems is not observable in groundwater monitoring in these areas. The observed impacts (or lack thereof) associated with the existing mining at Glendell provide a high degree of confidence in the model predictions of the groundwater impacts associated with the Glendell Pit Extension.

As noted above and in Section 7.5.9.2, the existing Mount Owen Complex groundwater monitoring program will be extended to the Project. Water Management Plan will also be updated to include specific Trigger Action Response Plans (TARPs) to address observed deviations in observed impacts from those predicted in the EIS; this will include triggers related to any significant increase in groundwater inflows into the pit area.

Community Submission

"The gross disruption of the ground surface and the removal of two tributaries of Bowmans Creek must surely be removing water flowing to the hunter river and to the hunter river alluvium aquifer. The Bowmans Creek alluvium are dry NOW and is likely that the existing mines have impacted the creek recharge from groundwater.

If tributaries of Bowmans creek are mined then the creek may not flow even outside of drought times. There is already a serious cumulative impact from existing mines.

The report describes the alluvium as not being significant, but this is a subjective view. Bowmans Creek catchment is circa 215km^2 (from Google earth) the area likely to be removed by Glendell North project is circa 22km^2 (including unmined upper creek catchment). That is a 10% reduction in contribution to Bowmans Creek either via surface water flow or groundwater recharge." S-121192

During the 2018-early 2020 drought period, surface flows within Bowmans Creek had ceased at the Bowmans Creek Flow Gauge however groundwater monitoring within the alluvium indicated that parts of the alluvium remain saturated and connected to the remnant pools within Bowmans Creek. While depressurisation of Permian aquifers associated with mining undoubtedly contributed to reduced inflows to the alluvium from subcropping Permian strata, the impact of reduced stream flow and low rainfall recharge is considered to be the primary factor in reduced groundwater levels and lack of surface flow within Bowmans Creek. A review of streamflow data and alluvial groundwater levels show strong correlation between rainfall and both creek flows and groundwater levels. Further, the rate of change within both the surface and alluvial systems associated with rainfall is significantly faster than any predicted changes associated with mining.

The realignment of Yorks Creek to the north of the proposed mining area is a key measure to mitigate impacts on stream flows.

Table 9-1 of the SWIA (reproduced as Table 7.27 from the EIS and in **Table 5.5** below) details the cumulative impacts to Bowmans Creek catchment associated with mining.

Table 5.5 Predicted Impact on Catchment Areas

Catchment	Pre-Mining conditions	Existing conditions (ha)	Proposed conditions (Year 13) (ha)	Approved conceptual final landform# (ha)	Proposed conceptual final landform# (ha)
Bowmans Creek upper*	19,635	15,495	15,495	15,495	15,495
Bowmans Creek lower		3,458	3,428	4,564	4,586
Yorks Creek (existing)	1,230	1,656	14	1,884	184
Yorks Creek (proposed realignment)		N/A	1,400	N/A	1,505
Swamp Creek	2,380	267	50	1,237	348
Bettys Creek	1,810	530	679	865	1,946
Total	**25,055**	**21,406**	**21,067**	**24,046**	**24,064**

* Areas of Bowmans Creek upstream of the Mount Owen Complex and Liddell Coal Operations water management system catchments.
# Assumes all rehabilitated areas outside of final void catchment areas are returned to downstream catchments.

During the life of the Project, cumulative impacts on catchment areas associated with the Project and other approved operations will reduce the overall catchment of Bowmans Creek by approximately 340 ha (3.4 km^2) relative to existing conditions. As described in Section 9.1 of the SWIA and Section 7.5.7.4 of the EIS, this reduction is less than the Additional Disturbance Area associated with the Project, because other areas of rehabilitated land at the Mount Owen Complex and Liddell Coal Operations are expected to have been returned to the catchment by the time the maximum extent of impacts associated with the Project occur. In this regard, the cumulative impact on the overall catchment size of Bowmans Creek relative to existing conditions is less than the incremental impact associated with the Project.

The proposed final landform will have almost identical impacts on the catchment of Bowmans Creek as the existing approved Glendell final landform. The catchment of Bowmans Creek post closure will be approximately 2600 ha (26 km^2) larger than existing conditions due to the release of rehabilitated areas currently contained within the water management systems of mining operations within the Bowmans Creek Catchment.

The impacts of the small reduction in catchment area (<2% reduction relative to existing conditions) during the life of the Project is considered unlikely to have an observable impact on stream flows in Bowmans Creek and negligible impacts on flows within the Hunter River.

Interest Group Submission: Lock the Gate Alliance

"The groundwater assessment shows that dramatic drawdown of the coal seam under the Bowman's Creek alluvium propagates upward into the alluvium and causes drawdown. The model predicts this to be less than 1m but also says "The zone of drawdown is relatively limited because the average rainfall recharge rate calibrated for the alluvium exceeds the losses induced by mining and therefore buffers the drawdown generated by the model." We suspect this means that in low rainfall years, as in the current situation, the effects of this drawdown are no longer offset by rainfall and have a greater impact.

The groundwater assessment also states that, "The model predictions indicate that the maximum drawdown of less than 1 m is relatively limited when compared with the climatic fluctuations that have recorded water level changes between 1 m and 4 m within the Bowmans Creek alluvium." The groundwater assessment in shows that cumulative draw down of exceeds 2m in the alluvium during the proposed mining operations (Figure 7-6), which is equivalent to 50% of the observed fluctuations. As the EIS shows, this is a continuation of drawdown caused by mining in the area over the last ten years. The depressurisation of the aquifers is expected to result in a peak take of 10ML per year from the Bowman's Creek alluvium.

The EIS does not correctly apply the Aquifer Interference Policy. It presents drawdown only at "private bores." The policy requires the minimal impact considerations to be applied "at any water supply work" regardless of who owns the land on which that water supply work is situated. The Independent Planning Commission, which is likely to be the consent authority for this project, has clarified and established this in its Bylong Coal Project Statement of Reasons (see paragraphs 242244). Revision of the groundwater impact assessment is necessary to apply the minimal impact considerations to mine-owned land as well as land owned by non-mining entities."

As discussed above, the Project's contributions to cumulative drawdown impact is largely limited to a small area along the eastern edge of the Bowmans Creek Alluvium near the confluence with Yorks Creek and around the point of intersection of the Glendell Pit Extension with the Swamp Creek alluvium. While there are monitoring bores located in this area, there are no licensed or approved water supply works in these areas.

Additionally, there are no water bores (other than monitoring bores) in highly productive aquifers within Glencore or other mine-owned and private land in areas of predicted drawdown associated with the Project.

Cumulative Groundwater Impacts

Community Submission

"The water assessment must look at the cumulative impact on groundwater in the hunter region and the groundwater impacts related to the number of final voids the interaction between pit lakes and water quality, how this will impact surface water or more importantly the water in regulated systems for water uses, especially to include climatic conditions changes" S-120750

The groundwater modelling undertaken for the Project is a regional groundwater model which covers an area of approximately 22 km wide (east-west direction) and 20.5 km long (north-south direction).

The Project includes open cut and underground mining associated with the following coal mining operations:

- Mt Owen Complex
- Hunter Valley Operations
- Ashton
- Ravensworth Operations (including Ravensworth Underground)
- Liddell Coal Operations and
- Integra Underground

Final voids and pit lakes associated with approved open cut operations are considered in the modelling.

Details of the consideration of cumulative impacts in the groundwater model, including assumptions regarding the progression of mining, are set out in Appendix B, Section B 2.4.6 of the GWIA (Appendix 16 of the EIS).

Water Quality

Community Submissions

***"The EIS** report admits that this project will negatively "impact further on the quality of groundwater over the life of the Project" and that these impacts are complex and vary both spatially and temporally." The fact that historically mining in the area has had a negative impact on water quality should not be used to justify further damage to groundwater systems. At a time when Australia and its food sources have been significantly affected by drought - a project which may (and the likelihood is admitted) compromise any water source should not be permitted."* S-120889

"The local groundwater is already under stress and this mine will add to water pollution problems both locally and further down the Hunter River." S-121156

The first purported quote in this submission regarding the Project's predicted impacts on groundwater quality is not from the EIS. The Project's predicted impacts on groundwater quality are summarised in Section 7.5.6.3 of the EIS. Importantly, the EIS does not predict a decline in groundwater quality associated with the Project.

The only potential change in groundwater quality is associated with the recovery of groundwater levels in the Permian which is likely to lead to an increased contribution to alluvium from the Permian. The increased recharge from the Permian is likely to result in a slight decline in alluvial groundwater quality due to the lower quality of water within the Permian. This minor change in water quality will occur irrespective of the Project and reflect a return to more natural conditions.

The Project is not predicted to have any adverse impacts on either surface water or groundwater quality.

The second quote in this submission is from Section 7.5.11 of the EIS and the executive summary and has been used out of context in this submission. The Project is a 'Brownfields' extension of an existing mining operation and an area where water resources have been modified as a result of historical mining in the area for over 50 years. The statement "*these impacts are complex and vary both spatially and temporally*" relates to the impacts of this historical and approved mining and provides context for the assessment of cumulative impacts on water resources which change throughout the life of the Project due to impacts associated with both the Project and existing approved operations. The EIS includes a comprehensive assessment of cumulative impacts and quantification of the Project's contribution to these cumulative impacts.

Groundwater Assessment

Community Submission

"The failure of the water report to identify climatic conditions related to water use, especially when groundwater becomes depleted through continual removal for coal extraction and then the industry turns towards water storage from dams with high security licenses and denies others the right for income, the use of the 2016 modelling for the water sharing plan has shown a number of scenarios but has failed to implement structures for water security for the hunter.

The case of the Hunter Valley Operations water take of approx. 500M/L a month from the hunter river in 2019 just proves the facts of the impacts on the groundwater systems when mining depletes the system and there is no recharge due to drought conditions that the industry then becomes totally reliant on stored water from the dams, this cause a flow on affect to others in the network of rights to water." S-120750

The Project does not rely on any groundwater extraction to source water for operational purposes. As is noted in the EIS and GWIA, groundwater inflows to the Glendell Pit (and Mount Owen North Pit and Bayswater North Pit) are at such a low rate that it evaporates on the wall before it is able to enter sumps within the mining voids. Accordingly, the groundwater contribution to the water balance for the operations is considered to be negligible under all climatic scenarios.

As discussed above, the Project's linkage to the Mount Owen Complex water management system and the broader GRAWTS provides a high degree of water security. The water balance assessment undertaken for the Project includes consideration of a wide range of climatic scenarios including low rainfall periods.

Seepage from Final Void

Community Submission

"Also the report failed to identify how much seepage water from the void will be removed a (sic) part of the mining process.." S-120750

Groundwater modelling indicates that there will be up to 249 ML of inflow from Permian groundwater systems to the mined pit area. Some of this will occur in areas backfilled with overburden and not make its way to the active mining area. Additionally, as has been observed at the existing Glendell operations, most of the inflows to the active pit area are at such a low rate that the inflow evaporates before reaching the sumps within the Pit. As a result, it is likely that a lower volume than the modelled seepage inflow amount will require pumping from the mining areas.

Conservatively, the water and salt balance model has assumed that all modelled Permian groundwater inflows are pumped from the mining areas.

5.1.6.2 Surface Water

Flooding

Community Submission

"Floods will affect the Great Northern Railway and New England Highway being significant increases to velocity and water levels for the 10% and 5% AEP. These are strategic and important transport arteries." S-120750

A flood assessment was completed as part of the Surface Water Impact Assessment (SWIA) (Appendix 17 of the EIS) and summarised in Section 7.5.7.6 of the EIS. The Project is not predicted to result in any changes to flooding impacts to either the New England Highway or the Main Northern Rail Line relative to existing approved operations. Increased flooding levels and flow velocity levels in the post mining landscape relative to existing conditions are associated with the release of rehabilitated catchments at a range of already approved mining operations within the Bowmans Creek catchment. The Project does not result in any change in the catchment area of Bowmans Creek upstream of this infrastructure.

Impacts on Creeks

Community Submissions

"Groundwater and surface water impacts related to the diversions of Yorks Creek, Swamp Creek and Bettys creek on the ecosystems and the impact this has on Bowmans creek pools and water flow.

The diversion of swamp creek will reduce the catchment area as stated in the report and this will have a significant impact on the water network." S-120750

The Project's impact on water dependent ecosystems is described in Section 7.6.2 of the EIS and Section 3.4 of the Assessment of Commonwealth Matters Report (Appendix 10 of the EIS).

The removal of a small section of the Swamp Creek catchment and the realignment of Yorks Creek is not predicted to have a significant impact on Bowmans Creek and impacts on stream flow are unlikely to be observable.

There are no threatened aquatic species likely to be adversely affected by the Project.

Yorks Creek Realignment

Community Submission

'Yorks creek must not be diverted, the springs and underground aquifers will remain in the original location which will be destroyed by mining, which means Yorks Creek would only flow in rainfall events. By diverting yorks creek will impact Bowmans creek pools and ecosystems, Bowmans creek has suffered immensely by mining and there must be no more destruction of this creek.' S-120795

Yorks Creek is currently an ephemeral system and only flows following substantial rainfall events. The realignment of the lower reach of Yorks Creek is unlikely to have any observable impacts on flow conditions within Yorks Creek or Bowmans Creek.

The SWIA has included consideration of the impacts of catchment changes and flooding conditions on Bowmans Creek. The Yorks Creek Realignment has been designed to be geomorphically stable, with appropriate aquatic and riparian habitat, and to mitigate the potential impact of erosion on downstream water quality. The realignment of Yorks Creek to an upstream confluence point is not predicted to have any observable impacts on Bowmans Creek.

Water Quality

Community Submission

"'In addition the surface water analysis does not meet the requirements of the new Australian New Zealand Freshwater Quality Guidelines, 2018. Under Section 5-2, it is not clear where the reference sites are located for the derivation of the Site Specific Guideline Values. According to the ANZG 2018 the reference site should have "minimal impact", hence sites, there are numerous locations on the headwaters of the Hunter River where there would be monitoring locations for physical and chemical parameters to derive these guideline values based on the 80%iles. " S-121065

Site specific guidelines values are used set triggers to determine whether mining related development has had an impact on water quality. As noted in the submission, ideally these would be derived from unimpacted sites. Reference sites should be located in close proximity to (and preferably upstream) of the project and/or have similar geological and soil (and streamflow) conditions to the areas under investigation. However, various factors need to be taken into account in the selection of reference sites and, in areas with a long history of impact there may be limited or no unimpacted sites which meet all reference site objectives.

Two recent guidelines, *Australian New Zealand Freshwater Quality Guidelines, 2018 (ANZG 2018), and* Deriving site-specific guideline values for physico-chemical parameters and toxicants (Huynh and Hobbs, 2019) provide guidance on the establishment of baseline water quality conditions against which the impacts of development can be assessed. Both ANZG (2018) and Huynh and Hobbs (2019) provide guidance on the selection of appropriate reference conditions. The overarching principle adopted in the SWIA is 'continual improvement', where management of waters should aim towards better water quality and ecological health." (Huynh and Hobbs 2019). This idealised principle is weighed against the practicality of historical disturbance and data availability. ANZG (2018) acknowledges that "for modified ecosystems, 'best available' reference sites may provide the only choice for the reference condition". In practical terms, this is a balance between a system that resists 'creeping normality' that allows slow incremental degradation to water quality, whilst allowing flexibility to reflect local conditions and natural variation so that 'exceedances' of guideline values provide meaningful feedback to site personnel, regulators and the general public.

Site specific guideline values used in the SWIA were applied from the Mount Owen Complex Surface Water Management and Monitoring Plan which was last updated in 2019. These are derived from sites both upstream and downstream of mining related disturbance. The site specific guideline values were established prior to the publication of Huynh and Hobbs (2019).

Huynh and Hobbs (2019) provides criteria for the selection of reference sites. The relevance of these to the project is summarised in **Table 5.6**.

Table 5.6 Reference Site Criteria

Reference site criteria	Relevance to the project
Minimal disturbance to local and upstream environments (e.g. from dense urban and industrial activity, extractive industry, intensive livestock or cropping areas)	Mining related activity has disturbed much of the catchment of Yorks, Bettys and Swamp Creeks. Monitoring points BMC1, BC1, SC1 and YC1 are upstream of mining related disturbance at the Mount Owen Complex.
No significant point source and diffuse source discharges nearby or upstream (e.g. mine discharges, sewage treatment plant discharges, industrial discharges, major agricultural or storm water drains, agricultural discharges such as those from dairies)	The Mount Owen Complex is a zero discharge site. There are no known point source discharges upstream.
Flow or water regime not significantly altered (if the site is classified as temporary, water body types and wet and dry phase GVs should be defined)	Mining has significantly disturbed much of the catchment of Yorks, Bettys and Swamp Creek, reducing the catchment area as catchment is disturbed and incorporated in the site water management system.
Sufficient water quality monitoring data available, and data from these sites collected, stored and analysed using approved protocols.	Monthly water quality (pH, EC, TSS) has been collected over at least a 10 year period at all monitoring locations (except for the recent addition of BMC5). Anecdotal information on the streamflow conditions and other conditions is documented in the Annual Reviews for the Mount Owen Complex (Glencore 2020).

Advice on the Project from the Independent Expert Scientific Committee (IESC) was requested by the DPIE which has also recommended an assessment of site-specific guideline values, having regard to ANZG 2018 and Huynh and Hobbs 2019. A separate response to the advice provided by the IESC covers the issue raised in this submission in more detail. It is noted however that monitoring of flows from the upper Hunter catchment or upper Bowmans Creek catchment are unlikely to be suitable as reference sites for the Project given the different geology in these areas (in the case of Bowmans Creek, this is due to the upper catchment being located on the other side of the Hunter thrust fault).

As noted in Section 7.5.9.2 of the EIS, the Mount Owen Complex Surface Water Management and Monitoring Plan will be updated to reflect the changes associated with the Project. The proposed management recommendations contained in the EIS include a commitment to update site specific guideline values used in the Surface Water Management and Monitoring Plan. These updates will have regard to all relevant guideline materials.

Community Submission

"The following statement is not acceptable as part of the ANZG that compares discharges with reference site values to stop the incremental degradation of a water source:

The monitoring data indicates that water quality within each creek system is generally consistent at locations upstream and downstream of the Mount Owen Complex, indicating that the existing disturbance does not impact on water quality.'" S-121065

The Mount Owen Complex does not presently discharge water directly to the receiving environment. The Project does not propose any change to existing discharge arrangements under the GRAWTS.

As noted above, the Mount Owen Complex Surface Water Management and Monitoring Plan will be updated for the Project and this update will include a review of the Site Specific Guideline Values for the different creek systems having regard to relevant guidance material.

The separate response to the IESC guidance includes a more detailed analysis of monitoring data between upstream and downstream monitoring points.

Water availability

Community Submissions

"this kind of project must be stopped in its tracks on grounds of local environmental degradation, the incredible amounts of potable water required" S-120674

*"The proponent has stated the importance of the Greater Ravensworth Area and tailing scheme, in which mine water is transfer between sites and also allows mines with larger storage capacity to hold mine water but what happens in a drought situation when there is insufficient water to meet demand of a project for mitigation etc. does this mean that this scheme can be used for fresh transfer from other sites owned by Glencore or operated by Glencore to meet requirements, which is not stated in the information provided and how this impacts other business."*S-120750

"Is there even enough water available for the additional watering required for more than double the production and hence more than double the truck movements?" S-120714

Section 4.3.1 details the water take associated with the Project which requires licensing. The Project does not result in any increase in surface water extractions above that currently authorised by licenses or land holder rights.

As discussed in **Section 4.7** above, the operation of the GRAWTS is subject to a range of operating controls including available water licences, environment protection licences (EPLs), and Hunter River Salinity Trading Scheme discharge restrictions at Ravensworth Operations and Liddell Coal Operations. To date, the GRAWTS has proved to be extremely effective in the management of water across the operations and, during the recent drought, licences held by Mount Owen for Hunter River extractions were able to be temporarily transferred to the Bulga Coal Complex as sufficient stored water remained available with the GRAWTS.

While the Project involves an increase in production from the Glendell Mine, this occurs at a time when other mining operations are either ceasing or reducing production resulting in no net increase in production levels at the Mount Owen Complex above currently approved levels.

The site water balance for the GRAWTS prepared as part of the Surface Water Impact Assessment (Appendix 17 of the EIS) assumed no change to existing licence allocations. This assessment concluded that the GRAWTS has sufficient storage and groundwater and surface water allocations to meet water demands at all operations within the GRAWTS including the proposed Project.

Interest Group Submission – EcoNetwork Port Stephens

"The prolonged drought in Australia has seen 55 towns run out of water, to date. Mining demands a high consumption of a very precious resource, water. We simply cannot afford to waste our water through coal washing and dust suppression at mine sites."

Water allocation in New South Wales is regulated by the *Water Management Act 2000* which sets limits on extraction based on modelled flows, demand and storage volumes. Town water supplies have the highest priority in terms of supply.

5.1.7 Rehabilitation

Issues relating to rehabilitation and the final void were raised in eight objecting submissions. One of these submissions was received from direct proximity to the project, with the other seven being submissions from regional areas. Examples of these issues and responses are provided in the following sections.

As described in Section 2.3.3, forty-one supporting submissions received outlined the positive land management and rehabilitation performance of Glencore more broadly, and the existing operation specifically. During the SIA for the EIS phase (Section 6.2.4 of Appendix 11 of EIS), rehabilitation was considered a priority issue, with stakeholders noting Glencore's responsibility to restore the Project site appropriately to facilitate future land use. In this regard, several stakeholders recalled the positive efforts of the company in rehabilitation.

5.1.7.1 Rehabilitation

Community Submission

"These mines are leaving the area virtually unrehabilitated to the state of lesser value before mining. Huge mountains of overburden higher than the original landform and the incorporation of toxic final voids will be left behind after mining. Visitors to the hunter valley cannot believe their eyes as they travel through the valley to see the destruction that is occurring." S-120795

As discussed in Section 7.9.4 of the EIS, the Project will result in an extension of mine life, additional disturbance and a modified final landform to that currently approved. However, the overall strategy for rehabilitating the proposed conceptual final landform is generally consistent with the currently approved Rehabilitation Strategy for the Mount Owen Complex and existing rehabilitation practices. The Mount Owen Rehabilitation Strategy draws heavily on the extensive and successful rehabilitation experience at the Mount Owen Complex and other Glencore operations in the Hunter Valley. This strategy was developed in consultation with the Resources Regulator and Singleton Council and has regard to strategic local, regional and State planning policies and strategies relevant to rehabilitation and the long-term use of land in the area.

Progressive rehabilitation has been undertaken throughout the life of the existing mining operations at the Mount Owen Complex, including at the existing Glendell Mine. Consistent with existing approved operations, disturbed areas will continue to be rehabilitated as soon as practicable throughout the life of mining in the Glendell Pit Extension. Progressive rehabilitation will consist of the shaping of overburden emplacement areas to create a suitable final landform with adequate surface drainage which is in keeping with the surrounding landscape. This will be achieved through both the form of the reshaped mining areas and use of a range of vegetation types, and the location and shape of vegetation areas to be established across the rehabilitated landform.

The conceptual final revegetation strategy currently identified for the Mount Owen Complex under the existing Glendell and Mount Owen Consents is a combination of native vegetation and open grassland areas; pit lakes forming in the in the Glendell Pit, North Pit and Bayswater North Pit voids. The grassed areas will be generally suitable for grazing production consistent with pre-mining conditions and the voids are approved for use as water storages (and in the case of Bayswater North Pit: tailings disposal). Various aspects of the Mount Owen Complex, including the final voids, have been identified as being suitable for a range of other land uses. The key landform changes in the final landform associated with the Project is the movement of the Glendell Pit void further to the north, modifications to the Glendell emplacement area (including increased height of emplacement) and integration with the Ravensworth East emplacement area and the realignment of part of Yorks Creek. The Project will also increase the extent or native revegetation in the post mining landform however areas suitable for grazing will be retained.

The Project's revegetation strategy is designed to establish and enhance native vegetation corridors to promote regional fauna movements across the Mount Owen Complex and surrounding region. The proposed revegetation strategy for the Project is consistent with the objectives of local strategic plans in that it increases the land area identified for ecological restoration and will significantly enhance regional biodiversity linkages. Importantly, the site also provides a number of opportunities for alternative land uses and employment opportunities which can occur concurrently with the proposed biodiversity outcomes.

Significant areas of the Mount Owen Complex are well advanced in terms of native vegetation rehabilitation objectives and significant research has been undertaken at the existing Mount Owen Mine which has informed these rehabilitation practices. The learnings from these practices and the rehabilitation practices at other Glencore operations in the Hunter Valley will be applied to the rehabilitation of the Mount Owen Complex, including the Glendell Pit Extension. In 2019, 104 ha of rehabilitation was completed across the Mount Owen Complex, made up of 54 ha at Glendell and 50 ha at Mount Owen.

5.1.7.2 Final Void

Community Submission

"The proposed extension contributes to an increase in the size of the final void following mining. Any remaining void is unacceptable, and measures must be taken to amend mine planning to reduce the long term disturbance footprint, noting that the progressive rehabilitation of disturbed areas is unacceptably slow. It is unacceptable for any final void to remain at the completion of mining. Mine planning for this proposal should provide for a transition to a landscape which is productive and leaves no final void or long term groundwater impacts." S-120894

As discussed in Section 7.9.3 of the EIS, there are no additional voids proposed within the final landform as a result of the Project. Consistent with approved Glendell Mine operations, a single final void will remain in the Glendell Pit Extension. This final void is proposed to be located approximately 3.4 km to the north of the location of the approved final void. The relocation of the final void to the north would not result in a material change to the conceptual final void catchment area with the proposed void having a catchment of approximately 321 ha and the existing approved void having a catchment of approximately 339 ha).

Consistent with the approved final landform, the proposed void has been designed with retained highwalls, designed to be stable in the long term. The Project will not affect the range of different final land use options that could be suitable for the Mount Owen Complex. The existing infrastructure lends itself to a multitude of potential different industrial and agricultural land uses which will be reviewed throughout the life of the Project and incorporated into the progressive closure planning process. The void also has the potential to provide viable options (e.g. water storage), and the complex also has potential tourism and recreational uses. Further, the water balance modelling showed that salinity levels in the pit lake are not predicted to exceed natural salinity levels in the Permian aquifer system and are therefore not considered to pose a risk of adversely affecting water quality (refer to Section 7.5.6.3 of the EIS for further detail). Alternative final land uses will be investigated in detail during the development of the Mine Closure Plan.

A 'no void' option was assessed in acknowledgement of stakeholder expectations and government approach including the "Improving Mine Rehabilitation in NSW Discussion Paper" (DPE 2017b). As stated within this discussion paper, it is not possible to reinstate the topography to pre mining levels across all previously mined areas, as following the extraction of coal there is a net deficit of overall material available.

The 'no void' option is not considered practical or economically viable due to:

- the need to disturb areas of mine rehabilitation in order to access the material needed to fill the void (approximately 355 ha)

- high cost associated with moving the large volume of material needed to fill the void to a free draining surface (indicative cost would be in excess of $1.6 billion spent from the end of mining until the void is filled)
- prolongation of noise and air quality impacts well beyond the life of the mining operation
- delay in final rehabilitation and mine closure in excess of 12 years.

Further detail on the final void options investigated for the Project are detailed in Section 5.0 of the Mine Planning Options Report (Appendix 1 of the EIS).

5.1.7.3 Security to Cover Expected Rehabilitation Costs

Community Submission

"Leaves the Hunter region again at risk of a bankrupt mining concern not fulfilling its contractually obligated environmental repair and regeneration duties (as has happened in this region previously)." S-120826

Interest Group Submission - Climate Action Newcastle

"the likelihood of bankruptcy may see the proponent walk away from mine rehabilitation commitments. Rather than this mine being an economic boon for the State, it stands to become an economic burden, with the cost and resourcing of mine rehabilitation falling back on the State."

As discussed in Section 7.9.1.2 of the EIS, under the terms of the mining leases applicable to the Glendell Pit Extension, security is required to be provided under the *Mining Act 1992* to cover the expected closure and rehabilitation costs. This security is assessed based on the anticipated costs of rehabilitating the site to a standard which meets the detailed rehabilitation objectives and closure criteria identified under the MOP in force at the time. The security requirements are reviewed whenever the MOP is amended or superseded by a new MOP and on renewal of the mining leases. The calculation (using the Rehabilitation Cost Estimation Tool) is based on costs estimated by the leaseholder and include additional project management costs and a contingency allowance. The security required by the mining lease is set following a review of the rehabilitation cost estimate by the Resources Regulator.

In the event of a default by the leaseholder, the security can be accessed by the Resources Regulator and used for the rehabilitation of the site. Current NSW Government Policy requires the security to be set at a level which covers the full costs of closure including rehabilitating the site.

5.1.8 Biodiversity

Issues relating to biodiversity were raised in five community submissions. Four submissions identified issues in regard to biodiversity impacts and one submission identified issues in the Stygofauna Assessment undertaken for the Project's EIS. This view appeared to be heightened by the recent bushfires in NSW.

A detailed Biodiversity Development Assessment Report (BDAR) was prepared as part of the EIS and is included in Section 7.6 and Appendix 20 of the Project's EIS. The BDAR was prepared in accordance with the SEARs for the Project which required an assessment of potential ecological impacts of the Project as per the Biodiversity Assessment Method (BAM) in accordance with the BC Act. A Stygofauna Assessment was also undertaken to assess the Project's potential impacts on subterranean fauna and is provided in Appendix 21 of the EIS.

5.1.8.1 Biodiversity Impacts

Community Submission

"Species Extinction:

- *Prior to the catastrophic fire season, Australian scientists had already declared that we are amid an extinction crisis for Australian wildlife. "A national disgrace".*
- *All native species have been pushed to the brink of survival – even the Australian icon Koala listed above. Each of the above species deserve the right to survival.*
- *The Department of the Environment and Energy (DoEE) considers that there is "likely or potential to be a significant impact on the following entities:*
    - *Central Hunter Valley Eucalypt Forest and Woodland ecological community – critically endangered*
    - *Regent Honeyeater (Anthochaera Phrygia) – critically endangered*
    - *Swift Parrot (Lathamus discolor) – critically endangered o The Green and Golden Bell Frog (Litoria aurea) – vulnerable*
    - *Spotted-tailed Quoll (Dasyurus maculatus maculatus) – endangered*
    - *Large-eared Pied Bat (Chalinolobus dwyeri) – vulnerable*
    - *Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) – vulnerable*
    - *New Holland Mouse (Pseudomys novaehollandiae) – vulnerable*
    - *Grey-headed Flying-fox (Pteropus poliocephalus) – vulnerable*
    - *Trailing Woodruff (Asperula asthenes) – vulnerable*
- *The project report was written prior to this catastrophic fire season which saw massive losses of wildlife (a billion creatures) and flora. It is certain that the prospects for the survival of all of the above species have been significantly reduced. Without protective action (ie. no more habitat loss from land clearing/mining) extinction is in high likelihood.*
- *Habitat for all of the species above should be fully protected in light of the fires of 2019-20 and the future fires to come as Australia becomes hotter and drier"* S-121197

A detailed assessment of the likelihood of occurrence of listed threatened species and Threatened Ecological Communities (TECs) within or in proximity to the Project was undertaken as part of the BDAR in accordance with the BAM.

It should be noted that the Project Area has been extensively cleared and grazed since the late 1820s. The majority of the Additional Disturbance Area associated with the Project comprises heavily modified vegetation in the form of grazed derived native grasslands, exotic grasslands and existing disturbed areas. The derived native grasslands represent lower quality habitat for a range of threatened species. The remainder of the Project Area predominantly comprises a mixture of native vegetation in a regenerative or rehabilitated state, which provides lower quality habitat for native flora and fauna than remnant woodland and forest would.

The BAM requires all vegetation identified within the Development Footprint to be assigned to a Plant Community Type (PCT). Seven of the PCT condition classes (or parts thereof) were identified as conforming to TECs listed under the BC Act and/or EPBC Act including:

- Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions
- Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the NSW North Coast and Sydney Basin Bioregion
- Central Hunter Valley Eucalypt Forest and Woodland

The BAM categorises species as either ecosystem-credit species or species-credit species which are defined as:

- ecosystem-credit species – species that can be reliably predicted to occur in PCTs and have a high likelihood of occurring on the site. Therefore, targeted surveys for ecosystem-credit species are not required
- species-credit species – species that cannot be reliably predicted based on a PCT, distribution or habitat criteria. These species require targeted survey effort to determine their presence or otherwise on the site.

All non-threatened species and some threatened species are ecosystem-credit species and therefore do not require further specific assessment under the BAM however the presence or likely presence of these species may influence ecosystem offsetting requirements. The remaining threatened species are species-credit species and require further targeted assessment and, where relevant, the calculation of impact species-credits under the BAM.

Four species-credit species were recorded in the Development Footprint during targeted seasonal surveys undertaken for the BDAR. These include:

- tiger orchid (*Cymbidium canalicatum*) – 1 individual
- southern myotis (*Myotis macropus*) – (46.6 ha of suitable habitat)
- brush-tailed phascogale (*Phascogale tapoatafa*) – (152.1 ha of suitable habitat)
- eastern cave bat (*Vespadelus troughtoni*) – (0.5 ha of suitable habitat).

Glencore is committed to delivering a biodiversity offset strategy that appropriately compensates for the unavoidable loss of ecological values as a result of the Project. Under the BAM process, calculated biodiversity credit requirements of the Project have been identified as:

- 5,972 ecosystem credits for six native plant community types (10 vegetation zones)
- 2 tiger orchid (i) endangered population credit
- 732 southern myotis (*Myotis macropus*) credits
- 2,559 brush-tailed phascogale (*Phascogale tapoatafa*) credits
- 17 eastern cave bat (*Vespadelus troughtoni*) credits.

The biodiversity offset strategy will be developed during the assessment process in consultation with the BCD and DPIE and based on the credits required to be retired to offset the impacts of the Project as specified in the BDAR and the offset options available under the BC Act and *Biodiversity Conservation Regulation 2017* (BC Regulation). It is noted that the approach to offsetting prescribed in the BC Act and BC Regulation has been endorsed by the Commonwealth Minister for the Environment through recent amendments to the NSW and Commonwealth EPBC Bilateral Assessment Agreement.

The BDAR and proposed offsets were prepared to meet the requirements under the BC Act and BC Regulation at the time of the assessment which was completed in November 2019. The BDAR and proposed offsets reflect the species listings, Species Profiles and Threats (SPRAT) information and conservation advice available at the time of the assessment.

Community Submission

"The Glendell and nearby Mt Owen Mines have already had a significant impact on regional biodiversity, and the proposed continuation and extension of operations will further increase this impact. The cumulative impact of this proposal in conjunction with other mining operations has not been assessed." S-120894

As discussed in Section 5.2.6 of the BDAR, the Development Footprint is situated in a landscape that is characterised by agricultural land and mining land. The history of land clearing, agriculture and mining development has resulted in an incremental loss of vegetation and fauna habitat surrounding the Development Footprint, and within the upper Hunter Valley more generally. The Project will result in a loss of approximately 540 ha of native vegetation communities consisting of approximately 386 ha of derived native grassland, and 155 ha of woodland and forest vegetation which will be offset through the implementation of a biodiversity offset strategy in accordance with the BC Act.

It is recognised that the Project will remove vegetation and further increase fragmentation and isolation of habitats in an already degraded landscape, and thus contribute to cumulative habitat loss and vegetation clearance in the locality. To address these impacts, an extensive mitigation and offsetting strategy is proposed including the provision of:

- delineation of clearance areas to prevent unwanted incursion into, and clearance of, surrounding vegetation
- habitat enhancement measures such as the installation of nest boxes, salvaged hollows, fallen timber, hollow logs and rocks to supplement mine rehabilitation areas
- rehabilitation of the Development Footprint post mining, and
- the implementation of a biodiversity offset strategy in accordance with the BC Act.

"In particular, incremental and ongoing development of the mine has not provided adequate biodiversity offsetting and management measures to achieve no net loss of biodiversity envisaged by applicable legislation, including the Biodiversity Conservation Act 2016.

Specifically, the following matters require assessment, and need to be addressed through appropriate measures in any approval:

1. Options for avoiding biodiversity impacts have not been seriously considered. Relevant options need to be identified (including no mining), and must form part of the environmental impact assessment." S-120894

As discussed in Section 7.6.3 of the EIS, Glencore undertook a detailed biodiversity constraints study as part of the Project's pre-feasibility assessment to guide the design of the Project. Through this process, alternative mining options were considered, and Glencore sought to minimise the environmental and community impacts associated with the Project whilst maximising the economic resource recovery. Key elements of the project design have been designed to ameliorate the impacts on significant biodiversity features, such as threatened species, endangered populations, TECs and their habitats. The approach was to avoid biodiversity impacts where practicable and maximise use of existing disturbed areas.

It is noted that avoidance can be challenging for resource projects as by necessity the resource extraction occurs where the resource is and this limits the ability to 'move' an impact, whereas there is more ability to relocate infrastructure or other project components. Nonetheless, a number of mining and infrastructure options were considered that resulted in additional impact and so were not selected, and further specific design changes were implemented during the early stages of designing the Project that ameliorated the impacts of the Project on significant biodiversity features. These impact reductions resulted in maximising the utilisation of previously disturbed areas and minimisation of disturbance of key vegetation communities through a Project design which maximises the use of existing infrastructure and facilities. Further, an

iterative process was undertaken to optimise the disturbance area associated with the Project which included avoidance of riparian vegetation on Bowmans Creek, avoiding mining through Bowmans Creek, and minimising the BSAL areas impacted by the Project.

Glencore will continue to seek opportunities to minimise impacts on biodiversity as part of the implementation of the Project.

"2. Offset ratios used for calculating offsets are not adequate and should be higher, thereby providing greater biodiversity offset areas.

3. Biodiversity offsetting arrangements and the security of offset areas associated with the mine are yet to be determined and have not been guaranteed. This should be an essential requirement of any approval. This can only be achieved by establishing offset areas as stewardship sites under the Biodiversity Conservation Act 2016" S-120894

The biodiversity credit requirements of the Project were calculated in accordance with the BAM process and the offset options available under the BC Act and BC Regulation. The biodiversity offset strategy will be developed during the assessment process in consultation with the BCD and DPIE based on the following offset options:

- land based offsets (Glencore will retire the credits calculated for this Project through either new Stewardship Sites or alternatively use credits from other existing Stewardship Sites)
- ecological rehabilitation (allowable for mining projects)
- purchasing credits from the market, and/or
- paying into the Biodiversity Conservation Fund.

"4. The assessment fails to mention of climate change as a risk for successful implementation of biodiversity impact measures, recognising that carbon Environmental Planning and Land Management Consultants emissions from the mine operation and production are a significant contributor to climate change." S-120894

Climate change is caused by changes in the energy balance of the climate system. The energy balance of the climate system is driven by atmospheric concentrations of greenhouse gases and aerosols, land cover and solar radiation (IPCC, 2007).

Climate change models forecast many different climate change impacts, which are influenced by future greenhouse gas emission scenarios. Climate change forecasts also vary significantly from region to region.

As discussed in Section 7.13.3.6 of the EIS, the Project, in isolation, is unlikely to materially influence global emission trajectories. Future emission trajectories will largely be influenced by global scale issues such as technology, population growth and GHG mitigation policy.

The extent to which global emissions and atmospheric concentrations of greenhouse gases have a demonstrable impact on climate change will be largely driven by the global response to reducing total global emissions that includes all major emission sources and sinks.

Additionally, the Mount Owen Complex has undertaken progressive rehabilitation throughout the life of Glendell, Ravensworth East and Mount Owen Mines. During this time, Glencore has put extensive effort into rehabilitation works including widespread flora and fauna monitoring and research projects in order to develop rehabilitation techniques and ensure the development and success of the rehabilitation programs in place to re-establish areas of native vegetation and fauna habitat even in times of climate uncertainty such as drought. In 2019, 104 ha of rehabilitation was completed across the Mount Owen Complex, made up of 54 ha at Glendell and 50 ha at Mount Owen.

The rehabilitation of significant areas of the landscape disturbed by the Project to native vegetation consistent with surrounding communities is a key aspect of the Project that will mitigate the adverse impacts of the Project and will likely contribute to improved long term biodiversity outcomes in the area. The Upper Hunter SRLUP refers to the potential for high value carbon forestry and ecological restoration, as part of the regional mitigation of climate change.

> *"5. Ongoing biodiversity monitoring at the site must continue for the full mine life and at least 10 years beyond. The long term monitoring undertaken by Glencore to date is of regional and national scientific importance. It is essential that the existing fauna and flora monitoring, management and governance program be maintained until the end of the mine life, and in the rehabilitation period following closure.*
>
> *6. The fauna and flora monitoring and management arrangements as outlined in the application documents are inadequate.*
>
> *7. Consent conditions for the project must provide public access to the results of ecological monitoring undertaken on the site, and ensure publication of results in scientific journals.*
>
> *8. Flora and fauna management plans and practices must be subject to periodic peer review processes to ensure that best biodiversity management practice at the mine is being maintained."* S-120894

Glencore notes the submission's recognition of the important biodiversity monitoring undertaken for the Mount Owen Complex.

As discussed in Section 4 of the BDAR, the effectiveness and long-term success of biodiversity mitigation actions will be evaluated against key outcomes, which necessitate regular and appropriately targeted monitoring. This will be achieved by using formal monitoring programs and due diligence assessments that periodically examine measurable changes over time and provide information on impacts and the success or otherwise of biodiversity mitigation actions. The current biodiversity monitoring programs undertaken at the Mount Owen Complex are contained in the Biodiversity and Offset Management Plan (BOMP) (December 2018) approved in consultation with BCD. The BOMP will be updated to include monitoring for the Project as required.

Narama Pipeline Impacts

> **Community Submission** *"With the relocation of the Narama Pipeline for the project approval and incorporating the GRATW to this area, the impacts this would have on the environment related to ecosystems"* S-120750

The Narama Pipeline will be subject to a separate modification of the Mount Owen Consent and is not a part of this Project. Therefore, the impacts of the Narama Pipeline, including the biodiversity impacts, have not been included in this assessment. For the purposes of this assessment, the Narama pipeline modification was assumed to be approved separately as outlined in Section 3.1 of the EIS.

5.1.8.2 Stygofauna Assessment

> **Community Submission**
>
> *"Stygo fauna tested only once Sampling was conducted between 4 and 6 September 2018 (Section 7 of EcoLogical report dated 26 November 2019) Sampling also occurred during a drought cycle of Bowmans Creek. This can be seen through the comments regarding 9 of the 22 bores were DRY at the time of sampling.*

The report states that the stygofauna identified are endemic to the Hunter River basin, which is true, BUT they only tested one round in winter and during a drought. ANY other flora and fauna assessment need both spring and autumn surveys to assess for seasonal variability in the ecosystem. Why is the stygo/troglofauna and or hyporheic fauna being treat differently. Bowmans Creek may host stygo/troglofauna during a Spring cycle or when the alluvium is saturated. There could be fauna that migrates to the area during wetter cycles that haven't been identified." S-121192

As discussed in Section 5 of the Stygofauna Assessment (refer to Appendix 21 of the EIS), 13 bores were sampled during the stygofauna survey for the Project's EIS with sampling conducted between 4 to 6 September 2018 (ELA 2019). In addition to these samples, sixteen existing bores were previously sampled as part of the Mount Owen Continued Operations Modification 2 with sampling conducted between 25 to 27 July 2017 (ELA 2018). This allowed for a combined total of 29 stygofauna samples from July 2017 and September 2018 which could be analysed to determine the diversity of stygofauna taxa for the Project.

Four stygofauna taxa, and one troglofauna taxon were collected in the shallow alluvial aquifers as part of the survey undertaken for the Project, which brings the total known stygofauna taxa within the vicinity of the Mount Owen Complex to seven. The assessment showed that all taxa identified in the surveyed bores have a broad distribution in the Hunter Valley and are widespread along the alluvial aquifers in the region, including the Hunter River.

Eco Logical Australia Pty Ltd (ELA) has conducted numerous stygofauna surveys for several Hunter Valley mines, including Bengalla (ELA 2013a), Liddell (ELA 2013b), Bylong (ELA 2014) and Mount Owen (ELA 2018). All taxa collected during these surveys were previously known from the alluvial aquifers of the Hunter River or its tributaries, except for two. The exceptions were *Chilibathynella peelensis*, previously known only from near Tamworth, and an unknown species of *Anaspidacea* that occurred in two bores at Bylong.

"Secondly, the groundwater impact assessment identifies impact to the Bowmans creek alluvium water level causing a potential permanent separation of the saturated portions of the alluvium. This is unacceptable in relation to maintaining stygo/troglofaunal and or hyporheic fauna habitat in the area, especially considering that the stygofauna assessment is not complete.

Stygofauna should be treated the same as other fauna AND should also be considered a groundwater dependent ecosystem (GDE.)

In the case of the stygofauna being a GDE, then according to the NSW aquifer interference policy (2012) the GDE must not be impacted without make good measures being put in place…and the stygofauna assessment actually recommends NO FURTHER MONITROING IS REQUIRED!?! For a start, there needs to be a proper baseline study during a wet season." S-121192

As discussed in Section 7.6.2.6 and Appendix 21 of the EIS, cumulative groundwater modelling for the Project indicates that desaturation will occur in two small sections of the Bowmans Creek alluvium. This desaturation results from the cumulative impacts from nearby mines and occurs irrespective of any contribution from Glendell operations (either approved or proposed). The Project will have a negligible impact on the extent of this desaturation. The predicted desaturation will result in the fragmentation of the Bowmans Creek alluvium. This fragmentation constitutes a significant threat to the local stygofauna community, although does not threaten regional stygofauna diversity. It is likely that the stygofauna community in upper Bowmans Creek could be reduced in biodiversity due to it becoming isolated, but this would not be caused by the Project.

The Project will delay reconnection of the fragmented aquifer but any impact from the isolation will already have occurred. As this fragmentation occurs without any contribution from the Project, the impact of the Project on the stygofauna community is negligible which is the reason the recommendation from the Stygofauna Assessment (Appendix 21 of the EIS) does not recommend any additional monitoring.

Therefore, drawdown from the Project poses negligible additional threat to stygofauna communities in the Bowmans Creek alluvium.

5.1.9 Bushfire

Two community submissions relating to bushfire issues were made on the Project. No bushfire issues were identified by interest groups.

A bushfire assessment was undertaken as part of the EIS and is provided in Section 7.14.3 of the EIS. The bushfire assessment was undertaken in accordance with the SEARs for the Project which required an assessment of hazards including bushfire.

Community Submissions

"NSW and the Nation have experienced changed realities with regard to the importance of wildlife and environment, the unpredictable ferocity of fire since this proposal was formulated. Are any mines under threat of ember attack? Does expanding mining pose a fire risk?" S-120681

"Damage to the environment including the loss of flora and fauna numbered in the billions in the recent fires with many species including the koala and platypus now being on the brink of extinction." S-120663

A bushfire threat assessment was completed to identify any potential bushfire threats within or in proximity to the Project Area. The bushfire threat assessment considered available fuel loads for fires, as well as, the slope and aspect of the land within the Project Area.

The vegetation formations and the slope of the land were used to identify appropriate Asset Protection Zones (APZs) for the Project Area. APZs are designed to reduce the potential for flame, radiant heat or embers to ignite a structure and to create a defendable space where occupants or fire-fighters can protect that asset. APZs were calculated in accordance with the NSW Rural Fire Service Planning for Bushfire Protection (PBP) Guideline 2018, a pre-released guideline to the now published 2019 version. It should be noted the bushfire threat assessment completed for the EIS is in accordance with the current Planning for Bushfire Protection (PBP) Guideline 2019 and does not require updating. The PBP method for calculating APZs has been applied at the Mount Owen Complex and approved under the existing Mount Owen Complex Bushfire Emergency Response Procedure.

In accordance with the PBP guideline, the proposed location and design of the MIA allows for the establishment and maintenance of the required 10 m APZ. APZs currently applied to existing infrastructure within the Mount Owen Complex will continue to be maintained as part of the ongoing operations. The application of APZs across the Project Area will mean that any infrastructure or operational activities with the potential to fuel bushfires are managed appropriately.

The majority of the Project Area has been cleared of vegetation associated with approved mining operations and agricultural land uses. The expansion of mining, in particular the Project, does not pose any increased risk of fires. With continued implementation of the bushfire management controls under the Bushfire Emergency Response Procedure in consultation with the RFS as operations progress, it is considered that bushfire risk associated with the Project can continue to be appropriately managed in an effective manner.

As addressed in **Section 3.2**, it should also be noted that RFS did not raise any specific issues in relation to the Project in their submission.

5.1.10 Agriculture

Two community submissions raised agricultural issues however one submission was provided as a comment and does not require a response. A response to the objecting submission is provided below.

A detailed Agricultural Impact Statement (AIS) was prepared as part of the EIS and is included in Section 7.12 and Appendix 27 of the Project EIS. The AIS was prepared in accordance with the SEARs for the Project, Agricultural Impact Statement Technical Notes (DPI 2013), the Upper Hunter SRLUP (2012) and the relevant provisions of the Mining SEPP.

5.1.10.1 Land use

Community Submission

"The agricultural land that will be lost because of this will be valuable in the future" S-121073

As discussed in Section 7.12 of the Project's EIS, the majority of the Additional Disturbance Area is currently managed for low intensity grazing production with only limited cropping of alluvial flats (predominately for pasture purposes) over the past 30 years. The site specific Land and Soil Capability (LSC) assessment confirmed that the majority of the Additional Disturbance Area (91%) would only be suited to low intensity grazing. Areas on the floodplain may be suitable to higher intensity grazing or cropping, representing only 9% of the proposed Additional Disturbance Area.

Biophysical Strategic Agricultural Land (BSAL) mapping is used to identify areas of NSW which have best quality soil, water resources, topography and are naturally capable of sustaining high levels of agricultural productivity and require minimal management practices. The total area of Verified BSAL within the Additional Disturbance Area is approximately 34 ha and is impacted by the Hebden Road realignment, MIA and heavy vehicle access road. However, the BSAL areas within the Additional Disturbance Area which are not permanently impacted by either the Hebden Road realignment or landform shaping required for final landform development (approximately 21 ha), are proposed to be rehabilitated to at least LSC Class 4 (the proposed MIA location and heavy vehicle access road).

The Verified BSAL located in the Additional Disturbance Area represents approximately 1% of the total area of BSAL in the Project Locality (i.e. within an approximate 5 km radius of the Additional Disturbance Area) as mapped in the Upper Hunter Strategic Regional Land Use Policy 2012 (SRLUP). None of the Verified BSAL area is located within the Glendell Pit Extension.

Additionally, much of the land surrounding the Project is mine owned significantly reducing the potential for impacts on private land uses. Where not used for mining related activities, land owned by Glencore and its subsidiaries within and surrounding the Project Area is utilised for cattle grazing and rural residential leases (subject to environmental conditions). The cattle grazing operations are currently managed and operated by Colinta Holdings Pty Limited (Colinta), a Glencore subsidiary. The Project is not predicted to result in adverse impacts on surrounding private agricultural land and the mining operations are expected to continue to coexist with the surrounding agricultural land uses.

5.2 The Project

Two community submissions raised concern over the project design, specifically the extension of time and the proposed extension itself. These responses are discussed below.

5.2.1 Project Design

5.2.1.1 Mine extension/extension of time

Community Submission

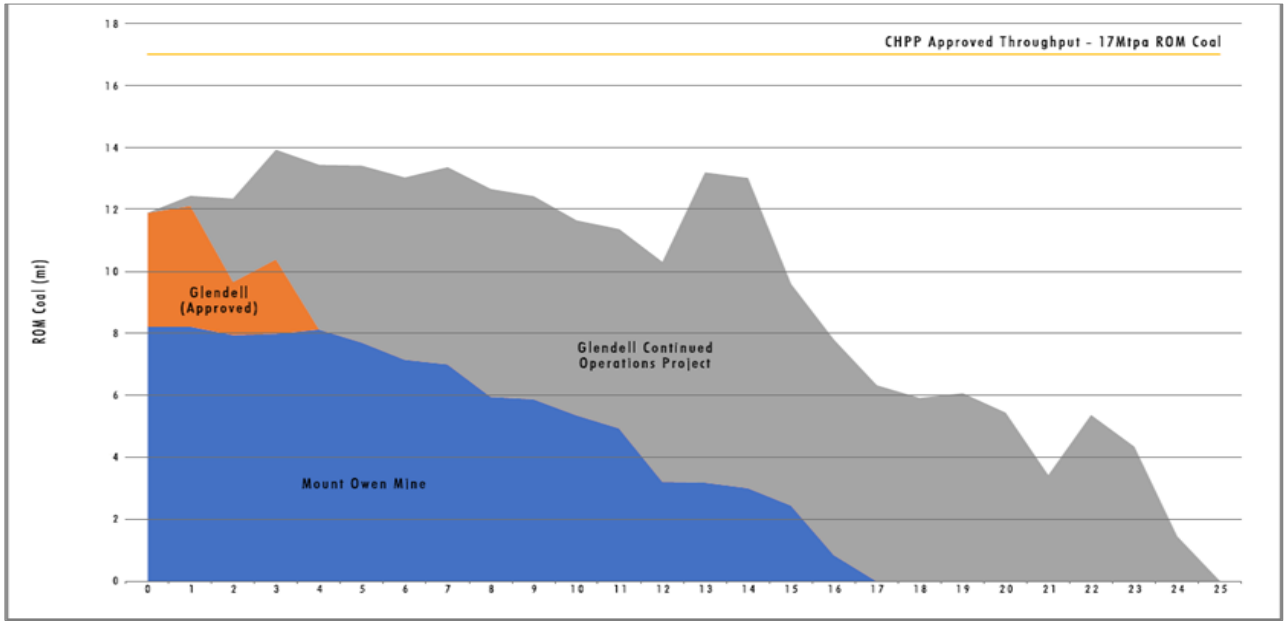
"Extension of mining including extraction of an additional 140 million tonnes of ROM coal until 2044 at an increased rate of 10 million tonnes per annum is so directly appose to the intention of the objects it is laughable." S-120631

As described in Section 3.1 of the EIS, the Project proposes the extension of mining at the Glendell Mine to the north of the current Glendell Pit (Glendell Pit Extension). Estimated additional ROM coal reserves in the Glendell Pit Extension are approximately 135 Mt.

Mining operations for the Project will initially proceed at the current approved production rate (up to 4.5 Mtpa) with production increasing during the life of the operations as production at Mount Owen's Bayswater North Pit and North Pit decline and eventually cease. Proposed maximum annual production from the Glendell Pit Extension will be up to 10 Mtpa ROM coal and would occur at a time when production at other Mount Owen Complex pits is declining such that there is no net increase in production from the complex as a whole. **Graph 5.2** shows the conceptual production schedule for the Mount Owen Complex over the life of the Project and includes the Project mine production schedule.

The Project will not result in any increase to the currently approved 17 Mtpa ROM coal throughput at the Mount Owen CHPP; however the Project will extend the life of the Mount Owen CHPP and associated coal handling and transport system and other infrastructure by an additional approximately eight years beyond that currently approved by the Mount Owen Consent.

The Project represents a brownfield continuation of the existing Glendell Pit and fits within Glencore's commitment to cap its global coal production at 150 Mtpa of saleable product. The Project will occur at a time when production at Glencore's adjacent Liddell Coal Operations, and the Ravensworth East and Glendell Mines have ceased. The coal produced by the Project is 'replacement production' that will help to maintain Glencore's long term production profile.



Graph 5.2 Indicative Mount Owen Complex ROM Coal Production Schedule

Community Submission

"The duration of the proposed extraction is unacceptable considering its contribution to climate change, and the inevitability of the decline in demand. It is another increment in a very recent series of Extensions, which if added into one step, would be so entirely unreasonable as to dismiss its credibility. It is creep.' S-120635

Glencore is a major producer of coal in the global market and coal from the Mount Owen Complex, which includes coal produced from the Glendell Mine, is a key component of Glencore's production profile. The Project will produce both thermal coal and semi-soft coking coal, typically of low ash and high energy content. Coal produced from Glendell may be blended with coal from other operations to meet market specifications and for this reason production from Glendell (and the Project) cannot be viewed in isolation in market terms but rather should be viewed as part of a broader portfolio of coal production. In addition, the coal produced from the Project is required to maintain supply into existing markets and does not represent an increase in production from Glencore's total NSW mining operations.

Coal remains one of the cheapest forms of energy and, while some countries are moving away from coal generated power production, industrialisation and urbanisation of developing economies, particularly in Asia, will continue to drive growth in global energy, electricity, steel and cement.

The South-East Asian economy is expected to triple in size and its energy needs are expected to grow by almost two thirds by 2040 (IEA World Energy Outlook 2018). Coal is expected to continue to be a key input to industrial processes as a competitive, safe, secure and reliable baseload source of energy for this time horizon.

This is supported by the policy commitments made in the Paris Agreement, the platform for the world to transition to a low-carbon economy in response to the risks posed by climate change, and by relevant subsequent analysis of coal demand, particularly in Asia.

In 2018 global seaborne thermal coal demand grew by more than 60 Mt (6.5%) from 2017, dominated by the Pacific and sub-continent markets, rising 8.8%. Indian and Chinese thermal electricity demand growth was 4.9% and 6.0% respectively, supporting demand growth for imported thermal coal. In Asia-Pacific markets, excluding China and India, import demand was buoyed by 9 gigawatts (GW) of newly commissioned coal fired power stations to meet demand for low cost base load electricity. More than 50 GW of new coal fired generation capacity is currently under construction in the region. While Australian export coal supply increased 6% from 2017 to 2018, with few new projects under development, supply growth going forward is expected to be limited meaning that demand for high energy coal, similar to what will be produced by the Project, is likely to be strong.

5.3 Procedural Matters

5.3.1 Compliance with SEARs

Two interest group submissions and one community submission raised issues relating to compliance with SEARs.

Community Submission

'The project EIS clearly hasn't seriously considered "the feasible alternatives to the development (and its key components), including the consequences of not carrying out the development", as required by the SEARs. The sky will not fall if this development doesn't go ahead, but Glencore have only assessed this from their point of view: "If no project then economic benefit of the project will be lost" S-120714

EcoNetwork Port Stephens and Hunter Environment Lobby Inc.

"The project EIS clearly hasn't seriously considered "the feasible alternatives to the development (and its key components), including the consequences of not carrying out the development", as required by the SEARs. The consequences of NOT carrying out this development may not be good for Glencore, but may be good for the planet and also good for consumers of coal fired power, who can swap to cheaper renewable power - the CSIRO has told us that renewable energy is cheaper than coal! Glencore clearly has such a high expectation of consent being granted that they haven't seriously assessed the full consequences of not proceeding with the development."

Appendix 1 of the EIS describes the project alternatives considered for the Project and are summarised in Section 1.3.2 of the EIS.

Glencore commenced investigations into the key mine design options in 2010 including geological and geotechnical drilling, development and assessment of alternate mine plan and infrastructure options, consideration of alternate final landform treatments, financial evaluation of options, and consideration of environmental and social impacts. A summary of the review of alternative mine designs undertaken by Glencore is provided in Table 1, and further discussed in Appendix 1 of the EIS. This shows that the preferred mine plan provides the best balance between economic, environmental and social outcomes.

The various mine plan and final landform options were assessed with a view of achieving a balance between optimal resource recovery and financial return and reducing environmental and social impacts through the implementation of appropriate mitigation measures.

The outcome of these ongoing studies was the selection of the Preferred Mine Plan that is proposed and has been assessed in the Project EIS. The Preferred Mine Plan has also been further refined throughout the impact assessment process to reduce where practicable air quality and noise impacts on sensitive receptors. A summary of the outcomes of the mine plan options assessment with regard to economic viability, technical considerations, and management of environmental and social impacts is provided in Appendix 1 of the EIS and reproduced below. This assessment also included the option of 'No Project'.

'No Project' would result in the loss of potential significant economic benefits to the local and regional communities and the state of NSW; being a net benefit to the Upper Hunter region of $446.7 million (in Net Present Value (NPV) terms), a net benefit of $1.15 billion to the State over the life of the Project (in NPV terms) and $296.1 million (in NPV terms) in royalties to NSW. Further, there would be no continued employment for the existing workforce as proposed as part of the Project (up to approximately 690 full time equivalents (FTEs) at maximum production).

Table 5.7 Summary of Mine Plan options

Option	ROM tonnes (Mt)	Approximate Mine Life (Yrs)	Royalties[1] to State of NSW ($M)	Economically Viable (Provides Financial Return)?	Technically achievable?	Reasonable and Manageable Environmental, Cultural and Social Impact?	Reasonable and Feasible Mine Plan?	Comments
Preferred Mine Plan: GCO Project	135	22	710				Yes	Preferred Mine Plan provides best balance between mine planning, economic, environmental and social outcomes
Option 1: No project	12	3	0				No	If no project then economic benefit of the project will be lost
Option 2: Maximum Resource Recovery	>150	>25	>780				No	Mining through Bowmans Creek and Liddell Underground is technically challenging. Diversion of Bowmans Creek unlikely to offset associated impacts. Also likely impacts on biodiversity and cultural heritage.
Option 3: Hunter Valley Dyke Constrained	145	25	750				No	Technical challenges associated with mining into the Liddell Underground.
Option 4: Yorks Creek Constrained	100	20	520				No	Truncated mine plan reduces ability to achieve a suitable return on capital investment.
Option 5: Swamp Creek Constrained	100	18	520				No	Truncated mine plan reduces ability to achieve a suitable return on capital investment. Potential for additional void in final landform and need for out-of-pit overburden emplacement area.
Option 6: Homestead Mine Around (within 100m)	89	18	460				No	Potential long term stability issues associated with highwall void to east of homestead. Homestead would be subjected to blast vibration and visual setting would change with void to east and dump to south
Option 7: Homestead 500m standoff (900m standoff)	57 (35)	10 (7)	290 (190)				No	Significant reduction in resource recovery and mine life making economically unviable with reduced revenue to the State.
Option 8: Underground Extraction	10	5-8	50				No	Geology and geometry not favourable for underground mining. Also significantly reduced resource recovery (approximately 7% of Preferred Mine Plan) for high capital expenditure

Legend: Key consideration met; Key consideration partially met; Key consideration not met

5.3.2 Economic Assessment

Two community submissions raised issues relating to the economic assessment completed for the Project. No interest group submissions were received.

Community Submission

"The economic analysis undertaken to support the mine is misleading. This analysis focuses only on the economic benefits to the State of NSW.

A separate economic analysis should be undertaken for the local area, and also considering the national and global impacts caused by costs of carbon emissions directly and indirectly associated with the project." S-120894

Consistent with the *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* (DP&E, 2015) the Economic Impact Assessment undertaken for the Project (Appendix 30 of the EIS), contains a local effects analysis (LEA) which assesses the net economic impacts to the local community. The local area was defined in accordance with the guideline, being the relevant statistical area as defined by the Australian Bureau of Statistics. In the Project case, the Lower Hunter SA3 region which includes Singleton and Cessnock was used to assess the economic benefits to this region only. It does not include any economic benefits that may accrue to the major regional centres that are located adjacent, including Maitland and Newcastle or the broader Hunter region.

Results of the LEA indicate that the Project will generate additional potential indirect benefits to local suppliers and employees of $134.3 million and $314.7 million respectively in net present value (NPV) terms above the Approved operations. The incremental indirect cost of the Project is $2.3 million in NPV terms. As a result, the Project is estimated to confer a potential net benefit on the Lower Hunter SA3 region of $446.7 million in NPV terms.

Further, as part of the SIA (Appendix 11 of EIS) information was sourced directly from Glendell Mine's employee, supplier/vendor and investment datasets from 2017 to 2019 to identify socio-economic linkages and associations with communities both within and outside the Singleton LGA. Using a technique known as Town Resource Cluster (TRC), estimations have been made of the direct and indirect contribution of the Project, by considering these employee and supplier associations. This information was further supplemented with a survey of suppliers contracting directly to Glendell.

TRC results are presented in Table 7.12 of the SIA and have been reproduced in **Table 5.4** below. To summarise, **Table 5.4** shows the number of Glendell Mine employees residing in each LGA, the estimated total annual household expenditure of Glendell Mine employees residing in each of these locations, and the estimated annual expenditure (on goods and services) of suppliers to Glendell Mine in each of these locations. It is important to note the calculations for employee and supplier expenditure are dependent on a number of assumptions[3].

[3]

- Inputs relating to employees are based on data provided by Glencore, which have not been externally validated, and are *exclusive* of subcontractors.
- Glendell related supplier expenditure on goods and service across regional townships has been estimated (44%) based on responses to a supplier survey (n=92). Survey data has then been used to extrapolate the amount spent on goods and services for the total Glendell supplier population (n=445) across each LGA within the region.

Table 5.8 Summary of TRC Results for Key Locations of Interest

	Singleton (LGA)	Muswellbrook (LGA	Cessnock (LGA)	Upper Hunter (LGA)	Maitland (LGA)	Newcastle and Lake Macquarie (LGA)
Number of Glendell Mine Employees	63	10	28	9	40	25
Employees' annual household expenditure (estimated)	$4,200,000	$700,000	$1,900,000	$600,000	$2,700,000	$1,700,000
Glendell Supplier's estimated annual expenditure on goods and services by LGA	$31,700,000	$12,800,000	$100,000	$50,000	$9,000,000	$29,600,000

Source: Glendell and Umwelt (2019)

Section 6.2.3 of the SIA highlighted community perception that economic activity associated with the Project should provide maximum benefits for locals. Local employment opportunities and community contributions were the most frequently discussed measures to enhance local economic benefits of the Project.

Community Submission

"The modelling done by Ernst and Young fails to consider likely future impacts to the proposal. Carbon taxeS have been proven to be successful at reducing greenhouse gas emissions. Further international pressure is mounting on Australia to reimplement carbon pricing, and the EU has even made moves to implement what is essential border carbon pricing." S-121095

The indirect costs associated with the Project were calculated as part of the Economic Impact Assessment for the EIS, which included GHG emissions. Consistent with Australia's international obligations under the United Nations Framework Convention on Climate Change, the level of GHG emissions attributable to the Project is measured by Scope 1 and Scope 2 emissions, with Scope 3 emissions excluded. This approach is also consistent with NSW Government *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (NSW. 2015).*

As described in the Economic Impact Assessment, Australia's national climate change policy includes the Emissions Reduction Fund (ERF) and the safeguard mechanism. Under the safeguard mechanism, the Project will be assigned an emissions baseline that it will need to maintain emission levels to. It is only if or when the Project exceeds this emission baseline that there is any carbon cost incurred. Baselines under the safeguard mechanism are calibrated to align with Australia's national emission reduction target and commitments under the Paris Agreement.

The externalities arising from GHG emissions associated with the Project are derived by taking the year-on-year emissions and multiplying these figures by the $14.17 carbon price (per tonne of CO_2e) under the ERF over the life of the Project. The carbon price used was taken from the most recent auction undertaken from the Clean Energy Regulator under the ERF.

On a global basis, the total estimated GHG cost is $62.3 million in NPV terms. Attributing the GHG costs based on the NSW population, consistent with the Guidelines, results in an attributed GHG cost of $0.07 million to NSW in NPV terms. The breakdown is reproduced from the Economic Impact Assessment in **Table 5.9** below.

Table 5.9 GHG emissions attributable to the Project

	NPV*	Total	2021	2026	2033	2038
Tonnes of GHG (Mt)	-					
Scope 1	-	9.9	0.0	0.4	0.7	0.4
Scope 2	-	0.4	0.0	0.0	0.0	0.0
Total	-	**10.4**	**0.0**	**0.4**	**0.8**	**0.5**
Price Path ($ per tonne^)	-	14.2	14.2	14.2	14.2	14.2
Global impact ($ million^)	62.3	146.8	0.3	6.4	10.9	6.4
NSW ($ million ^)	0.07	0.2	0.0	0.0	0.0	0.0

Source: EY estimates based on Umwelt, Greenhouse Gas and Energy Assessment. ^ Real 2019 Australian dollars. * NPV in 2019 Australian dollars based on a 7 per cent real discount rate.

It should be noted that the Scope 1 numbers provided in Table 5.6 are reflective of the results from the original GHGEA prepared as part of the EIS for the Project (Appendix 28 of the EIS) and not the revised assessment provided in **Appendix 2**. The revised assessment indicates that the actual emissions (and therefore the costs associated with these emissions) are less than predicted values in the original assessment which has been verified through gas drilling and modelling at the site by Glencore.

Community Submission

"The economic report also fails to include the health costs associated with air pollution and climate change contributions. Quality adjusted life years of children with asthma for example are significant financial considerations which have failed to be considered." S-121095

As outlined above, the indirect costs associated with the Project were calculated as part of the Economic Impact Assessment for the EIS, which included air quality and GHG emissions. Indirect costs associated with GHG emissions were analysed based on Scope 1 and Scope 2 emissions generated by the Project (see Table 5.6 above) in the economic assessment. The indirect costs associated with air quality were assessed based on results from the air quality impact assessment (AQIA) undertaken by Jacobs which indicated that the Project will have similar air quality impacts to the existing approved operations with impacts in Camberwell and the Middle Falbrook area declining as operations extend to the north.

As described in Section 7.2 and Appendix 13 of the EIS, the Project's incremental contribution to air quality impacts in larger residential areas (e.g. Singleton, Singleton Heights and Muswellbrook) is considered to be negligible. Due to the low population density in other areas around the Project area and the low predicted incremental impacts at these locations, quantification of the economic impacts associated with the adverse health impacts associated with the Project is not necessary.

5.3.3 Engagement and Decision Making

Ten submissions received related to engagement and decision-making and varied in their depth and breadth of response.

Community Submission

"The project is listed as "State Significant Development". Given the importance of the decision to the State - constituents interested in our energy future, mining, alternative energies etc have been given no voice on your list of stakeholders, invited to be part of the process. The significance of the project would surely require broader stakeholder involvement and a more critical focus.

In essence, those invited are confined to those who are involved with the coal industry and community groups within the the Singleton LGA. Within those surveyed from the Singleton LGA, completed interviews comprise only 7.5 % of potential respondents. A small sample.

Despite the overload of tables and surveys and results the Report is significantly diminished in what should be its scope.

Communities along the coal line are all affected by mining in the valley. The residents of large parts of Newcastle breathe in coal dust and live near the mountains of coal awaiting export. Novocastrians were not included as stakeholders in your process. A proposal for the extension of the operation of the mine for 20 years and its expansion should be considered on a much wider community level.

The project - Appendix 11. 3.1 has implications broader than the local LGA on Way of life, Health and Wellbeing, Political and decision-making systems, Fears and aspirations. The stakeholders as described in Table 3.1 and 3.2 show how limited the contribution, from those affected in the greater region." S-120681

Submission S-120681 questioned the adequacy of stakeholder representation during the SIA and outlines that residents along the coal rail route should also have been engaged (Appendix 11 of EIS). Section 7.4.2 of the SIA acknowledges that an emphasis is placed on engagement with local stakeholders, who are more likely to be directly affected by the Project.

The SIA (Appendix 11 of EIS) completed for the project was prepared to meet the requirements of the *Social Impact Assessment Guideline for State Significant mining, petroleum production and extractive industry development* (DPE, 2017a) (SIA Guideline). The SIA provides a participatory platform for the community to be involved in the assessment process relating to state significant developments. An extensive SIA consultation program was undertaken for the Project with key stakeholders encouraged to provide input and feedback to decision-making surrounding the Project, with relatively high levels of satisfaction with the process recorded (7.72 out of 10).

In addition, the SEARS Attachment 3 – Social Impact Assessment Comments Q8-11 Areas of Influence, received from the DPIE, stated that the DPIE were satisfied with the range of stakeholders consulted for the Project: *The Scoping Report describes at length (Section 2.3) the efforts made to identify different social groups that may be affected by the project, and different ways they have been and will continue to be consulted and engaged with during the SIA.* Further DPIE comments in relation to the scoping report suggest: *It (the report) sensibly takes a broad geographical scope to cover potential social impacts across the region, including economic linkages. It also notes that information in the area of influence will be updated in the SIA for the EIS (Section 3.1).*

Community Submission

"In relation to Table 5:4 related to mine approvals, which only looks at four applications, in which three were refused but a failed to table the large number of modifications been approved and continued operations approved in the last couple of years. And the evidence of the number of approvals by the department of planning and PAC and IPCN significantly outweigh the refusals." S-120750

Submission S-120750 expressed a perceived failure of the SIA to identify all recent modifications approved at the Mount Owen Complex. To clarify, the purpose of Table 5.4 (Section 5.4.3 of Appendix 11 of EIS), was to provide an analysis of the current developmental context and projects that had been refused (3 projects) or approved (1 project) by the DPIE in order to evaluate the communities response or resilience to change. Assessment of the positive and negative impacts of previous development projects is considered important to assess the experience of local communities in proximity to mining operations, and the capacity of these communities to adapt to operational changes.

Approval Process

Six objection submissions were received in relation to the DPIE process of assessment for state significant developments, with stakeholders expressing dissatisfaction with the approvals process. Section 7.9 of the SIA acknowledged similar stakeholder sentiment expressed during SIA consultations, including a level of distrust and disempowerment in the government's approvals and assessment process.

Community Submissions

"The whole approval process is as totally corrupt as the NSW Planning Department and doubtless will be approved." S-120627

"It is another increment in a very recent series of Extensions, which if added into one step, would be so entirely unreasonable as to dismiss its credibility" S-120635

"Most of my neighbours are not making submissions because they have made so many submissions to previous projects with their concerns only to fall on deaf ears" S-120792

Interest Group Submission - EcoNetwork Port Stephens

"Glencore tell us that "The project design has been informed by many of the studies to ensure impacts are mitigated as far as reasonably and feasibly possible." The NSW Government/Planning Department needs to be deciding what is "reasonably and feasibly possible", after input from its citizens, not Glencore!"

The EIS and SIA have been undertaken in accordance with relevant NSW legislation and guidelines as prescribed by the SEARs.

Community Submission *"The survey related to the project on the phone was inappropriate, unfair and unjust, more importantly denied the right to make a point because it did not meet the tick in the box question, to the stage it became offensive to the person been interviewed. In relation to the Community Consultative Committee engagement of the community there is no gauge or measure of the performance or related to the accuracy of the material presented. There is possible lack of understanding related to the formal complaint's procedure related to CCC but there is clear failure of departmental involvement in the Community Consultative committee at meetings and failure to assess the performance."* S-120750

Another submission related to the methodology conducted for the random community survey of the wider Singleton LGA (Section 3.4.1 of Appendix 11 of EIS), stating an inability to fairly share all concerns related to the Project. The survey was designed with several quantitative questions, requiring single answer responses, however the final question allowed the respondent to provide any further comments and is unrestricted in its content. Any questions requiring additional information, clarification or justification were able to be completed in this section, allowing an uninhibited response from the interviewee.

In relation to the Community Consultative Committee (CCC), Project material is delivered to CCC representatives, highlighting the most up to date Project information, including data, analysis and interpretation of relevant technical studies, and is delivered in a format that is easy to understand for the general public, with ample opportunities for each member to ask questions and have their query addressed. Meetings are conducted in accordance with the DPIE's *Community Consultative Committee Guideline for State Significant Projects* (NSW Government, 2019), which states that the CCC is not a decision-making or regulatory body, but instead has an advisory and consultative role. No provision is made for the evaluation of the CCC's performance; however, the Government is responsible for ensuring that the proponent complies with their statutory obligations.

There is no formal complaints procedure related to the CCC, other than the CCC is encouraged to discuss complaints with the mine operator and what responses were undertaken. All complaints are encouraged to be recorded through the dedicated Community Response Line, where the complaint can be registered with a member of the Mount Owen Complex Environment and Community Team. The complainant is involved in the reconciliation of the complaint, including the provision of feedback of any outcomes of the investigation.

5.4 Merits of the Project

Two objections were received on the Project which stated no specific issues. These objections were classified as objections on the merits of the Project. However, one of these submissions noted their support for the relocation of the Ravensworth Homestead to Broke, despite objecting to the Project itself.

In addition to the two general objection submissions, ten submissions received on the Project raised concern relating to environmental harm generally and its success in achieving principles of ecological sustainable development. Examples of these submissions and the response is provided below.

5.4.1 Ecologically sustainable development

A number of submissions raised environmental impact of the Project generally and its viability in relation to the principles of ecologically sustainable development (ESD).

Community Submissions

"The very nature of the proposal fails to "facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making". S-120631

"In the circumstances approval of the project would not promote a better environment by the proper management, development, and conservation of the State's natural and other resources, and nor would it facilitate ecologically sustainable development" S-120663

"This continued operations project must not go ahead. It would be detrimental to our environment." S-120548

"The proposal also fails to protect the environment in anyway whatsoever." S-120631

An assessment of the Project in relation to the principles of ecologically sustainable development (ESD) was completed as part of the EIS (refer to Section 8.3 of the EIS).

The EIS and SIA assessment processes involved a detailed study of the existing environment and community (refer to Sections 4.0 and 7.0 of the EIS), and the use of engineering and scientific modelling to assess and determine potential impacts as a result of the Project, as well as modelling of economic costs and benefits. Environmental impact assessment models have been calibrated using data gathered from the existing mining operation (e.g. noise, air, water and blast monitoring data) to ensure the models are robust and appropriately characterise the Project, allowing the impacts to be predicted and evaluated. To this end, there has been careful evaluation to avoid, where possible, irreversible damage to the environment. Social impact assessment and economic modelling have also been undertaken in accordance with specific NSW impact assessment guidelines.

The Project is not predicted to increase noise and air quality impacts relative to that already experienced in the area and both noise and air quality impacts are predicted to decline at residential areas to the south and east as mining operations progress away from these areas. Project specific impacts in the Hebden area will increase but remain within relevant noise and air quality criteria and cumulative impacts in this area will decline as mining operations at Liddell cease and AGL's Liddell Power station ceases operations.

The Project maximises efficiency of the coal resource recovery and productivity on an existing brownfield site and provides for further efficiencies through the use of the existing Mount Owen CHPP and associated infrastructure.

A range of environmental management and mitigation measures, including avoiding and minimising biological impacts and delivery of a biodiversity offset strategy (discussed in Section 7.0 and Appendix 5 of the EIS) have been developed and evaluated to minimise the impact on the environment as far as practicable. The design of the Project and commitment to the management of environmental issues as outlined in this EIS, including rehabilitation commitments, will maintain the health, diversity and productivity of the environment for future generations. The Project will also make a significant contribution to maintaining services in the community through the direct and flow on effects of workforce and operational expenditure and through development contributions in accordance with the EP&A Act.

6.0 Proposed Additional Management Measures

The proposed additional mitigation measures will be finalised following the additional assessment work being completed in relation to heritage and a consolidated list of mitigation measures will be provided in the RTS Part B report.

7.0 Updated Evaluation of Project Merits

Following consideration of the submissions received, Glencore has prepared the detailed response report to address the issues raised in agency, community and interest group submissions. This process has included undertaking some additional works, providing clarifications and, where relevant, explaining the findings of the technical studies that have been completed as part of the EIS in order to address all of the issues raised. Glencore has also made additional commitments (refer to **Section 6.0**) as a response to some of the issues raised in the submissions. The overall outcomes of this response to submissions process have not changed the overall assessment of merits of the Project as outlined in the EIS.

In this regard, it is considered that the Project as proposed is a logical brownfield continuation of Glendell Mine to the immediate north of the existing operation using existing processing infrastructure. The Glendell Pit Extension is located on mine owned land that is surrounded on three sides by current and historical mining operations. The majority of the Project Area has been cleared through historic agricultural use with only a few remnant areas of trees. Almost the entirety of the vegetation within the Project's Additional Disturbance Area is regrowth that has occurred over the past 30 years, including the riparian vegetation along Swamp Creek and Yorks Creek. Past and approved mining within and surrounding the Project Area has significantly modified the regional groundwater and surface water systems and will continue to do so into the future. There is substantial buffer distance between the Project and private residences, with the nearest residence being approximately 3.5 km from the Glendell Pit Extension.

The proposed relocation of the Ravensworth Homestead is an ancillary aspect of the Project that is required to enable the efficient extraction of coal reserves in accordance with Glencore's obligations as a tenement holder under the *NSW Mining Act 1992* and maximise the economic benefits of the Project whilst mitigating potential heritage impacts.

The same environmental management approach and controls implemented as part of the existing Mount Owen Complex operations will continue to apply to the Project, which is considered leading practice. This includes integrated mine design and management to minimise dust and noise impacts, manage water, and the implementation of rehabilitation techniques. As part of the implementation of the Project, Glencore will continue to manage and respond to issues or community concerns that arise and seek to continuously improve environment and community mitigation and monitoring.

The Project proposes the same mining techniques and equipment as the existing operations. The mine plans have been designed to maximise resource recovery, operational efficiencies and synergies with the existing operations whilst aiming to minimise environmental and social impacts. The extraction of this resource now, while there is existing mining equipment operating at the site, an existing workforce and available mining infrastructure, is substantially more efficient than seeking to mine the resource at a future date following closure and rehabilitation of the existing operations. It is highly likely that the economic benefits of mining this substantial resource may never be realised if it is not mined as part of continued operations at the Glendell Mine.

Glencore is committed to transitioning to a low-carbon economy. To assist in meeting the growing needs of a lower carbon economy, globally the company aims to prioritise its capital investment to grow production of commodities essential to the energy and mobility transition and to limit its coal production capacity broadly to current levels. This commitment was made publicly in 2019. The Project will extend the life of the existing operation and continue to contribute to coal production at the Mount Owen Complex for approximately another twenty years. In this regard the Project fits within Glencore's commitment of a production cap, as it is focused on sustaining current coal production and is not proposing an increase in production or output from the overall Mount Owen Complex. This continued production from the Mount Owen Complex meets Glencore's existing market demand for coal. The Project would commence at a time when production at other adjacent Glencore mining operations is ceasing (Glendell, Liddell and

Ravensworth East) with the coal produced by the Project being 'replacement production' that will contribute to Glencore's long term production profile and the future demand for high quality thermal and semi-soft coking coal.

Should the Project not be approved, the closure of the Glendell Mine at the end of its planned life would result in the loss of up to approximately 300 full-time positions, plus the potential loss of flow-on jobs and significant economic benefits for the local and regional communities. If approved, the Project would provide for ongoing employment opportunities for the Glendell workforce and the wider region. This would also maintain the Mount Owen Complex employment levels for an extended period of time, as production in the Glendell Pit Extension increases and mining in the Bayswater North Pit and North Pit decline. The Project also provides significant ongoing economic benefits to the local area, the region and the State, with an estimated net benefit of $1.15 billion to NSW over the life of the Project in NPV terms.

As outlined in the EIS, the Project has been assessed against the principles of ESD as required by the EP&A Act and EP&A Regulation. This assessment has indicated that while the Project, like any large scale development, will have impacts, these impacts can be effectively managed, mitigated and offset and the development will result in significant economic benefits. The assessment therefore concluded that the Project is consistent with the principles of ESD and after consideration of the submissions made and the responses provided in this RTS, there is no change to that conclusion.

The Economic Assessment completed as part of the EIS (refer to Appendix 30 of the EIS) describes a range of positive benefits at a local, regional and State level that will result from the Project. These benefits include:

- ongoing employment opportunities for the existing Glendell Mine workforce
- an ongoing contribution to the local, regional and State economies from a well-established mining operation
- a net benefit on the Lower Hunter SA3 region of $446.7 million in NPV terms
- a net benefit of approximately $1.15 billion to NSW over the life of the Project in NPV terms
- a royalty revenue stream flowing to the NSW Government estimated to be $710 million over the life of the Project ($296.1 M in NPV terms)
- significant export earnings for Australia.

The revenue, expenditure and employment associated with the construction and operation of the Project will stimulate economic activity in the regional economy, as well as the broader NSW economy. Over the life of the Project, the Hunter Region's Gross Regional Product (GRP) is projected to increase by $2.52 billion in NPV terms. NSW's Gross State Product (GSP) (including the Hunter) is predicted to increase by around $3 billion (NPV terms).

The cost benefit analysis undertaken for the Project assessed the net benefit of the Project when all external and internal costs were considered, including environmental and social externality costs. As noted above, the economic benefits to the local region and the State are significant.

With the implementation of the management, mitigation and offset measures proposed by Glencore, it is considered that the Project would result in a substantial net benefit to the NSW community.

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9.0 Abbreviations

Term	Definition
AAIA	Aboriginal Archaeology Impact Assessment
ACHA	Aboriginal Cultural Heritage Assessment
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHM	Australian Cultural Heritage Management
ACHMP	Aboriginal Cultural Heritage Management Plan
AEP	Annual Exceedance Probability
AGE	Australasian Groundwater and Environmental Consultants Pty Ltd
AHIMS	Aboriginal Heritage Information Management System
AIP	NSW Aquifer Interference Policy
Approved Glendell Disturbance Area	Areas approved for disturbance under the Glendell Consent (including areas identified for disturbance under the Glendell Modification 4 application
ANZG	*Australian New Zealand Freshwater Quality Guidelines 2018*
ANZECC	Australian and New Zealand Environment Conservation Council
AQGHGMP	Air Quality and Greenhouse Gas Management Plan
AQIA	Air Quality Impact Assessment
BAM	Biodiversity Assessment Methodology
BC Act	*Biodiversity Conservation Act 2016*
BC Regulation	*Biodiversity Conservation Regulation 2017*
BCM	Bank Cubic Meters (volume of rock material in situ)
BCD	Biodiversity and Conservation Division within DPIE
BDAR	Biodiversity Development Assessment Report
BIA	Blast Impact Assessment
BMP	Blast Management Plan
BNP	Bayswater North Pit
BOM	Bureau of Meteorology
BOMP	Biodiversity and Offset Management Plan
BSAL	Biophysical Strategic Agricultural Land
C&L	Casey & Lowe Pty Ltd (T/A Casey & Lower Archaeological & Heritage)
CBA	Cost Benefit Analysis
CCC	Community Consultative Committee
CEEC	Critically Endangered Ecological Community
CHPP	Coal Handling and Preparation Plant
CLM Act	*Crown Lands Management Act 2016*
dB(A), dBA	Decibels A-weighted.

Term	Definition
Development Footprint	The total impact zone assessed by the BDAR in accordance with the BAM
DoEE	Commonwealth Department of Environment and Energy
DPE	Department of Planning and Environment (now DPIE)
DPIE	Department of Planning, Industry and Environment
DPI	Department of Primary Industries
DNG	Derived Native Grassland
DRG	Department of Planning, Industry and Environment – Division of Resources and Geoscience (now MEG)
DSC	NSW Dams Safety Committee
EA	Environmental Assessment
EEC	Endangered Ecological Community
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ESC	Enviro Strata Consulting Pty Ltd
ESD	Ecologically sustainable development
FTE	Full time equivalent
GCAA	Glencore Coal Assets Australia
GDE	Groundwater Dependent Ecosystem
GHD	GHD Pty Ltd
GHG	Greenhouse Gas
GHGEA	Greenhouse Gas and Energy Assessment
Glencore	The proponents collectively
Glendell Consent	Glendell development consent DA 80/952
Glendell Continued Operations Consent	Proposed development consent to cover the mining of the Glendell Pit Extension – (SSD9349)
Glendell Continued Operations Disturbance Area	Areas to be disturbed by the Project that are to be managed under the Glendell Continued Operations Consent
Glendell Modification 4	Section 4.55 application to modify the Glendell Consent for a minor extension of the approved mining area
GRAWTS	Greater Ravensworth Area Water and Tailings Scheme
GRP	Gross Regional Product

Term	Definition
GSP	Gross State Product
GWIA	Groundwater Impact Assessment
ha	hectare
HASS	Heritage Analysis and Statement of Significance (HASS)
Heritage Act	*Heritage Act 1977*
HRSTS	Hunter River Salinity Trading Scheme
IESC	Independent Expert Scientific Committee
IPC	Independent Planning Commission
km	kilometre
ktpa	Thousand tonnes per annum
LEA	Local effects analysis
LEP	Local Environment Plan
LGA	Local Government Area
LOM	Life of Mine
LSC	Land and Soil Capability
LSJ	Lucas Stapleton Johnson & Partners Pty Ltd
m	metre
MEG	Department of Planning, Industry and Environment – Division of Mining, Exploration and Geoscience within the Department of Regional NSW (MEG) (formerly DRG)
mg/L	Milligram per litre
mAHD	Metres above Australian Height Datum
Mbcm	Million bank cubic metres
MIA	Mine Infrastructure Area
Mining Act	Mining Act 1992
Mining SEPP	*State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
ML	Megalitre (when used in relation to volume of water)
Mtpa	Million tonnes per annum
MNES	Matters of National Environmental Significance
MOP	Mining Operations Plan (also referred to as Rehabilitation Management Plan)
Mount Owen	Mt Owen Pty Limited
Mount Owen Complex	The combined operations of the Mount Owen Mine, Ravensworth East Mine and Glendell Mine
Mount Owen Consent	Mount Owen Continued Operations Project development consent SSD-5850
MSB	NSW Mine Subsidence Board (now Subsidence Advisory NSW)
CMSC Act	*Coal Mine Subsidence Compensation Act 2017*
Mt	Million tonnes
Mtpa	Million tonnes per annum

Term	Definition
Narama Pipeline Modification	Section 4.55 EP&A Act application to modify the Mount Owen Consent to permit the construction and operation of an augmented GRAWTS water linkage between the Mount Owen Complex and Ravensworth Operations
NEPM	National Environment Protection Measures
NGER	National Greenhouse and Energy Reporting
NIA	Noise Impact Assessment
NMP	Noise Management Plan
NOx	Nitrogen Oxide
NPfI	Noise Policy for Industry
NPV	Net Present Value
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	Office of Environment and Heritage (now BCD)
OzArk	OzArk Environmental and Heritage Management
PCT	Plant Community Type
PCWP	Plains Clan of the Wonnarua People
PM_{10}	Particulate Matter less than 10 µm in diameter
$PM_{2.5}$	Particulate matter less than 2.5 µm in diameter
PSNL	Project Specific Noise Levels
RAP	Registered Aboriginal Party
Ravensworth Homestead Complex/ Homestead Complex	Refers to the c1832 complex of buildings including the main house with attached kitchen wing, the stables, the barn, the men's quarters, the privy, the gardens, farm yard and associated boundary. Shown as Site 1 (C&L Archaeological Test Areas 3 & 4).
Resources Regulator	Department of Planning, Industry and Environment – Resources Regulator
RFS	Rural Fire Service
RHAC	Ravensworth Homestead Advisory Group
RMP	Rehabilitation Management Plan
Roads Act	Roads Act 1993
ROM	Run of mine
SEARs	Secretary's Environmental Assessment Requirements
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy
SIA	Social Impact Assessment
SIA Guideline	Social impact assessment guideline for State significant mining, petroleum production and extractive industry development (DPE, 2017)
Singleton LEP	*Singleton Local Environmental Plan 2013*
SRLUP	Strategic Regional Land Use Plan
SSD	State significant development
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*

Term	Definition
SWIA	Surface Water Impact Assessment
Synoptic Plan	Synoptic Plan Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW (Andrews, 1999)
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
µg	microgram
UNFCCC	United Nations Framework Convention on Climate Change
VCA	Voluntary Conservation Area
VLAMP	Voluntary Land Acquisition and Mitigation Policy 2018 (NSW Government, 2018)
VPA	Voluntary Planning Agreement
WAL	Water Access Licence
WLALC	Wanaruah Local Aboriginal Land Council
WMS	Water Management System
WNAC	Wonnarua Nation Aboriginal Corporation

APPENDIX 1

Register of Submitters

Appendix 1 – Register of Submitters

Agency Submission	Where issues are addressed in RTS
Division of Resources and Geoscience	**Section 4.1**
Resource Regulator	**Section 4.2**
Department of Planning, Industry and Environment - Water	**Section 4.3**
Environment Protection Authority	**Section 4.4**
Biodiversity and Conservation Division – Environment, Energy and Science	**Section 4.5** – response to issues relating to cultural heritage will be provided in RTS Part B report
Department of Primary Industries	**Section 4.6**
Singleton Council	**Section 4.7**
Crown Lands	**Section 4.8**
Hunter New England Local Health District	**Section 4.9**
NSW Rural Fire Service	**Section 4.10**
Subsidence Advisory NSW	**Section 4.11**
Transport for NSW	**Section 4.12**
Dams Safety NSW	**Section 4.13**
Department of Environment and Energy	**Section 4.14**
Heritage Council	Response will be provided in RTS Part B report
Independent Expert Scientific Committee	Response will be provided separately to the RTS

Issue Category					Environmental, Social and Economic Issues																								The Project	Merits		Procedural Matters		
Theme					Agriculture	Climate Change	Impacts on Community							Rehabilitation		Project Emissions				Water Resources		Biodiversity		Heritage			Bushfire	Socio-economic		Project Design	Merits		Compliance With SEARs	Economic Assessment	Engagement and Decision Making
Sub-Theme																																	
Submitter	Ref. Number (Submitter ID)	Location	Group	View	Land Use	GHG/Climate Change	Sense of Community and Culture	Health and Wellbeing	Personal and Property Rights	Intergenerational equity	Social Amenity	Existing Operation/infrastructure	Impacts on Surroundings	Final Void/ Final Landform	Rehabilitation	Air Quality	Blasting	Noise	Cumulative Impacts	Groundwater	Surface Water	Stygofauna	Biodiversity impact	Ravensworth Homestead	Aboriginal Cultural Heritage	Aboriginal events related to Heritage and Historical Ravensworth Estate	Bushfire	Economic Contribution and Community Investment	Lack of Community Benefits	Mine Extension/Extension of Time	Support/Object (Non-Specific)	Environmental Harm/Ecologically Sustainable Development	Compliance with SEARs	Economic Assessment	Engagement and Decision Making
Aaron Hamer	S-120599	Branxton 2335	Individual	Support			2.3.3				2.3.3																	2.3.3						
Adrian Jaji	S-120778	Corlette 2315	Individual	Support			2.3.3																											
Allan Davies	S-120713	Coolum Beach 4573	Individual	Support								2.3.3																2.3.3						
Allan Pryor	S-120866	Figtree 2525	Individual	Support																								2.3.3						
Amy Breakwell	S-119079	Aberglasslyn 2320	Individual	Support			2.3.3																					2.3.3						
Andrew Drain	S-120571	Largs 2320	Individual	Support																								2.3.3						
Andrew Lovell	S-121080	Branxton 2335	Individual	Support																								2.3.3						
Anonymous	S-119300	Floraville 2280	Individual	Support																								2.3.3						
Anonymous	S-119676	North Rothbury 2335	Individual	Support								2.3.3																2.3.3						
Anonymous	S-119885	Milbrodale 2330	Individual	Support																								2.3.3						
Anonymous	S-120135	Muswellbrook 2333	Individual	Support								2.3.3																2.3.3						
Anonymous	S-120254	Merewether 2291	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120258	Thornton 2322	Individual	Support																								2.3.3						
Anonymous	S-120283	Branxton 2335	Individual	Support																								2.3.3						
Anonymous	S-120319	Macksville 2447	Individual	Support			2.3.3			2.3.3																								
Anonymous	S-120320	Griffith 2680	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120321	Gumma 2447	Individual	Support																								2.3.3						
Anonymous	S-120493	Rutherford 2320	Individual	Support						2.3.3																								
Anonymous	S-120497	Charlestown 2290	Individual	Support																											2.3.3			
Anonymous	S-120503	Maitland 2320	Individual	Support																								2.3.3						
Anonymous	S-120505	Rutherford 2320	Individual	Support																								2.3.3						
Anonymous	S-120515	Newcastle East 2300	Individual	Support																								2.3.3						
Anonymous	S-120517	Singleton 2330	Individual	Support																								2.3.3						
Anonymous	S-120527	Windella 2320	Individual	Support			2.3.3			2.3.3																		2.3.3						
Anonymous	S-120542	Singleton Heights 2330	Individual	Support																								2.3.3						
Anonymous	S-120544	Branxton 2335	Individual	Support																								2.3.3						
Anonymous	S-120556	Telarah 2320	Individual	Support																											2.3.3			
Anonymous	S-120575	Lorn 2320	Individual	Support			2.3.3			2.3.3		2.3.3																2.3.3						
Anonymous	S-120586	Scone 2337	Individual	Support						2.3.3	2.3.3																	2.3.3						2.3.3
Anonymous	S-120587	Dartbrook 2336	Individual	Support							2.3.3																	2.3.3						
Anonymous	S-120601	Singleton 2330	Individual	Support						2.3.3	2.3.3																	2.3.3						
Anonymous	S-120608	Gumma 2447	Individual	Support																											2.3.3			
Anonymous	S-120634	Branxton 2335	Individual	Support																								2.3.3						
Anonymous	S-120656	Gowrie 2330	Individual	Support																								2.3.3						
Anonymous	S-120665	Singleton Heights 2330	Individual	Support																								2.3.3						
Anonymous	S-120666	Singleton Heights 2330	Individual	Support																								2.3.3						
Anonymous	S-120667	Heddon Greta 2321	Individual	Support																											2.3.3			
Anonymous	S-120676	Heddon Greta 2321	Individual	Support																								2.3.3						
Anonymous	S-120687	Lower Belford 2335	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120703	North Rothbury 2335	Individual	Support																											2.3.3			
Anonymous	S-120709	Macksville 2447	Individual	Support																								2.3.3						
Anonymous	S-120711	Bonny Hills 2445	Individual	Support																								2.3.3						
Anonymous	S-120722	Lower Belford 2335	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120727	Broke 2330	Individual	Support			2.3.3																											
Anonymous	S-120728	Singleton 2330	Individual	Support																											2.3.3			
Anonymous	S-120743	Broke 2330	Individual	Support			2.3.3																											
Anonymous	S-120793	Heddon Greta 2321	Individual	Support																								2.3.3						
Anonymous	S-120834	East Gresford 2311	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120849	Hunterview 2330	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120850	Gumma 2447	Individual	Support																											2.3.3			
Anonymous	S-120851	Hunterview 2330	Individual	Support																								2.3.3						
Anonymous	S-120864	Aberglasslyn 2320	Individual	Support								2.3.3																2.3.3						
Anonymous	S-120869	Figtree 2525	Individual	Support						2.3.3																		2.3.3						
Anonymous	S-120608	Gumma 2447	Individual	Support																											2.3.3			
Anonymous	S-120321	Gumma 2447	Individual	Support																														
Anonymous	S-120881	Singleton 2330	Individual	Support																								2.3.3						
Anonymous	S-120883	Mascot 2020	Individual	Support																								2.3.3						
Anonymous	S-120890	Shortland 2307	Individual	Support																								2.3.3						

Issue Category					Environmental, Social and Economic Issues																								The Project	Merits		Procedural Matters		
Theme					Agriculture	Climate Change	Impacts on Community							Rehabilitation		Project Emissions				Water Resources		Biodiversity		Heritage			Bushfire	Socio-economic		Project Design	Merits		Compliance With SEARs	Economic Assessment	Engagement and Decision Making
Sub-Theme					Land Use	GHG/Climate Change	Sense of Community and Culture	Health and Wellbeing	Personal and Property Rights	Intergenerational equity	Social Amenity	Existing Operation/infrastructure	Impacts on Surroundings	Final Void/ Final Landform	Rehabilitation	Air Quality	Blasting	Noise	Cumulative Impacts	Groundwater	Surface Water	Stygofauna	Biodiversity impact	Ravensworth Homestead	Aboriginal Cultural Heritage	Aboriginal events related to Heritage and Historical Ravensworth Estate	Bushfire	Economic Contribution and Community Investment	Lack of Community Benefits	Mine Extension/Extension of Time	Support/Object (Non-Specific)	Environmental Harm/Ecologically Sustainable Development	Compliance with SEARs	Economic Assessment	Engagement and Decision Making
Submitter	Ref. Number (Submitter ID)	Location	Group	View																															
Anonymous	S-120899	Singleton Heights 2330	Individual	Support																								2.3.3							
Anonymous	S-120908	Broke 2330	Individual	Support			2.3.3																												
Anonymous	S-120922	Bolwarra Heights 2320	Individual	Support						2.3.3																		2.3.3							
Anonymous	S-120952	Muswellbrook 2333	Individual	Support																								2.3.3							
Anonymous	S-120995	Thornton 2322	Individual	Support																								2.3.3							
Anonymous	S-120997	North Rothbury 2335	Individual	Support																								2.3.3							
Anonymous	S-120998	Scone 2337	Individual	Support																								2.3.3							
Anonymous	S-120999	Greta 2334	Individual	Support																								2.3.3							
Anonymous	S-121004	Ravensworth 2330	Individual	Support						2.3.3	2.3.3																	2.3.3							2.3.3
Anonymous	S-121005	Merewether 2291	Individual	Support																								2.3.3							
Anonymous	S-121008	Heddon Greta 2321	Individual	Support						2.3.3																		2.3.3							
Anonymous	S-121044	Manly 2095	Individual	Support																								2.3.3							
Anonymous	S-121063	Singleton Heights 2330	Individual	Support						2.3.3																		2.3.3							
Anonymous	S-121072	Gillieston Heights 2321	Individual	Support																								2.3.3							
Anonymous	S-121077	Singleton 2330	Individual	Support																								2.3.3							
Anonymous	S-121083	Singleton 2330	Individual	Support							2.3.3	2.3.3																2.3.3							
Anonymous	S-120544	Branxton 2335	Individual	Support																								2.3.3							
Anonymous	S-121134	Singleton Heights 2330	Individual	Support			2.3.3			2.3.3																		2.3.3							
Anonymous	S-121144	Singleton Heights 2330	Individual	Support																								2.3.3							
Anonymous	S-121150	Singleton Heights 2330	Individual	Support																								2.3.3							
Anonymous	S-121173	Bolwarra 2320	Individual	Support																								2.3.3							
Anonymous	S-121180	Bolwarra Heights 2320	Individual	Support						2.3.3																		2.3.3							2.3.3
Anthony Fay	S-120578	Singleton 2330	Individual	Support																								2.3.3							
Ashley McLeod	S-118350	Hunterview 2330	Individual	Support																								2.3.3							
Belinda Passlow	S-120734	Bulga 2330	Individual	Support																								2.3.3							
Benjamin Deaves	S-120723	Hunterview 2330	Individual	Support																								2.3.3							
Benjeman Cummins	S-120731	Millfield 2325	Individual	Support																															
Bianca Rolph	S-120607	Greta 2334	Individual	Support																											2.3.3				
Brad Whitmarsh	S-120765	Fordwich 2330	Individual	Support			2.3.3																					2.3.3							
Brendan O'Brien	S-119340	Stanhope 2335	Individual	Support																								2.3.3							
Brendan Mudd	S-120668	Bishops Bridge 2326	Individual	Support						2.3.3	2.3.3																	2.3.3							
Brendan Haworth	S-120877	Muswellbrook 2333	Individual	Support																											2.3.3				
Brendon Heien	S-120923	East Branxton 2335	Individual	Support						2.3.3																		2.3.3							
Brett Harris	S-120031	Wattle Ponds 2330	Individual	Support																								2.3.3							
Brian Mcguigan	S-120831	Pokolbin 2320	Individual	Support			2.3.3																												
Callan Sheldon	S-120888	Salamander Bay 2317	Individual	Support								2.3.3																2.3.3							
Cameron Wallace	S-120848	Singleton 2330	Individual	Support						2.3.3																		2.3.3							
Campbell Anlezark	S-120492	Mulbring 2323	Individual	Support																								2.3.3							
Cindy Wilkinson	S-120602	Roughit 2330	Individual	Support																								2.3.3							
Craig Duffie	S-120330	North Rothbury 2335	Individual	Support																								2.3.3							
Daniel Pietrangel	S-120504	Singleton 2330	Individual	Support																								2.3.3							
Daryl Gray	S-121082	Jerrys Plains 2330	Individual	Support						2.3.3																		2.3.3							
Dean Bryen	S-120896	East Branxton 2335	Individual	Support			2.3.3			2.3.3																		2.3.3							
Donovan Meehan	S-120840	Cliftleigh 2321	Individual	Support																								2.3.3							
Doug Smith	S-120551	Cessnock 2325	Individual	Support						2.3.3																		2.3.3							
Emily Hunter	S-120934	Nulkaba 2325	Individual	Support																								2.3.3							
Emma Oswell	S-120625	Aberglasslyn 2320	Individual	Support																								2.3.3							
Expressway Spares	-	Wauchope 2446	Interest Group	Support																								2.3.3							
Felicia Deaves	S-120724	Hunterview 2330	Individual	Support																								2.3.3							
Francesca Scholl	S-120725	Broke 2330	Individual	Support			2.3.3																												
Gareth Boss-Walker	S-121181	Wattle Ponds 2330	Individual	Support							2.3.3																	2.3.3							
Geoff Trescott	S-120694	Tenambit 2323	Individual	Support								2.3.3																2.3.3							
Geoff Stevenson	S-120879	Singleton Heights 2330	Individual	Support																								2.3.3							
Graham Weary	S-119209	Hamlyn Terrace 2259	Individual	Support																								2.3.3							
Graham Farish	S-120737	Lambton 2299	Individual	Support			2.3.3																												
Harrison Vassallo	S-120893	Singleton 2330	Individual	Support						2.3.3																		2.3.3							
Helen Sharrock	S-120775	Fordwich 2330	Individual	Support																								2.3.3							
Hiroshi Morita	S-121019	Sydney 2000	Individual	Support						2.3.3																		2.3.3							

Issue Category					Environmental, Social and Economic Issues																								The Project	Merits		Procedural Matters		
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Submitter	Ref. Number (Submitter ID)	Location	Group	View																															
Ian Buffier	S-121052	Bolwarra Heights 2320	Individual	Support						2.3.3		2.3.3																2.3.3							
Jack Stoker	S-120494	Weston 2326	Individual	Support																								2.3.3							
James Johnston	S-119662	East Maitland 2323	Individual	Support			2.3.3																					2.3.3							
James Cox	S-120854	Muswellbrook 2333	Individual	Support						2.3.3	2.3.3																	2.3.3							
Jason Passlow	S-120732	Bulga 2330	Individual	Support																								2.3.3							
Jason Cooper	S-120738	Broke 2330	Individual	Support			2.3.3																												
Jeff Torkington	S-120689	Stanmore 2048	Individual	Support						2.3.3		2.3.3																2.3.3							
Jeremy Hill	S-120314	East Maitland 2323	Individual	Support																								2.3.3							
Jeroen Hendriks	S-121007	Merewether 2291	Individual	Support																								2.3.3							
Jody Derrick	S-120701	Broke 2330	Individual	Support			2.3.3																					2.3.3							
Joel Cribb	S-120670	East Maitland 2323	Individual	Support																								2.3.3							
Jon Gontier	S-121017	Ellalong 2325	Individual	Support						2.3.3																									
Jordan Smith	S-120603	Singleton 2330	Individual	Support						2.3.3																		2.3.3							
Joseph Andrews	S-119678	North Rothbury 2335	Individual	Support																								2.3.3							
Joseph Florence	S-120642	Heddon Greta 2321	Individual	Support						2.3.3																		2.3.3							
Justin Martin	S-120616	Speers Point 2284	Individual	Support						2.3.3																		2.3.3							
Kate Mcshea	S-120272	Hunterview 2330	Individual	Support																								2.3.3							
Kathleen Harris	S-120553	Largs 2320	Individual	Support																								2.3.3							
Kelsea Lewis	S-120858	Wattle Ponds 2330	Individual	Support																								2.3.3							
Kerry Popowski	S-120678	Mount Thorley 2330	Individual	Support						2.3.3																		2.3.3							
Kevin Morris	S-120312	Rutherford 2320	Individual	Support																								2.3.3							
Kevin Hardy	S-120675	Bateau Bay 2261	Individual	Support																											2.3.3				
Kim Charters	S-120636	Castle Rock 2333	Individual	Support			2.3.3			2.3.3																		2.3.3							
Kim Barry	S-120658	Singleton Heights 2330	Individual	Support																								2.3.3							
Leanne Morris	S-120644	Rutherford 2320	Individual	Support																								2.3.3							
Lee Morgan	S-120514	Singleton Heights 2330	Individual	Support																								2.3.3							
Leighton O?brien	S-120543	Rutherford 2320	Individual	Support																								2.3.3							
Leon Cutts	S-119681	North Rothbury 2335	Individual	Support																								2.3.3							
Liam Murphy	S-119282	Fern Bay 2295	Individual	Support																								2.3.3							
Lindsay Macleay	S-120513	Wybong 2333	Individual	Support																								2.3.3							
Ling Tayla	S-120508	Singleton Heights 2330	Individual	Support																								2.3.3							
Madi Magill	S-120574	Singleton 2330	Individual	Support																								2.3.3							
Maico Pereira	S-120516	Hunterview 2330	Individual	Support								2.3.3																2.3.3							
Mark Robinson	S-120318	Lambton 2299	Individual	Support								2.3.3																2.3.3							
Mark Russell	S-120683	Unknown 2330	Individual	Support			2.3.3																					2.3.3							
Matt King	S-120664	Soldiers Point 2317	Individual	Support						2.3.3																		2.3.3							
Matt Owens	S-120892	Thornton 2322	Individual	Support			2.3.3																					2.3.3							
Michael Deaves	S-120525	Hunterview 2330	Individual	Support			2.3.3																					2.3.3							
Michael Walls	S-120559	Aberglasslyn 2320	Individual	Support								2.3.3																2.3.3							
Michele Omeley	S-121175	Aberglasslyn 2320	Individual	Support																								2.3.3							
Mitch Graham	S-120688	Lambton 2299	Individual	Support																								2.3.3							
Mitchell Nolan	S-120673	Maitland Vale 2320	Individual	Support					2.3.3																			2.3.3							
Mitchell Bayley	S-120882	Singleton 2330	Individual	Support																								2.3.3							
Murray Gregson	S-121054	Lorn 2320	Individual	Support																								2.3.3							
Namka Gorman	S-120886	Mulbring 2323	Individual	Support																								2.3.3							
Olivia Morrissey Burley	S-120509	Singleton 2330	Individual	Support																								2.3.3							
One Key Resources	-	Singleton 2330	Interest Group	Support																								2.3.3							
P M	S-120295	Branxton 2335	Individual	Support						2.3.3																		2.3.3							
Patrick Kennedy	S-120936	Scone 2337	Individual	Support																								2.3.3							
Paul Adams	S-120260	Gillieston Heights 2321	Individual	Support																								2.3.3							
Phillip Enderby	S-120331	Speers Point 2284	Individual	Support																								2.3.3							
Rebecca Rollason	S-119281	Bolwarra Heights 2320	Individual	Support																								2.3.3							
Rebel Darr	S-120567	Singleton Heights 2330	Individual	Support						2.3.3																		2.3.3							
Renata Roberts	S-120693	Merewether 2291	Individual	Support								2.3.3																2.3.3							
Richard Wilkes	S-120852	East Branxton 2335	Individual	Support						2.3.3	2.3.3																	2.3.3							
Robert Hanington	S-120560	Macquarie Hills 2285	Individual	Support						2.3.3	2.3.3																	2.3.3							
Robert Stanley	S-120704	Chain Valley Bay 2259	Individual	Support						2.3.3																		2.3.3							
Robyn Lynch	S-120501	Singleton 2330	Individual	Support					2.3.3																			2.3.3							

Issue Category					Environmental, Social and Economic Issues																											The Project	Merits		Procedural Matters		
Theme					Agriculture	Climate Change	Impacts on Community							Rehabilitation		Project Emissions				Water Resources		Biodiversity		Heritage			Bushfire	Socio-economic		Project Design	Merits		Compliance With SEARs	Economic Assessment	Engagement and Decision Making
Sub-Theme					Land Use	GHG/Climate Change	Sense of Community and Culture	Health and Wellbeing	Personal and Property Rights	Intergenerational equity	Social Amenity	Existing Operation/infrastructure	Impacts on Surroundings	Final Void/ Final Landform	Rehabilitation	Air Quality	Blasting	Noise	Cumulative Impacts	Groundwater	Surface Water	Stygofauna	Biodiversity impact	Ravensworth Homestead	Aboriginal Cultural Heritage	Aboriginal events related to Heritage and Historical Ravensworth Estate	Bushfire	Economic Contribution and Community Investment	Lack of Community Benefits	Mine Extension/Extension of Time	Support/Object (Non-Specific)	Environmental Harm/Ecologically Sustainable Development	Compliance with SEARs	Economic Assessment	Engagement and Decision Making
Submitter	Ref. Number (Submitter ID)	Location	Group	View																																
Roman Rzechowicz	S-120259	Cooks Hill 2300	Individual	Support						2.3.3																										2.3.3
Ross Heath	S-120315	Cooks Hill 2300	Individual	Support																								2.3.3							
Sally Morris	S-120692	Rutherford 2320	Individual	Support																								2.3.3							
Sarah Williams	S-120733	Jerrys Plains 2330	Individual	Support																								2.3.3							
Scott Perry	S-118542	Sedgefield 2330	Individual	Support																								2.3.3							
Scott Omeley	S-120522	Aberglasslyn 2320	Individual	Support						2.3.3																		2.3.3							
Scott Perrett	S-120853	Rutherford 2320	Individual	Support						2.3.3																		2.3.3							
Shane Colbert	S-120686	Kotara South 2289	Individual	Support						2.3.3																		2.3.3							
Simon Breakwell	S-119078	Aberglasslyn 2320	Individual	Support			2.3.3																					2.3.3							
Simon Charters	S-120641	Denman 2823	Individual	Support			2.3.3			2.3.3																		2.3.3							
Sini Ariell	S-120856	Mirannie 2330	Individual	Support								2.3.3																2.3.3							
Sonja Read	S-120736	Broke 2330	Individual	Support			2.3.3																												
Sophie Morris	S-120313	Rutherford 2320	Individual	Support																								2.3.3							
Steven Humbles	S-120861	Telarah 2320	Individual	Support						2.3.3																		2.3.3							
Strike Force Services Pty Ltd	-	Maitland 2320	Interest Group	Support																								2.3.3							
Suzanne Turner	S-120653	Singleton 2330	Individual	Support																								2.3.3							
Tamara Donnelly	S-120677	Aberdeen 2336	Individual	Support						2.3.3																		2.3.3							
Tennille Perry	S-121191	Singleton 2330	Individual	Support																								2.3.3							
Thiess	-	South Brisbane 4101	Interest Group	Support						2.3.3																		2.3.3							
Thomas Carroll	S-119688	Glendon 2330	Individual	Support																								2.3.3							
Tim Strong	S-120554	Kotara 2289	Individual	Support						2.3.3	2.3.3																	2.3.3							
Tim Harris	S-120557	Birmingham Gardens 2287	Individual	Support																								2.3.3							
Timothy Lovekin	S-119344	Gateshead 2290	Individual	Support																								2.3.3							
Todd Geddes	S-120742	Singleton 2330	Individual	Support																								2.3.3							
Tom Lee	S-120735	Point Frederick 2250	Individual	Support																								2.3.3							
Tracy Dargan	S-120912	Broke 2330	Individual	Support			2.3.3																												
Trent Brown	S-120526	Aberglasslyn 2320	Individual	Support						2.3.3																		2.3.3							
Vanessa Egan-Smith	S-120719	Broke 2330	Individual	Support			2.3.3																												
Wayne Florence	S-120672	West Wallsend 2286	Individual	Support							2.3.3																								
WesTrac NSW	-	Tomago 2322	Interest Group	Support						2.3.3																		2.3.3							
Zoe Cunningham	S-120498	Maison Dieu 2330	Individual	Support					2.3.3																			2.3.3							
Adrian Garner	S-120652	Tighes Hill 2297	Individual	Object		5.1.3																													
Adrianne Haddow	S-120754	Broadmeadow 2292	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Allie McGarity	S-120612	Broadmeadow 2292	Individual	Object		5.1.3		5.1.2.2								5.1.1.1																			
Alexa Stuart	S-120712	Lambton 2299	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Alycia Senthinathan	S-121081	Elermore Vale 2287	Individual	Object				5.1.2.2																											
Anonymous	S-120539	Tighes Hill 2297	Individual	Object		5.1.3																													
Anonymous	S-120540	Wickham 2293	Individual	Object		5.1.3																													
Anonymous	S-120541	Highfields 2289	Individual	Object		5.1.3																													
Anonymous	S-120546	Dudley 2290	Individual	Object		5.1.3																													
Anonymous	S-120547	Birmingham Gardens 2287	Individual	Object		5.1.3																													
Anonymous	S-120548	Mayfield 2304	Individual	Object																								5.1.5.1				5.4.1			
Anonymous	S-120549	Charlestown 2290	Individual	Object		5.1.3																													
Anonymous	S-120552	The Hill 2300	Individual	Object																												5.4.1			
Anonymous	S-120555	Hamilton 2303	Individual	Object		5.1.3																													
Anonymous	S-120558	Merewether 2291	Individual	Object		5.1.3																													
Anonymous	S-120568	Merewether 2291	Individual	Object		5.1.3																													
Anonymous	S-120569	Merewether Heights 2291	Individual	Object		5.1.3																													
Anonymous	S-120585	Tighes Hill 2297	Individual	Object																												5.4.1			
Anonymous	S-120600	Cardiff 2285	Individual	Object		5.1.3																													
Anonymous	S-120617	Mayfield 2304	Individual	Object		5.1.3																													
Anonymous	S-120629	Valentine 2280	Individual	Object		5.1.3																													
Anonymous	S-120630	Lightning Ridge 2834	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Anonymous	S-120640	Merewether 2291	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Anonymous	S-120643	Belmont 2280	Individual	Object		5.1.3		5.1.2.2												5.1.6.1															
Anonymous	S-120645	The Hill 2300	Individual	Object		5.1.3																													
Anonymous	S-120649	Tighes Hill 2297	Individual	Object		5.1.3										5.1.1.1			5.1.1.4	5.1.6.1															
Anonymous	S-120652	Rutherford 2320	Individual	Object		5.1.3																													

Issue Category					Environmental, Social and Economic Issues																								The Project	Merits		Procedural Matters		
Theme					Agriculture	Climate Change	Impacts on Community							Rehabilitation		Project Emissions					Water Resources		Biodiversity		Heritage			Bushfire	Socio-economic			Project Design	Merits		Compliance With SEARs	Economic Assessment	Engagement and Decision Making
Sub-Theme					Land Use	GHG/Climate Change	Sense of Community and Culture	Health and Wellbeing	Personal and Property Rights	Intergenerational equity	Social Amenity	Existing Operation/Infrastructure	Impacts on Surroundings	Final Void/ Final Landform	Rehabilitation	Air Quality	Blasting	Noise	Cumulative Impacts	Groundwater	Surface Water	Stygofauna	Biodiversity impact	Ravensworth Homestead	Aboriginal Cultural Heritage	Aboriginal events related to Heritage and Historical Ravensworth Estate	Bushfire	Economic Contribution and Community Investment	Lack of Community Benefits	Mine Extension/Extension of Time	Support/Object (Non-Specific)	Environmental Harm/Ecologically Sustainable Development	Compliance with SEARs	Economic Assessment	Engagement and Decision Making
Submitter	Ref. Number (Submitter ID)	Location	Group	View																															
Anonymous	S-120663	Lambton 2299	Individual	Object		5.1.3		5.1.2.2	5.1.2.3				5.1.2.4		5.1.7													5.1.9		5.1.5.2			5.4.1			
Anonymous	S-120718	Charlestown 2290	Individual	Object		5.1.3																		5.1.4.1											
Anonymous	S-120726	Elizabeth Bay 2011	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Anonymous	S-120750	Camberwell 2330	Individual	Object				5.1.2.2	5.1.2.3				5.1.2.4	5.1.7		5.1.1.1	5.1.1.2				5.1.6.2		5.1.8.1	5.1.4.1		5.1.4.2								5.3.3
Anonymous	S-120753	Camberwell 2330	Individual	Object				5.1.2.2								5.1.1.1			5.1.1.4					5.1.4.1										
Anonymous	S-120769	Tighes Hill 2297	Individual	Object		5.1.3																													
Anonymous	S-120777	Adamstown Height 2289	Individual	Object		5.1.3										5.1.1.1					5.1.6.2													
Anonymous	S-120795	Singleton 2330	Individual	Object		5.1.3		5.1.2.2							5.1.7						5.1.6.2			5.1.4.1										
Anonymous	S-120837	Camberwell 2330	Individual	Object				5.1.2.2	5.1.2.3							5.1.1.1	5.1.1.2	5.1.1.3	5.1.1.4		5.1.6.2			5.1.4.1										
Anonymous	S-120838	Pokolbin 2320	Individual	Object																				5.1.4.1							5.4			
Anonymous	S-120839	Hamilton 2303	Individual	Object		5.1.3																													
Anonymous	S-120889	Cooks Hill 2300	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Anonymous	S-120932	Maryville 2293	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Anonymous	S-120937	Gateshead 2290	Individual	Object		5.1.3										5.1.1.1																			
Anonymous	S-121060	Adamstown 2289	Individual	Object				5.1.2.2																											
Anonymous	S-121061	Elermore Vale 2287	Individual	Object		5.1.3										5.1.1.1																			
Anonymous	S-121073	Not supplied	Individual	Object	5.1.10	5.1.3															5.1.6.2			5.1.4.1											
Anonymous	S-121089	Hamilton North 2292	Individual	Object												5.1.1.1																			
Anonymous	S-121090	Eastwood 2122	Individual	Object				5.1.2.2																											
Anonymous	S-121170	Fairfield 2165	Individual	Object		5.1.3																													
Anthony Lonergan	S-121192	Kayuga 2333	Individual	Object		5.1.3														5.1.6.1		5.1.8.2													
Ben Ewald	S-121016	The Hill 2300	Individual	Object		5.1.3										5.1.1.1																			
Beverley Atkinson	S-120635	Scone 2337	Individual	Object		5.1.3									5.1.7	5.1.1.1				5.1.6.1				5.1.4.1						5.2.1					5.3.3
Bob Vickers	S-121095	Gowrie 2330	Individual	Object		5.1.3		5.1.2.2																										5.3.2	
Bronwen Hughes	S-120637	Port Macquarie 2444	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Brooke Macnab	S-121188	Maitland 2320	Individual	Object		5.1.3		5.1.2.2																						5.1.5.2					
Christine Turner	S-121078	Camberwell 2330	Individual	Object																				5.1.4.1											
Claire Cupitt	S-120717	Paddys River 2577	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Climate Action Newcastle	-	Dangar 2309	Interest Group	Object		5.1.3									5.1.7														5.1.5.2			5.4.1			
Climate Change Australia (CCA)	-	Port Macquarie 2444	Interest Group	Object		5.1.3																													
Clint Seares	S-120885	Coomera 4209	Individual	Object		5.1.3														5.1.6.1															
Crystal Egan	S-120768	The Hill 2300	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Dana Upenieks	S-120961	Cardiff 2285	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Daniel Ewald	S-121099	Lennox Head 2478	Individual	Object		5.1.3										5.1.1.1	5.1.1.2																		
Denis Rothwell	S-120867	North Rothbury 2335	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Denman Aberdeen Muswellbrook Scone Healthy Environment Group	-	Kayuga 2333	Interest Group	Object		5.1.3																													
Diane Call	S-120639	Tenambit 2323	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Doctors for the Environment Australia (DEA)	-	College Park 5069	Interest Group	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
EcoNetwork Port Stephens	-	Salamander Bay 2317	Interest Group	Object		5.1.3										5.1.1.1					5.1.6.2			5.1.4.1		5.1.4.2							5.3.1		5.3.3
Elisha Jahnsen	S-120646	Forster 2428	Individual	Object		5.1.3																													
Eliza Milliken	S-120826	Mayfield 2304	Individual	Object		5.1.3		5.1.2.2							5.1.7					5.1.6.1															
Emily O'Sullivan	S-120631	Stockton 2295	Individual	Object		5.1.3							5.1.2.4											5.1.4.1						5.2.1		5.4.1			5.3.3
Emily Grace	S-120891	East Lismore 2480	Individual	Object		5.1.3																													
Georgina Huxtable	S-120576	Hamilton East 2303	Individual	Object		5.1.3																													
Graeme Cheetham	S-120792	Middle Falbrook 2330	Individual	Object			5.1.2.1									5.1.1.1		5.1.1.3												5.1.5.2					5.3.3
Greer Allen	S-120902	Edgecombe 3444	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Guy Jeffery	S-121091	Armidale 2350	Individual	Object		5.1.3										5.1.1.1																			
Heather Mclean	S-121189	Mount Royal 2330	Individual	Object		5.1.3																													
Holly Wilcox	S-120550	Kurri Kurri 2327	Individual	Object		5.1.3																													
Hunter Environment Lobby	-	North Rothbury 2335	Interest Group	Object		5.1.3		5.1.2.2								5.1.1.1																			
Hunter Environment Lobby Inc.	-	East Maitland 2323	Interest Group	Object		5.1.3		5.1.2.2						5.1.7		5.1.1.1				5.1.6.1				5.1.4.1									5.3.1		5.3.3
Ieva Dzintars	S-120901	Pennant Hills 2120	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Ileigh Hellier	S-120650	Merewether 2291	Individual	Object				5.1.2.2																									5.4.1			
Isabelle Jones	S-120615	Hamilton 2303	Individual	Object		5.1.3																													
Jane Morgan	S-121013	Hamilton 2303	Individual	Object		5.1.3		5.1.2.2								5.1.1.1																			
Janet Fenwick	S-120671	Bulga 2330	Individual	Object		5.1.3										5.1.1.1			5.1.1.4	5.1.6.1				5.1.4.1											
Janet Murray	S-120714	Buttai 2323	Individual	Object		5.1.3										5.1.1.1					5.1.6.2			5.1.4.1									5.3.1		5.3.3
Jetse Kalma	S-120847	Dudley 2290	Individual	Object		5.1.3																													

Issue Category					Environmental, Social and Economic Issues																								The Project	Merits		Procedural Matters		
Theme					Agriculture	Climate Change	Impacts on Community							Rehabilitation		Project Emissions				Water Resources		Biodiversity		Heritage			Bushfire	Socio-economic		Project Design	Merits		Compliance With SEARs	Economic Assessment	Engagement and Decision Making
Sub-Theme					Land Use	GHG/Climate Change	Sense of Community and Culture	Health and Wellbeing	Personal and Property Rights	Intergenerational equity	Social Amenity	Existing Operation/Infrastructure	Impacts on Surroundings	Final Void/ Final Landform	Rehabilitation	Air Quality	Blasting	Noise	Cumulative Impacts	Groundwater	Surface Water	Stygofauna	Biodiversity impact	Ravensworth Homestead	Aboriginal Cultural Heritage	Aboriginal events related to Heritage and Historical Ravensworth Estate	Bushfire	Economic Contribution and Community Investment	Lack of Community Benefits	Mine Extension/Extension of Time	Support/Object (Non-Specific)	Environmental Harm/Ecologically Sustainable Development	Compliance with SEARs	Economic Assessment	Engagement and Decision Making
Submitter	Ref. Number (Submitter ID)	Location	Group	View																															
Joe Karten	S-120674	Newtown 2042	Individual	Object		5.1.3															5.1.6.2											5.4.1			
Johanna Weiss	S-120588	Tathra 2550	Individual	Object		5.1.3																													
John Woodward	S-120488	Kotara 2289	Individual	Object		5.1.3																													
Katherine Jones	S-120620	Cromer 2099	Individual	Object		5.1.3							5.1.2																						
Kathryn Teagle	S-120930	Mayfield 2304	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Katrin Gustafson	S-121096	The Hill 2300	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1			5.1.8.1												
Keshni Visvaa	S-121075	Elermore Vale 2287	Individual	Object												5.1.1.1																			
Koshy Mathew	S-121171	Valentine 2280	Individual	Object		5.1.3		5.1.2.2																											
Leonie Funk	S-120573	Cooks Hill 2300	Individual	Object		5.1.3																													
Lock the Gate Alliance	-	Newcastle 2300	Interest Group	Object		5.1.3										5.1.1.1				5.1.6.1	5.1.6.2					5.1.4.2									
Lorraine Davies	S-120706	Toormina 2452	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Louise Ihlein	S-120715	Cessnock 2325	Individual	Object		5.1.3																													
Lynn Benn	S-120622	Mulbring 2323	Individual	Object		5.1.3													5.1.1.4	5.1.6.1															
Margaret Clarke	S-120681	Mayfield 2304	Individual	Object		5.1.3															5.1.6.2						5.1.9		5.1.5.2						5.3.3
Margaret Edwards	S-120880	East Maitland 2323	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Maria Cotter*	S-121212	Armidale 2351	Individual	Object																															
Martin Fallding	S-120894	Singleton 2330	Individual	Object		5.1.3								5.1.7					5.1.1.4					5.1.4.1										5.3.2	
Maryann Lees	S-120623	Tighes Hill 2297	Individual	Object		5.1.3																							5.1.5.2						
Megan Campbell	S-120579	Hamilton 2303	Individual	Object		5.1.3																							5.1.5.2						
Megan Benson	S-120655	Bundeena 2230	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															
Melanie Jackson	S-120638	Belmont North 2280	Individual	Object		5.1.3																													
Michael Fenech	S-120716	Mulbring 2323	Individual	Object		5.1.3																													
Nicholas Brown	S-121172	Valentine 2280	Individual	Object				5.1.2.2																											
Nick Bendit	S-121156	Newcastle East 2300	Individual	Object		5.1.3														5.1.6.1															
Nigel Waters	S-120545	Nelson Bay 2315	Individual	Object		5.1.3																													
Nipun Athukorala	S-121174	Baulkham Hills 2153	Individual	Object				5.1.2.2																											
Port Stephens Greens	-	Lemon Tree Passage 2319	Interest Group	Object		5.1.3																													
Prue Bodsworth	S-121065	Tighes Hill 2297	Individual	Object		5.1.3										5.1.1.1				5.1.6.1	5.1.6.2														
Ric Woods	S-120685	Hamilton 2303	Individual	Object																													5.4			5.3.3
Robert McLaughlin	S-120627	Bulga 2330	Individual	Object		5.1.3										5.1.1.1				5.1.6.1															5.3.3
Sally Corbett	S-120895	Dungog 2420	Individual	Object		5.1.3		5.1.2.2												5.1.6.1															
Samir Hussein	S-121027	Highfields 2289	Individual	Object		5.1.3		5.1.2.2																											
Simon Morgan	S-120708	Hamilton East 2303	Individual	Object		5.1.3		5.1.2.2								5.1.1.1				5.1.6.1															
Singleton Shire Healthy Environment Group	-	Singleton 2330	Interest Group	Object				5.1.2.2								5.1.1.1			5.1.1.4					5.1.4.1											
Stephanie Miller	S-120496	Wickham 2293	Individual	Object		5.1.3																													
Stewart Mitchell	S-121068	Bulga 2330	Individual	Object																				5.1.4.1					5.1.5.2						
Susan Morley	S-121197	Islington 2296	Individual	Object		5.1.3			5.1.2.3							5.1.1.1				5.1.6.1			5.1.8.1												
Thanjon Michniewicz	S-121094	East Gosford 2250	Individual	Object		5.1.3		5.1.2.2																									5.4.1			
Tony Fane	S-120781	Grays Point 2232	Individual	Object																															
Virginia Reid	S-121097	The Hill 2300	Individual	Object		5.1.3														5.1.6.1			5.8.5.1												
Wendy Wales	S-120626	Kayuga 2333	Individual	Object		5.1.3																													
Wendy White	S-120844	East Maitland 2323	Individual	Object		5.1.3																													
Andrew Birtchnell	S-120875	Pokolbin 2320	Individual	Comment			5.1.2.1	5.1.2.2								5.1.1.1								2.3.2											
Anonymous	S-120860	East Branxton 2335	Individual	Comment																				2.3.2				2.3.2							
Anonymous	S-121069	Middle Falbrook 2330	Individual	Comment															5.1.1.4	5.1.6.1															
Antony Bainton	S-120767	Fordwich 2330	Individual	Comment																				2.3.2											
Carol Russell	S-120684	Canberra 2912	Individual	Comment																				2.3.2											
Ian Napier	S-120843	Pokolbin 2320	Individual	Comment																				2.3.2											
Natalie Hewitt	S-120827	Wattle Ponds 2330	Individual	Comment																				2.3.2											
Richard Owens	S-120710	Newcastle 2300	Individual	Comment																				2.3.2											
Stewart Ewen	S-120707	Fordwich 2330	Individual	Comment																				2.3.2											
Stuart Bonds	S-120855	Mirannie 2330	Individual	Comment	2.3.2																			2.3.2				2.3.2							
Plains Clan Wonnarua People*	-	Wentworth Falls 2781	Interest Group	Comment																															

*Responses will be provided in RTS Part B report

APPENDIX 2

Revised Greenhouse Gas and Energy Assessment

umwelt
Environmental & Social Consultants

GLENCORE

REVISED GREENHOUSE GAS AND ENERGY ASSESSMENT

Glendell Continued Operations Project

FINAL

May 2020

GLENCORE

REVISED GREENHOUSE GAS AND ENERGY ASSESSMENT

Glendell Continued Operations Project

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Glendell Tenements Pty Limited

Project Director:	Bret Jenkins
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Report No.	4166/R08
Date:	May 2020

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Bret Jenkins	22/11/2019	Bret Jenkins	22/11/2019
Final V2	Bret Jenkins	15/05/2020	Bret Jenkins	15/02/2020

Executive Summary

The Glendell Continued Operations Project (the Project) will seek approval to extract approximately 135 Mt of ROM coal through an extension of the existing Glendell Mine. The Glendell Mine forms part of the Mount Owen Complex, located within the Hunter Coalfields in the Upper Hunter Valley of New South Wales (NSW) which is owned and operated by subsidiaries of Glencore Coal Pty Limited (Glencore). The applicant for the Project is Glendell Tenements Pty Ltd, which is a 100% owned subsidiary of Glencore. Approval for the Project will be sought under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which requires the Proponent to prepare an Environmental Impact Statement (EIS) to support the development application for the Project.

The original Greenhouse Gas and Energy Assessment (GHGEA) (Umwelt, 2019) submitted as part of the Project EIS (Umwelt, 2019) used the default NSW Method 1 fugitive emissions factor (0.054 t CO_2-e / ROM t), as final gas analysis results of the proposed mining area were not available at the time of the assessment. Fugitive emissions from the open cut operation have now been re-calculated based on the Method 2 approach described in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 utilising a gas distribution model for the Project, calculated by the Proponent based on results of drill core gas sampling and analysis.

This revised GHGEA report will replace the original assessment submitted with the EIS and includes greenhouse gas emission projections, an assessment of climate change impacts and an evaluation of greenhouse gas mitigation options. The scope of the revised GHGEA includes:

- estimating direct and indirect (Scopes 1, 2 and 3) greenhouse gas emissions associated with the Project
- estimating energy use directly associated with the Project
- qualitatively assessing how the Project's greenhouse gas emissions may impact the environment
- estimating the impact of the Project's emissions on State, national and international greenhouse gas emission targets/policies
- assessing reasonable and feasible measures to minimise the greenhouse gas emissions and ensure energy use efficiency

The revised GHGEA found that the Project can be associated with the following reduced greenhouse gas emissions.

Greenhouse Gas Emissions over the life of the Project				
	Original Assessment (t CO2-e)	**Revised Assessment (t CO_2-e)**	**Original Assessment (%) of total emissions**	**Revised Assessment (%) of total emissions**
Scope 1	9,933,000	6,057,000	4.30	2.67
Scope 2	458,000	458,000	0.20	0.20
Scope 3	220,434,000	220,424,000	95.50	97.13
TOTAL	230,814,000	**226,939,000**	**100**	**100**

The Project is forecast to produce approximately 253,000 t CO_2-e Scope 1 emissions per annum (reduced from 414,000 t CO2-e Scope 1 emissions per annum), this is a significant reduction (approximately 39%) from that previously calculated. This emission total is comparable to other Hunter Valley open cut coal mining operations of similar size. Consistent with the original assessment, the majority of Scope 1 emissions are generated by fugitive emissions and diesel combustion. The Proponent has a direct influence over Scope 1 emissions generated from diesel use, and these emissions will be subject to management and mitigation plans.

The Project is forecast to consume approximately 81,000 GJ of electricity per annum, which will generate approximately 19,000 t CO_2-e of Scope 2 emissions per annum. The Proponent can influence reductions in Scope 2 emissions by driving electricity reduction and efficiency initiatives.

Approximately 9,185,000 t CO_2-e of Scope 3 emissions per annum are estimated to be associated with the Project. The majority of Scope 3 emissions associated with the Project will be generated by third parties who transport and consume coal products. The Proponent has no operational control over Scope 3 emissions, as these emissions are generated by the activities of other organisations.

The Project's greenhouse gas inventory is dominated by Scope 3 emissions. Approximately 97% of the Project's greenhouse gas emissions will occur either upstream or downstream of the Project and outside the direct operational control of the Proponent. Approximately 3% of the greenhouse gases associated with the Project are related to on-site energy use and fugitive emissions (Scope 1 and 2 emissions) (refer to **Figure ES1**).

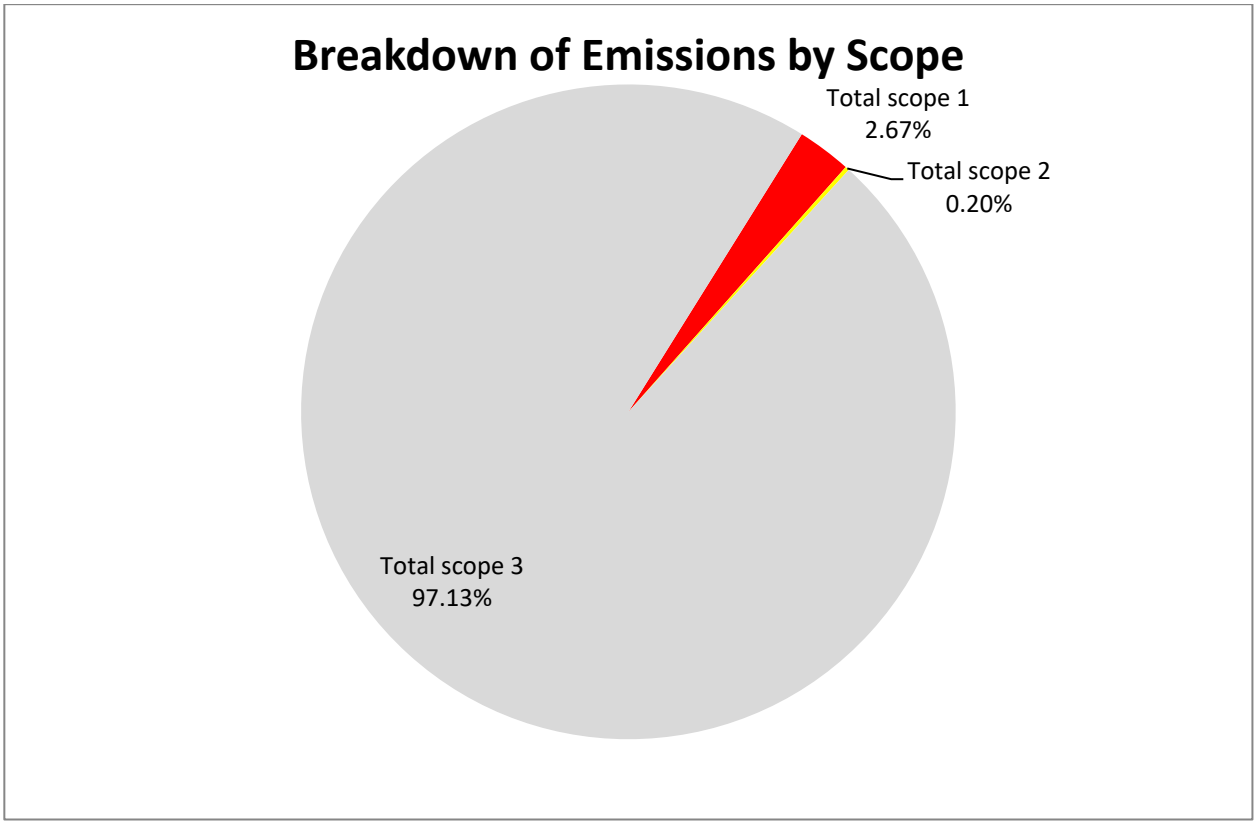

Figure ES1 – Breakdown of Emissions by Scope

Glencore has reviewed the Project's forecasts greenhouse gas emissions inventory, and believes the Project is unlikely to materially increase the national effort required to reach Australia's 2030 greenhouse gas mitigation target. Further, the Project in isolation is unlikely to limit Australia achieving its national mitigation targets.

As part of implementing the Project, the Proponent will seek to mitigate greenhouse gas emissions through ongoing energy efficiency initiatives and optimising productivity.

The Project will contribute to global emissions, however, the extent to which global emissions and atmospheric concentrations of greenhouse gases have a demonstrable impact on climate change will be largely driven by the global response to reducing total global emissions which includes all major emission sources and sinks.

Glencore has announced that it will manage global coal production to a total of around 150 Mtpa going forward as part of a voluntary cap on coal production. However, this does not mean Glencore will freeze its coal projects nor be exiting coal. Glencore has indicated that it will continue to develop a pipeline of coal projects assessed against market conditions and project economics while remaining within the coal production cap.

Glencore also participates and supports a range of low emission technology initiatives that seek to reduce greenhouse gas emissions from mining operations and provide a pathway to reduce emissions from the use of its products.

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Figures

Tables

Appendices

1.0 Introduction

The Glendell Mine forms part of the Mount Owen Complex located within the Hunter Coalfields in the Upper Hunter Valley of New South Wales (NSW) (refer to **Figure 1.1**), approximately 20 kilometres (km) north-west of Singleton, 24 km south-east of Muswellbrook and to the north of Camberwell. The Mount Owen Complex is owned and operated by subsidiaries of Glencore Coal Australia Pty Limited (Glencore), the applicant for the development application for the Project is Glendell Tenements Pty Ltd (an entity owned by Glencore).

The Mount Owen Complex also includes Mount Owen Mine, Ravensworth East Mine, a coal handling and preparation plant (CHPP) and coal transport infrastructure.

The Glendell Continued Operations Project (the Project) is a northward extension of open cut mining operations from the existing Glendell Mine. The Project would extend the life of the Glendell Mine to approximately 2044 and allow for the recovery of approximately 135 million tonnes (Mt) of run of mine (ROM) coal.

The Project will necessitate the realignment of Hebden Road, the realignment of Yorks Creek and the relocation of Ravensworth Homestead. The Project will also require the construction of a new mine infrastructure area (MIA) and a heavy vehicle access road. The Project will continue to use the existing Mount Owen Complex CHPP and rail transport facilities and extend the operation of these facilities for the life of the Project.

Figure 1.2 illustrates the key features of the Project.

Table 1.1 includes the key features of the Project that will impact greenhouse gas emissions.

Table 1.1 Key features of the Project that will impact greenhouse gas emissions

Key Feature	Proposed Operations
Mining methods	• Truck and excavator supported by ancillary equipment such as drills, bulldozers, front-end-loaders, etc.
Mine life	• Glendell Mine – to 2044 (Glendell Pit currently approved to 2024)
Total resource recovered	• Approximately 135 Mt ROM coal
Maximum annual production	• Up to 4.5 Mtpa increasing to up to 10 Mtpa ROM coal as production at the other mines in the Mount Owen Complex decline
CHPP production	• Processing at the existing Mount Owen CHPP. Approved throughput of 17 Mtpa ROM coal will remain as approved

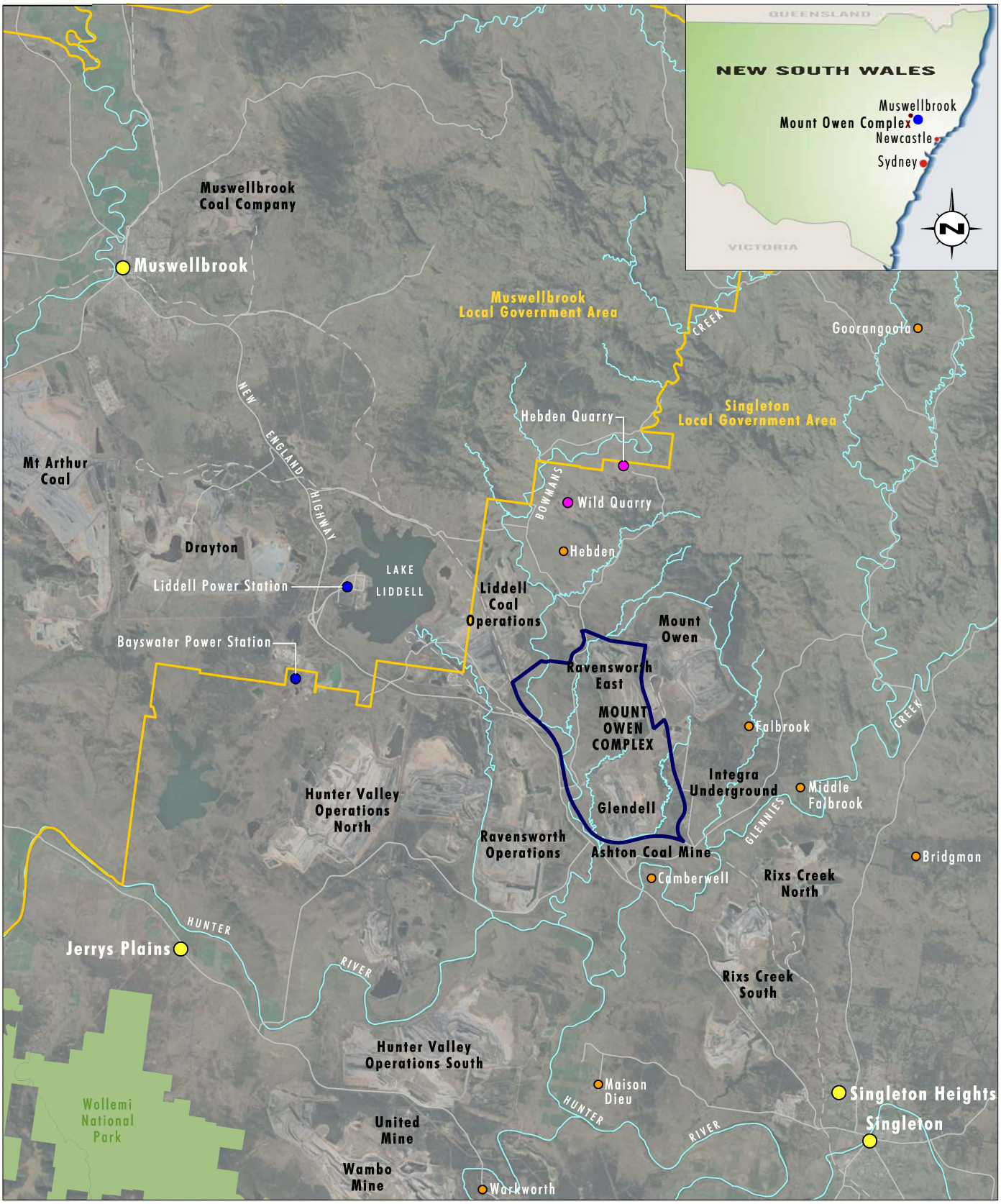

Image Source: Google Earth (2018)
Data Source: Glencore (2019), OEH (2018)

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

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20191118 14.23

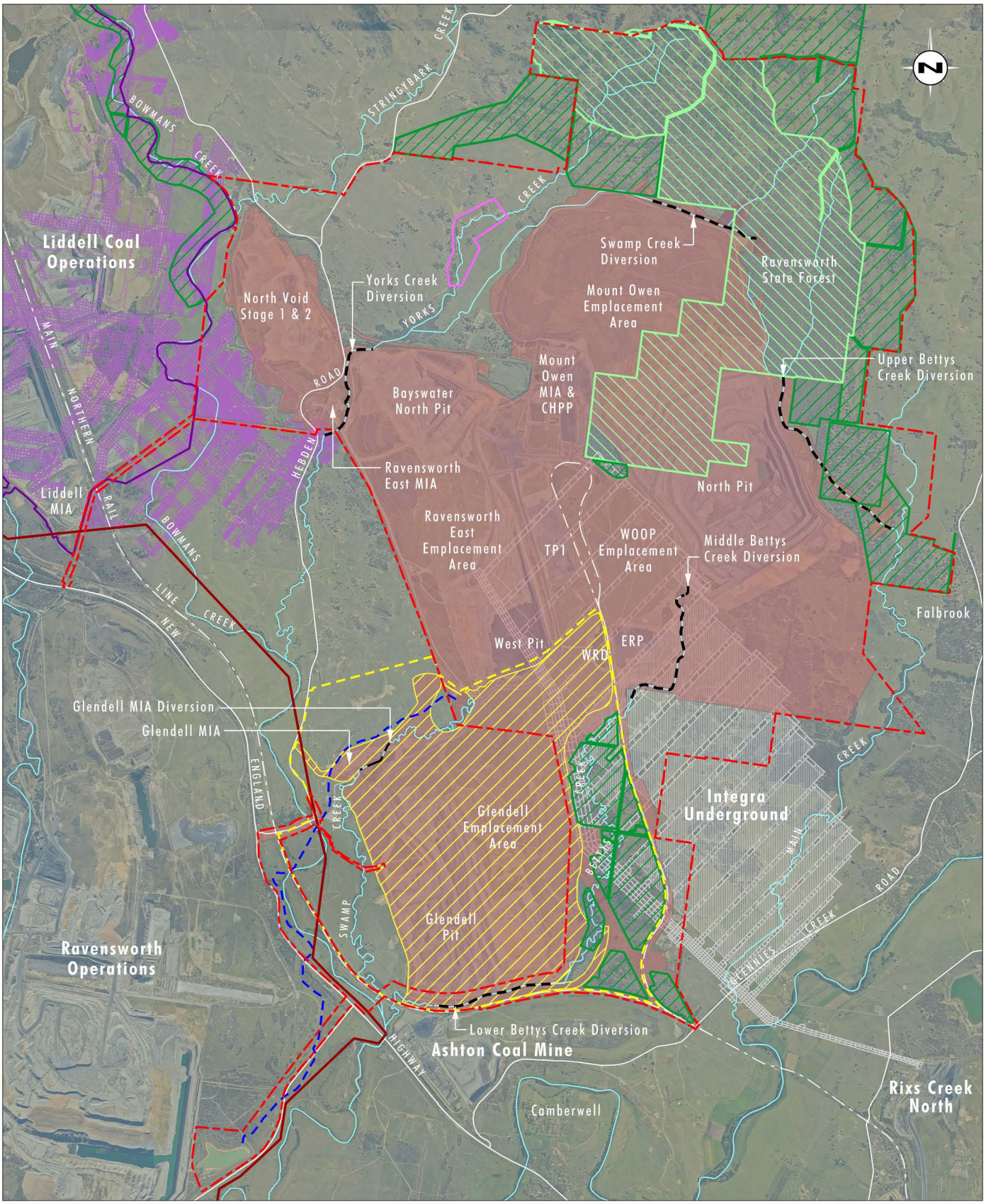

Image Source Glencore (Dec 2018), Data Source: Glencore (2019)
Note: Mount Owen Consent Boundary assumes Narama Pipeline Modification is approved.
* Mining Related Disturbance assumes Glendell MOD 4 is approved

0 1.0 2.0 3.0km
1:60 000

Legend

- Glendell Consent Boundary (DA 80/952)
- Mount Owen Consent Boundary (SSD-5850)
- Liddell Consent Boundary (DA 305-11-01)
- Ravensworth Consent Boundary (09_0176)
- Mount Owen Complex Mining Related Disturbance*
- Approved Glendell Disturbance Area*
- Existing Creek Diversion
- Existing Narama Pipeline
- Approved Integra Underground Mining Area - Middle Liddell Seam Workings
- Integra Underground Workings Middle Liddell Seam as at October 2019
- Liddell Underground Workings
- Biodiversity Offset Area
- Yorks Creek Voluntary Conservation Area
- Ravensworth State Forest

FIGURE 1.2

Existing Glendell Mine and Other Approved Operations

File Name (A4): R08/4166_134.dgn
20191128 11.28

2.0 Assessment framework

2.1 Objectives

Approval for the Project has been sought under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As a State Significant Development (SSD), an Environmental Impact Statement (EIS) is required to support the development application for the Project.

The objective of this revised assessment is to evaluate the greenhouse gas and energy use implications of the Project, in a manner that satisfies the Secretary's Environmental Assessment Requirements (SEARs) for the Project. The SEARs for the Project were issued by DPE on 7 June 2018 and reissued on 11 July 2018 and 12 August 2019 which identify the specific requirements to be addressed by the EIS for the Project. The SEARs request *"an assessment of the likely greenhouse gas impacts of the development".*

This report has been prepared to support the Project EIS, and includes greenhouse gas emission projections, an assessment of climate change impacts and an evaluation of greenhouse gas mitigation options.

2.2 Scope

The scope of the GHGEA includes:

- estimating direct and indirect (Scopes 1, 2 and 3) greenhouse gas emissions associated with the Project
- estimating energy use directly associated with the Project
- qualitatively assessing how the Project's greenhouse gas emissions may impact the environment
- estimating the impact of the Project's emissions on State, national and international greenhouse gas emission targets/policies
- assessing reasonable and feasible measures to minimise the greenhouse gas emissions of the Project and ensure energy use efficiency.

2.3 Definitions

Table 2.1 contains concepts and a glossary of terms relevant to this GHGEA.

Table 2.1 Glossary of terms[1]

Concept	Definition
Greenhouse gases	The greenhouse gases covered by the Kyoto Protocol and referred to in this GHGEA include: • Carbon dioxide • Methane • Nitrous oxide • Hydrofluorocarbons • Perfluorocarbons • Sulphur hexafluoride.

[1] The GHG Protocol 2004

Concept	Definition
Scope 1 emissions	Direct emissions that occur from sources that are owned or controlled by the Project (e.g. fuel use, fugitive emissions). Scope 1 emissions are emissions over which the Project has a high level of control.
Scope 2 emissions	Emissions from the generation of purchased electricity consumed by the Project.
Scope 3 emissions	Indirect emissions that are a consequence of the activities of the Project, but occur at sources owned or controlled by other entities (e.g. outsourced services). Scope 3 emissions can include emissions generated upstream of the Project by providers of energy, materials and transport. Scope 3 emissions can also include emissions generated downstream of the Project by transport providers and product use.

2.4 Impact assessment methodology

The GHGEA framework is based on the methodologies and emission factors contained in the *National Greenhouse Accounts (NGA) Factors* 2018 (DoEE 2018a) (the NGA Factors). The assessment framework also incorporates the principles of *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (WRI/WBCSD 2004) (the GHG Protocol).

The GHG Protocol provides an internationally accepted approach to greenhouse gas accounting. The GHG Protocol provides guidance on setting reporting boundaries, defining emission sources and dealing with issues such as data quality and materiality.

Scope 1 and 2 emissions were calculated based on the methodologies and emission factors contained in the NGA Factors 2018 (DEE 2018a). The original calculations presented in the EIS, used the default NSW Method 1 fugitive emissions factor (0.054 t CO_2-e / ROM t), as final gas analysis results of the proposed mining area were not available at the time of the assessment. Fugitive emissions from the open cut operation have now been re-calculated using a gas distribution model of the Project, (calculated by the Proponent based on results of drill core gas sampling and analysis) which is now complete, using the Method 2 approach described in the National Greenhouse and Energy Reporting (Measurement) Determination 2008.

Scope 3 emissions associated with product transport were calculated based on emission factors contained in the *National GHG Inventory: Analysis of Recent Trends and GHG Indicators* (AGO 2007). Other Scope 3 emissions were calculated using methodologies and emission factors contained in the NGA Factors.

All methodologies and calculations have been made assuming that all operations will continue as described in **Section 1.0**.

2.5 Data sources

The calculations in this report are based on activity data developed by the Proponent during the mine planning process.

Table 2.2 contains the source of activity data.

Table 2.2 Source of activity data used for the assessment

Activity data	Source
Construction materials	Glencore - forecast construction materials
On-site fuel consumption	Glencore - forecast diesel consumption
Electricity consumption	Glencore - historical electricity consumption

Activity data	Source
Fugitive emissions	Glencore – Method 2 gas distribution model
Product consumption	Glencore - forecast mine production
Product transport	Umwelt - product transport distances

A detailed description of activity data and calculations are provided in **Appendix A**.

2.6 Assessment boundary

The GHGEA boundary was developed to include all significant Scope 1, 2 and 3 emissions. **Figure 2.1** demonstrates how the assessment boundary interacts with the potential emission sources under the Proponent's operational control and other emission sources associated with the Project.

The assessment has been separated into the following components:

- construction emissions that relate to the Project under the proposed Glendell consent (SSD9349)
- operational emissions that relate to the Project under the proposed Glendell consent (SSD9349)
- operational emissions that relate to the proposed modification of the Mount Owen Consent (SSD5850).

2.7 Data exclusions

The GHG Protocol requires inventory data and methodologies to be relevant, consistent, complete, transparent and accurate. The relevance principle states that the greenhouse gas inventory should appropriately reflect greenhouse gas emissions and serve the decision-making needs of users – both internal and external [to the Project] (WRI/WBCSD 2004).

An open cut coal mine has a number of potential emission sources, however, the dominant emission sources, often targeted by mitigation measures and stakeholders can be summarised as:

- diesel use
- fugitive emissions
- electricity use
- product transport
- product use
- materials use.

The completeness principle states that all relevant emission sources within the chosen inventory boundary need to be accounted for so that a comprehensive and meaningful inventory is compiled (WRI/WBCSD 2004).

The emission sources listed in **Table 2.3** have been excluded from the GHGEA as activity data is not readily available, and modelling activity data for these sources is unlikely to generate sufficient emissions to materially change impacts or influence the decision-making outcomes of stakeholders.

Table 2.3 Data exclusions

Emission source	Scope	Description
Combustion of fuel for energy	Scope 1	Small quantities of fuels such as petrol and LPG.
Industrial processes	Scope 1	Sulphur hexafluoride (high voltage switch gear). Hydrofluorcarbon (commercial and industrial refrigeration).
Waste water handling (industrial)	Scope 1	Methane emissions from waste water management.
Solid waste	Scope 3	Solid waste to landfill.
Business travel	Scope 3	Employees travelling for business purposes.
Employee travel	Scope 3	Employees travelling between their place of residence and the Glendell site.

Greenhouse gas emissions resulting from land use, land use change and forestry (LULUCF) were also excluded from the GHGEA. While it is acknowledged that emissions resulting from LULUCF may be an important emission source for decision makers, the assessment made an assumption that all emissions generated during the land clearing process would be sequestered via rehabilitation plantings.

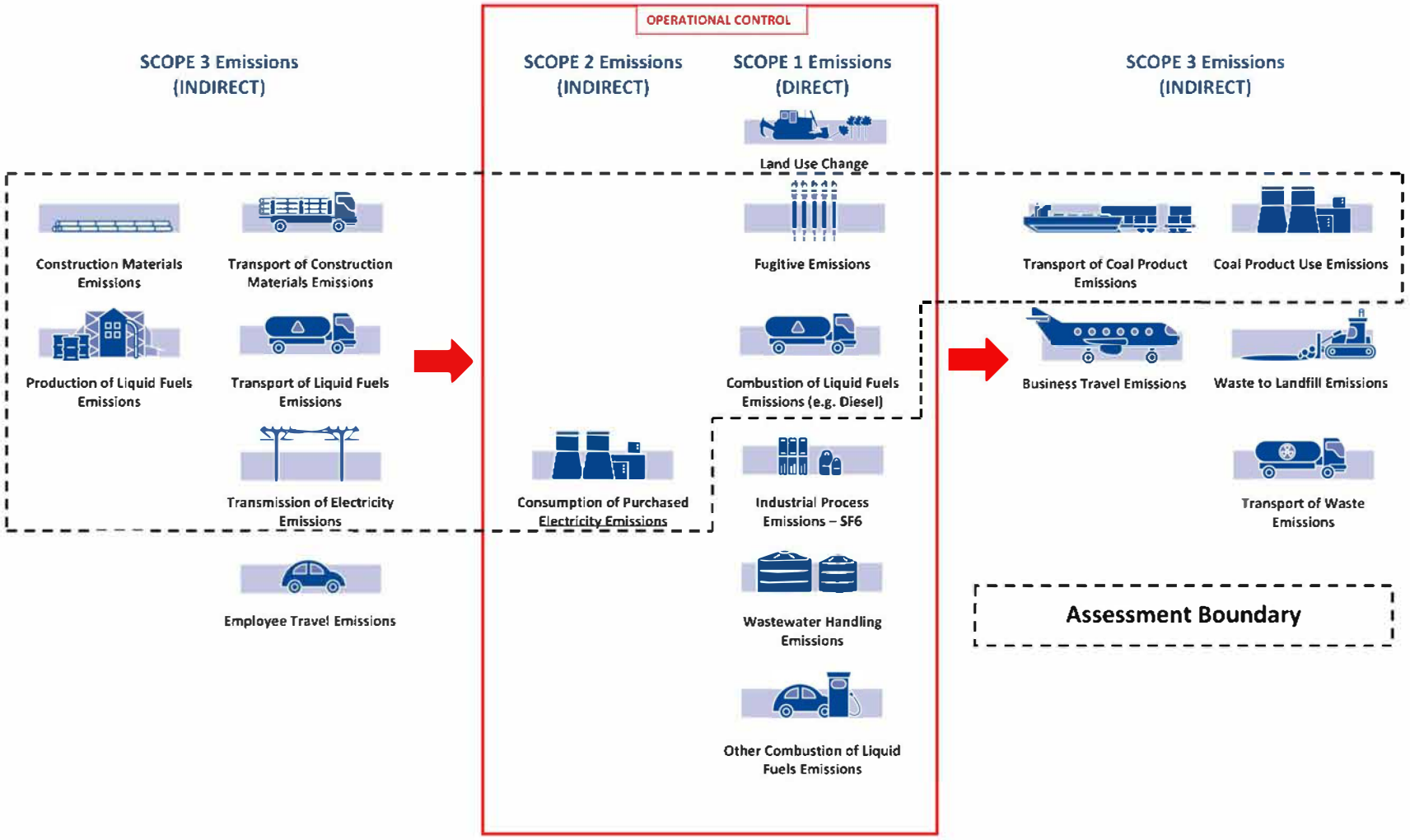

FIGURE 2.1

Greenhouse Gas Assessment Boundary

3.0 Impact assessment results

Greenhouse gas and energy use estimates have been calculated for the construction and operational stages of the Project. As the Project incorporates an application for a new Glendell Development Consent (SSD 9349), and a modification to the approved Mount Owen Development Consent (SSD 5850), the impact results have been separated to demonstrate the potential impact of the individual applications.

The greenhouse gas forecasts referenced throughout this document, only relate to the expected impact of the Project (i.e. recovery of an additional 135 Mt of ROM coal). Forecasts in this document do not include forecast emissions from the currently approved operations.

3.1 Glendell Development Consent (SSD 9349)

The Project incorporates both construction and operational activities.

3.1.1 Construction assumptions

A number of construction activities are planned to occur within the first five years of the Project. The GHGEA only considers the major construction activities associated with the Project and does not include ongoing construction associated with operational activities.

Greenhouse gas estimates have been prepared for the construction of the following Project components that were described in **Section 1.0**:

- the realignment of Hebden Road
- the realignment of Yorks Creek
- the relocation of Ravensworth Homestead to Broke (i.e. worst-case scenario)
- the construction of a new MIA
- the construction of a new heavy vehicle access road.

The demolition of the existing MIA has not been included in the assessment as this is already approved as part of the existing operations.

The greenhouse gas emission estimates for the construction phase are based on the following assumptions[2]:

- The existing Hebden Road will be progressively mined through, and all road waste will either be recycled onsite, or used as fill across the Project site.
- Civil construction will source materials from the Project site and suitable quarries in the region.
- The new section of Hebden Road will be approximately 5 km long and include two lanes.
- Diesel use for civil works will average 1.2 litres/Bank Cubic Metre (BCM) handled.

[2] The assumptions have been developed for the purposes of estimating greenhouse gas emissions, and should not be read as a definitive list of on-site construction activities.

3.1.2 Construction greenhouse gas emissions

The Project's construction related greenhouse gas emissions are summarised in **Table 3.1**. The assessment has assumed that all construction related activities will be outsourced to third party contractors. All greenhouse gas emissions associated the construction phase will be Scope 3 emissions and will be generated by third parties combusting energy and generating industrial emissions in the process of producing and transporting construction materials. Scope 3 emissions will also be generated by contractors consuming energy during the construction process. The construction of the Project is forecast to be associated with approximately 14,000 t CO_2-e Scope 3 emissions.

The breakdown of construction related emissions in **Table 3.1** demonstrate that approximately 45% of forecast construction related emissions are attributable to the consumption of construction materials. The consumption of energy during construction contributes 37% of construction emissions, while 18% of construction emissions are attributable to the transport of construction materials (refer to **Table 3.1**) (refer to **Appendix A** for further detail).

Table 3.1 Greenhouse gas emission summary for the Project

Stage	Scope	Source	Source Totals (t CO_2-e)	Scope Totals (t CO_2-e)
Construction	Scope 3 (Indirect)	Materials use	6,157	13,528
		Diesel use	4,981	
		Materials transport	2,390	
Homestead Relocation	Scope 3 (Indirect)	Diesel use	171	171
Total Emissions for Construction				**13,699**

3.1.3 Construction energy use

The construction related activities of the Project are forecast to require approximately 103,000 Gigajoules (GJ) of energy from diesel.

3.1.4 Revised Operational assumptions

The following information was used to estimate the greenhouse gas emissions from the operational activities associated with the Project.

- approximately 135,000,000 tonnes of ROM coal will be recovered over the life of the Project
- there will be no change to existing mining methods, coal processing or product transport methods
- diesel and explosive consumption will match the mine plan
- electricity use for the new MIA will average approximately 6,500 GJ per annum between 2021 and 2045
- product coal quality will average approximately 27.5 GJ/tonne and has been classified as Bituminous Coal to align with the NGA Factors
- 100% of all product coal will be exported

- fugitive emissions will average approximately 25.336 Kg CO_2-e / ROM coal tonne (note: the previous assessment was based on an average of approximately 54 kg (0.054 t) CO_2-e / ROM coal tonne (Method 1 fugitive emissions factor)
- rail transport of product coal will average approximately 92 km
- ship transport of product coal will average approximately 9,500 km.

3.1.5 Revised Operational greenhouse gas emissions

The revised greenhouse gas emissions associated with the Project and comparison to the emissions presented in the EIS are summarised in **Table 3.2** (refer to **Appendix B** for further detail).

Table 3.2 Greenhouse gas emission summary

Stage	Scope	Source	Original Source Totals (t CO_2-e)	Revised Source Totals (t CO_2-e)	Original Scope Totals (t CO_2-e)	Revised Scope Totals (t CO_2-e)
Operation	Scope 1 (Direct)	Diesel use	2,630,968	No change	9,932,087	6,056,553
		Fugitive emissions	7,301,119	3,425,585		
	Scope 2 (Indirect)	Electricity	37,050	No change	37,050	37,050
	Scope 3 (Indirect)	Product use	209,864,104	No change	220,372,162	220,372,162
		Associated with energy extraction and distribution	141,889	No change		
		Product transport	10,354,195	No change		
		Materials transport	11,973	No change		
Total operational emissions associated with the Glendell Continued Operations Project					**230,341,299**	**226,465,765**

A discussion of the results is provided in **Section 3.3.1**.

3.1.6 Operational energy use

The Project will form part of the Mount Owen Complex, and the Project will generate new energy demands, and share the energy demands of the existing CHPP and MIA. The Project will require diesel for most operational activities and electricity for the new MIA.

The Project is expected to require approximately 38,313,000 GJ.

3.2 Mount Owen Consent (SSD 5850)

3.2.1 Assumptions

The following information was used to estimate the greenhouse gas emissions from the operational activities associated with the modification of the Mount Owen Consent:

- Electricity use will average approximately 205,000 GJ per annum between 2037 and 2045.
- All other electricity use associated with the Project between 2021 and 2036 has not been included in the assessment, as all forecast electricity consumption associated with the Project between 2021 and 2036 has already been assessed as part of the Mount Owen Continued Operations Project (and subsequent modifications)

3.2.2 Greenhouse gas emissions

The greenhouse gas emissions associated with the Mount Owen Consent are summarised in **Table 3.3** (refer to **Appendix B** for further detail). There has been no change to the emissions estimates associated with the Mount Owen Consent as presented in the original GHGEA report.

Table 3.3 Greenhouse gas emission summary

Stage	Scope	Source	Source Totals (t CO_2-e)	Scope Totals (t CO_2-e)
Operation	Scope 2 (Indirect)	Electricity	420,660	420,660
	Scope 3 (Indirect)	Associated with energy extraction and distribution	51,660	51,660
Total operational emissions associated with the Mount Owen Consent				**472,320**

A discussion of the results is provided in **Section 3.3.1**.

3.2.3 Energy use

The electricity use requirements of the Mount Owen Consent (the existing CHPP and MIA) has been assessed and approved (at full operating capacity) up until 2037, as part of the approved Mount Owen Complex Development Consent. The GHGEAs completed for the approved operations have assumed the CHPP would operate a full operational capacity (i.e. 17 Mpta) up until 2037, to create a contingency for additional projects across the Mount Owen Complex. The Project's forecast production fits within the assumptions made for the Mount Owen Complex assessment (i.e. the Project won't inflate the total Complex's processing requirements beyond 17 Mtpa) up until 2037.

From 2037 to 2045 the Project will generate new electricity demands beyond those already assessed as part of the approved operations. The proposed Mount Owen Modification is expected to require approximately 1,845,000 GJ.

3.3 Revised Total project operations

The following sections incorporate the results presented in **Sections 3.1** and **3.2** to present the total operational emissions and energy use associated with the Project.

3.3.1 Greenhouse gas emissions

The total revised greenhouse gas emissions associated with the Project are summarised in **Table 3.4** (refer to **Appendix B** for further detail).

Table 3.4 Summary of revised total project operational greenhouse gas emission

Stage	Scope	Source	Revised Source Totals (t CO_2-e)	Revised Scope Totals (t CO_2-e)
Operation	Scope 1 (Direct)	Diesel use	2,630,968	6,056,553
		Fugitive emissions	3,425,585	
	Scope 2 (Indirect)	Electricity	457,710	457,710
	Scope 3 (Indirect)	Product use	209,864,104	220,423,822
		Associated with energy extraction and distribution	193,549	
		Product transport	10,354,195	
		Materials transport	11,973	
Total operational emissions associated with the Project				**226,938,085**

The Project is forecast to generate approximately 6,057,000 t CO_2-e of Scope 1 emissions from combusting diesel and releasing fugitive emissions. This presents a reduction of 3,876,000 (approximately 39%) from the 9,933,000 t CO_2-e calculated using the Method 1 approach as part of the original assessment submitted with the EIS. Annual Scope 1 emissions associated with the Project were originally expected to average approximately 414,000 t CO_2-e per annum, the revised calculations indicate Scope 1 emissions are expected to average approximately 253,000 t CO_2-e per annum (when averaged over the life of the Project), a reduction of approximately 39%. Annual average Scope 1 emission estimates should not be used to benchmark annual performance, as annual emissions will vary significantly due to normal variations in annual activity.

As discussed in the original assessment and the EIS the application of the Method 1 assessment method was considered a conservative approach given the initial review of the interim fugitive gas model developed for the site (based on preliminary gas analysis of sampled bore core) estimated that actual fugitive emissions may be significantly lower than the default emission factor, which has now been confirmed through the revised assessment.

The Project is forecast to be associated with approximately 458,000 t CO_2-e of Scope 2 emissions from consuming electricity. Annual Scope 2 emissions associated with the Project are expected to average approximately 19,000 t CO_2-e per annum (when averaged over the life of the Project)[3].

The Project is forecast to be associated with approximately 220,424,000 t CO_2-e of Scope 3 emissions over the life of the Project. Scope 3 emissions will be generated by third parties who transport and consume coal products.

[3] Annual average electricity consumption has been averaged over 25 years as the Project is likely to process ROM coal for up to 12 months after mining ceases.

Figure 3.1 demonstrates that the Project's greenhouse gas inventory is dominated by Scope 3 emissions. Approximately 97% of the Project's greenhouse gas emissions occur either upstream or downstream of the Project. Approximately 3% of the greenhouse gas emissions associated with the Project are related to on-site energy use and fugitive emissions (Scope 1 and 2 emissions), a reduction from 5%, calculated as part of the original assessment.

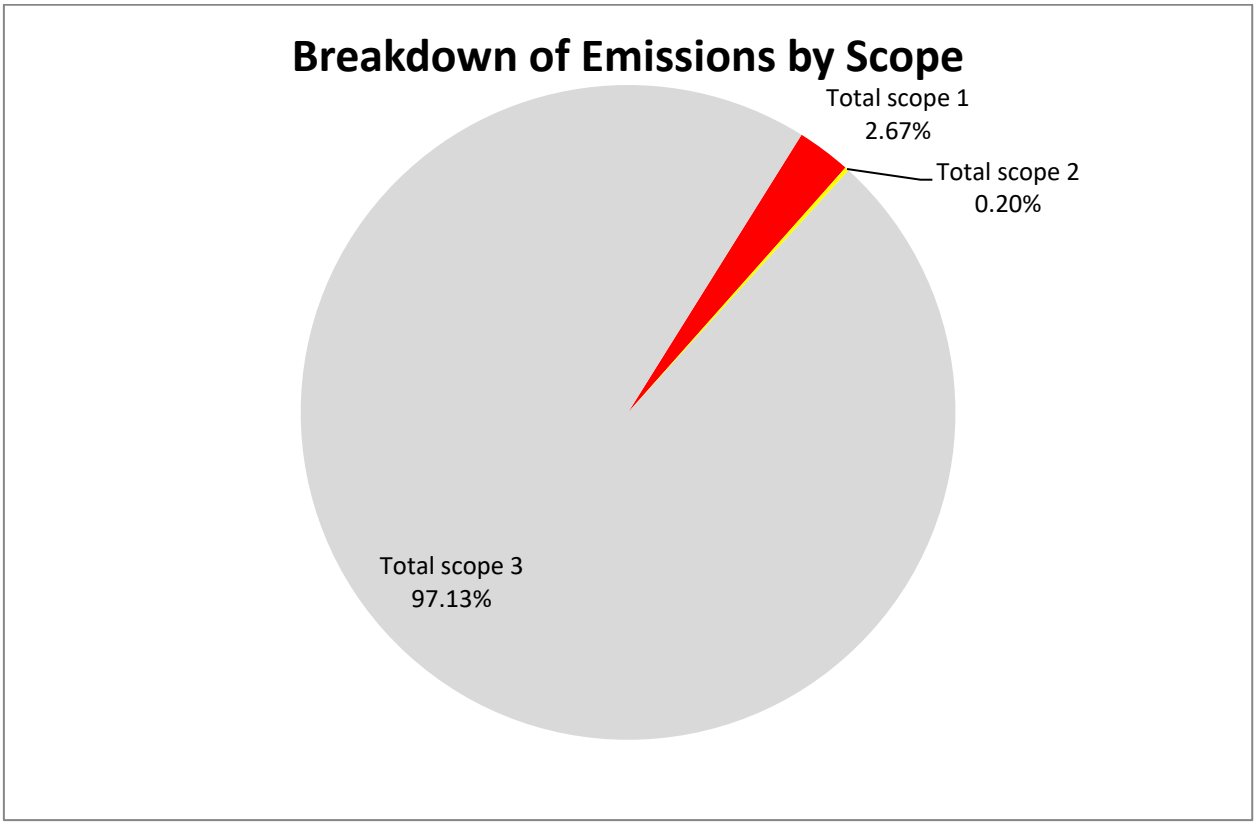

Figure 3.1 Breakdown of emissions by scope

Scope 2 and 3 emissions have been included in the GHGEA to demonstrate the potential upstream and downstream impacts of the Project. All Scope 2 and 3 emissions identified in the GHGEA are attributable to, and may be reported by, other sectors.

3.3.2 Energy use

The following energy use has been included in this assessment:

- diesel use associated with recovering approximately 135,000,000 tonne of ROM coal
- diesel use associated with operational activities associated with the Project mine plan (e.g. progressive rehabilitation)
- 100% of the electricity use associated with the new MIA planned for the Project
- 100% of the CHPP operating a full capacity between 2037 and 2045.

The assessment assumptions avoid double counting electricity use across inter-related Development Approvals, and over-estimates electricity consumption between 2037 and 2045 (as the Project will not require the full operational capacity of the CHPP).

The GHGEA has been completed based on the assumption that the Project will consume 40,158,000 GJ of energy from diesel and grid electricity. Energy use associated with the Project is expected to average approximately 1,607,000 GJ per annum (when averaged over the life of the Project).

The industry average energy use for open cut coal mines in Australia ranges between 430 and 660 Megajoules (MJ)/product tonne (AGSO 2000). The forecast energy use intensity associated with the additional coal extracted by the Project is approximately 467 MJ/product tonne, which is at the lower end this range.

4.0 Impact assessment summary

The greenhouse gas emissions generated by the Project have the potential to impact the physical environment and the emission reduction objectives of State, national and international governing bodies. The following assessment makes the distinction between environmental impacts and impacts on policy objectives.

4.1 Impact on the environment

The Project's greenhouse gas emissions will have a disperse impact as they are highly mobile and are generated up and down the supply chain. The accumulation of greenhouse gas or carbon in 'carbon sinks' is the primary impact of emissions. Anthropogenic greenhouse gas emissions have accumulated in three major carbon sinks - the ocean (30%), terrestrial plants (30%) and the atmosphere (40%) (BOM and CSIRO 2014).

The accumulation of greenhouse gas in the atmosphere is an important driver of global warming, sea level rise and climate change (IPCC 2013). Sea level rise and climate change may have many ramifications for the natural and built environment. The accumulation of greenhouse gas in the ocean is also an important driver of ocean acidification (IPCC 2013).

The Project's revised direct emissions (Scope 1) are forecast to be approximately 253,000 t CO_2 –e per annum.

To put the Project's emissions into perspective, under current policy settings, global greenhouse gas emissions are forecast to reach 56,200,000,000 t CO_2-e per annum by 2025 (UNEP 2016). During operation, the Project will contribute approximately 0.00045% (reduced from 0.00074%) to global emissions per annum (based on its projected Scope 1 emissions). The relative environmental impact of the Project is likely to be relative to its proportion of global greenhouse gas emissions.

The Scope 2 and 3 emissions associated with the Project should not be considered, as global projections only represent Scope 1 emissions (i.e. the sum of all individual emission sources) as Scope 2 and 3 emissions of the Project are the Scope 1 emission of other parties.

4.2 Impact on climate change

The Intergovernmental Panel on Climate Change (IPCC) define climate change as a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties, and persists for an extended period, typically decades or longer (IPCC 2007).

Climate change is caused by changes in the energy balance of the climate system. The energy balance of the climate system is driven by atmospheric concentrations of greenhouse gases and aerosols, land cover and solar radiation (IPCC 2007).

Climate change models forecast many different climate change impacts, which are influenced by future emission scenarios. Climate change forecasts also vary significantly from region to region.

A qualitative assessment of climate change requires a regional reference and future emission trajectory assumptions. The Project, in isolation, is unlikely to influence global emission trajectories. Future emission trajectories will largely be influenced by global scale issues such as; technology, population growth and greenhouse gas mitigation policy. NSW climate change projections have been modelled by the NSW and ACT Regional Climate Modelling (NARCliM) project. NARCliM has modelled climate change projections for 2030 and 2070, using the IPCC high emissions A2 emission trajectory scenario. The A2 scenario assumes (IPCC 2000):

- relatively slow demographic transition and relatively slow convergence in regional fertility patterns
- relatively slow convergence in inter-regional gross domestic product (GDP) per capita differences
- relatively slow end-use and supply-side energy efficiency improvements (compared to other storylines)
- delayed development of renewable energy
- no barriers to the use of nuclear energy.

The Project is consistent with the A2 emissions trajectory scenario, therefore the climate change projections developed by NARCliM seem a reasonable basis for a qualitative climate change impact assessment. NARCliM makes the following climate change projections for NSW (Adapt NSW 2016):

- maximum temperatures are projected to increase
- minimum temperatures are projected to increase
- the number of hot days will increase
- the number of cold nights will decrease
- rainfall is projected to decrease in spring and winter
- rainfall is projected to increase in summer and autumn
- average fire weather is projected to increase in summer and spring
- number of days with severe fire danger is projected to increase in summer and spring.

The extent to which global emissions and atmospheric concentrations of greenhouse gases have a demonstrable impact on climate change will be largely driven by the global response to reducing total global emissions that includes all major emission sources and sinks.

Glencore has announced that it will manage global coal production to a total of around 150 Mt per annum (pa) going forward as part of a voluntary cap on coal production. However, this does not mean Glencore will freeze its coal projects nor exiting coal. Glencore has indicated that it will continue to develop a pipeline of coal projects assessed against market conditions and project economics and while remaining within the coal production cap.

Glencore also participates and supports a range of low emission technology initiatives that seek to reduce greenhouse gas emissions from mining operations and provide a pathway to reduce emissions from the use of its products

Glencore recognises that over the next 20 years the percentage of the energy generation market supplied by coal is predicted to decline. As the Project meets an existing coal demand and fits within Glencore's committed production cap, Glencore considers that the Project is aligned with the global energy market.

In response to recent commentary and court cases on climate issues related to coal projects has been prepared by Glencore and is attached to the EIS as Appendix 28.

4.3 Impact on policy objectives

The United Nations Framework Convention on Climate Change (UNFCCC) is the leading international forum for setting climate change targets and objectives. The UNFCCC has been responsible for developing internationally accepted greenhouse gas emission reporting methodologies, and has led the development of:

- the Kyoto Protocol
- the Paris Agreement
- specific directives and guidance to improve the implementation of the UNFCCC.

The Kyoto Protocol became international policy in 2005, and it committed the European Union (EU) plus 37 other member states to manage greenhouse gas emissions between 2008 and 2012. A second round of the Kyoto Protocol (the Doha Amendment) committed the EU plus 191 other member states to manage greenhouse gas emissions between 2013 and 2020. Australia was a signatory to both rounds of the Kyoto Protocol and Australia will meet its obligations under the Kyoto Protocol in 2020 (DoEE 2018b).

In 2015 the UNFCCC successfully negotiated an international climate change agreement between 195 countries (the Paris Agreement). The Paris Agreement aims to:

- hold the increase in the global average temperature to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels
- increase the ability [of nations] to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production
- make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

The Paris Agreement seeks to meet its objectives by developing programs and mechanisms that:

- require participating Parties to prepare and communicate greenhouse gas mitigation contributions. Parties are expected to set mitigation targets for 2020, and then develop new targets every five years. Each successive target is expected to represent a larger mitigation effort than the previous target
- promote climate change resilience and adaptation
- provide mitigation and adaptation funding to developing countries
- foster mitigation and adaptation technology transfer between Parties
- require participating Parties to report progress towards their mitigation contributions on an annual basis.

Australia signed the Paris Agreement on 22 April 2016, and Australia's obligations under the Paris Agreement will drive national greenhouse gas policy between 2020 and 2030. Under the Paris Agreement, Australia is obliged to:

- prepare, communicate and maintain a Nationally Determined Contribution (NDC). An NDC outlines the size and type of mitigation contribution each member state will make to the international effort

- pursue domestic mitigation measures, with the aim of achieving the objectives of its NDC
- communicate an NDC every 5 years
- quantify its NDC in accordance with IPCC methodologies, which promote transparency and avoid double counting.

4.3.1 Australian targets

Australia's commitment to the Paris Agreement includes reducing greenhouse gas emissions by 26 - 28 %, on 2005 levels, by 2030 (Commonwealth of Australia, 2015). To meet the requirements of the Paris Agreement, Australia will also have to develop interim targets for 2020 and 2025. Australia's NDC is summarised in **Table 4.1**.

Table 4.1 A summary of Australia's NDC

Target	Description
Emissions reduction target	Economy-wide target to reduce greenhouse gas emissions by 26 to 28 % below 2005 levels by 2030
Coverage	Economy-wide
Scope	Energy Industrial processes and product use Agriculture Land-use, land-use change and forestry Waste
Gases	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3

Australia's NDC prescribes an unconditional economy-wide target to reduce greenhouse gas emissions, and states that future policies will target emissions generated from:

- energy use
- industrial processes
- agriculture, land-use, land-use change and forestry
- waste.

Australia's NDC does not contain sector or state based targets, nor does it make any reference to the mining sector.

Glencore has reviewed the Project's forecasts greenhouse gas emissions inventory, and believes the Project is unlikely to materially increase the national effort required to reach Australia's 2030 greenhouse gas mitigation target. Further, the Project in isolation is unlikely to limit Australia achieving its national mitigation targets.

The Project's Scope 2 and 3 emissions will be generated in either international jurisdictions or by Australian facilities with separate environmental approvals to generate greenhouse gas emissions.

4.3.2 NSW Policy

The NSW Government has developed its NSW Climate Change Policy Framework, which aims to deliver net-zero emissions by 2050, and a State that is more resilient and responsive to climate change (OEH 2016).

Under the NSW Climate Change Policy Framework, NSW has committed to both follow the Paris Agreement and to work to complement national action. The key policy directions under the NSW Climate Change Policy Framework are summarised in the **Table 4.2**.

Table 4.2 A summary of the NSW climate change policy framework

Policy Direction	Rationale/Goals
Creating an investment environment that manages the emissions reduction transition	Energy will be transformed and investment/job opportunities will be created in emerging industries of advanced energy, transport and carbon farming and environmental services
Boost energy productivity and put downward pressure on energy bills	Boosting energy and resource productivity will help reduce prices and the cost of transitions to net-zero emissions
Grow new industries and capitalise on competitive advantages	Capitalising on the competitive advantage and growth of industries in professional services, advanced energy technology, property management and financial services
Reduce risks and damage to public and private assets arising from climate change	Embed climate change considerations into asset and risk management as well as support the private sector by providing information and supportive regulatory frameworks for adaptation
Reduce climate change impacts on health and wellbeing	Recognise the increased demand for health and emergency services due to climate change and identify ways to better support more vulnerable communities to health impacts
Manage impacts on natural resources and communities	Coordinate efforts to increase resilience of primary industries and rural communities as climate change impacts water availability, water quality, habitats, weeds and air pollution

The policy framework is being delivered through:

- the Climate Change Fund
- developing an economic appraisal methodology to value greenhouse gas emissions mitigation
- embedding climate change mitigation and adaptation across government operations
- building on NSW's expansion of renewable energy
- developing action plans and strategies.

The Project is unlikely to affect the objectives of the NSW Climate Change Policy Framework in a material way.

5.0 Evaluation of greenhouse gas mitigation measures

This GHGEA is required to assess reasonable and feasible measures to minimise the Project's greenhouse gas emissions.

The term reasonable incorporates notions of costs and benefits, whereas the term feasible focuses on the more fundamental practicalities of the mitigation measures, such as engineering considerations and what is practical to build or operate (Hunter Environment Lobby Inc v Minister for Planning *[2011] NSWLEC 221*).

5.1 Energy efficiency

The Project will mitigate Scope 1 and 2 emissions through energy efficiency initiatives. The energy efficiency of mining operations is driven by energy use and productivity. Energy efficiency is maximised when equipment is operated at optimal capacity. Glencore's mine planning process optimises operational productivity through scheduling, haul road ramp design, haul road design and equipment selection.

5.2 Assessment of potential management measures

The Proponent has incorporated a range of measures into the Project design, with the aim of minimising potential greenhouse gas emissions and improving energy efficiency. Energy efficiency was a key driver for the design of the mine plan as energy usage is a direct driver of cost as well as greenhouse gas emissions. The Project design inherently minimises greenhouse gas emissions generated from the mining operations (i.e. Scope 1 emissions). Key measures included in the Project design to minimise emissions include:

- limiting the length of material haulage routes (where feasible), thus minimising transport distances and associated fuel consumption
- selecting equipment and vehicles that have high energy efficiency
- scheduling activities so that equipment and vehicle operation is optimised.

The following sections assess the Project's planned mitigation measures against best practice greenhouse gas management.

5.2.1 Improving the diesel use efficiency of haul trucks and equipment

Diesel consumption in haul trucks and equipment is forecast to generate approximately 40% of the Project's combined Scope 1 and 2 emissions. **Table 5.1** includes the GHG mitigation measures assessed for improving diesel use efficiency.

Table 5.1 A summary of the NSW climate change policy framework

Energy use during extraction		
Potential Mitigation Measure	**Planned for the Project**	**Reason for Inclusion/Exclusion**
1. Limiting the length of material haulage routes	Yes	Length of haulage routes has been optimised to minimise dust, noise and fuel use
2. Optimising ramp gradients	Yes	Ramp gradients have been optimised according to pit geometry parameters

Energy use during extraction		
Potential Mitigation Measure	**Planned for the Project**	**Reason for Inclusion/Exclusion**
3. Fuel efficient haul trucks	Yes	Fuel use efficiency has been an important selection criteria when allocating existing trucks to operations. New fuel use technology will be considered should any new trucks be purchased over the life of the Project
4. Payload Management	Yes	Payload will be constantly monitored and actively managed to maintain efficiency
5. Reducing rolling resistance of haul roads	Yes	Haul roads are planned to be constructed of rock rather than of soil or subsoil material. Where practical road materials are selectively sourced which may include crushed rock for use in on-site roads to provide improved road surfaces and reduced rolling resistance
6. Scheduling activities so that equipment and vehicle operation is optimised	Yes	Scheduling activities to optimise plant and vehicle operation is a routine activity. The Proponent will continue to prepare long, medium and short term plans to optimise production
7. Alternative fuels	-	Biodiesel products may be considered with regard to engine performance and maintenance impacts
8. Replacing trucks with conveyors	No	The use of conveyors is not feasible or cost effective given the short haul distances and relatively short life of the Project
9. Fuel efficient equipment	Yes	Fuel use efficiency has been an important selection criteria when allocating existing equipment to operations. New fuel use technology will be considered should any new equipment be purchased over the life of the Project
10. Blasting strategies to improve extraction efficiency	Yes	Through seam blasting will be employed to minimise the need for ripping and parting
11. Maximising resource recovery efficiency	Yes	Long, medium and short term operational plans will be developed to optimise the recovery of approved resources
12. Working machines to their upper design performance	Yes	Glencore's business objectives support and promote effective equipment utilisation and performance rates
13. Electric drills	No	Electric drills are not used at Glendell due to the lack of availability of in-pit supply of electricity and small work areas requiring regular walking of the drills or relocations
14. Preventing unnecessary water ingress	Yes	The surface water management system is designed to maximise separation of clean and dirty water systems. Clean water is diverted away from mining areas where practicable
15. In-pit servicing	Yes	A current operational practice that will continue
16. Replace lighting plants with LED	Likely	Glencore has conducted a review of LED lighting plants across its operations and is currently considering the implementation of LED technology
17. Use of chemical dust suppressants to reduce energy consumption by water carts	Yes	Dust suppressants will be used on roads at Glendell

5.2.2 Improving electricity efficiency

Electricity consumption is forecast to generate approximately 7% of the Project's combined Scope 1 and 2 emissions. **Table 5.2** includes the mitigation measures assessed for the CHPP. It is noted that the CHPP is an existing, approved facility and no changes are proposed to this existing facility as part of the Project. Regardless, as the CHPP will be used to process coal from the Project, the Proponent will continue to assess energy efficiency options for the CHPP.

Table 5.2 CHPP energy use options assessed

Energy use during processing		
Potential Mitigation Measure	**Planned for proposed Project**	**Reason for Inclusion/Exclusion**
1. Reducing reject percentage	Yes	CHPP density set points are monitored each shift and product coal scan ash analysers are used to extract highest yield and thus lowest amount of reject
2. Automatically shutting down CHPP when not in use	N/A	CHPP runs 24 hours, 7 days per week other than for maintenance, Christmas and Boxing Days
3. High efficiency motors	Yes	These are installed and will be maintained for the life of the Project
4. Variable Speed Drives	Yes	These are installed and will be maintained for the life of the Project
5. Optimising motor size to load	Yes	This has been implemented at the CHPP
6. LED lighting for the MIA and parking areas	Yes	The new MIA and parking areas constructed for the Project will use LED lighting technology

The Project is planning to utilise many of the common greenhouse gas mitigation measures available for an open cut mine operation. High impact mitigation measures such as pre-draining coal seam methane will not be implemented, as Glencore has determined that this mitigation measure cannot be economically justified.

5.3 The safeguard mechanism

The Project will be subject to the Safeguard Mechanism emission caps which are currently applied to the Glendell Mine. The Safeguard Mechanism sets a maximum emissions cap (a Safeguard Number) for all Australian facilities that emit over 100,000 tonnes CO_2-e per year. If an Australian facility exceeds its Safeguard Number, it is nominally required to offset its exceedance by surrendering Australian Carbon Credit Units to the Clean Energy Regulator (CER).

The current Glendell Mine Safeguard Number is currently set at 448,015 tonnes of CO_2-e, which corresponds to its highest level of emissions between 2009-10 and 2013-14. The Safeguard Mechanism will provide an incentive for the Proponent to manage annual greenhouse gas emissions.

6.0 Scope 3 emissions

Scope 3 emissions are indirect emissions that are associated with the Project, but occur at sources owned or controlled by other entities. Scope 3 emissions simply acknowledge that products will continue to generate greenhouse gas emissions as they move through a value chain. The Project's Scope 3 emissions are forecast to be generated by electricity generators burning coal in countries such as Australia, China, India, Japan, Malaysia, Philippines, South Korea and Taiwan. The Proponent is not seeking approval to generate Scope 3 emissions, as they are not generated by the Project, and approval for Scope 3 emissions has been or will be granted to other parties using other approval pathways.

6.1 Double counting

In assessing the impacts of Scope 3 emissions, it is important not to double count Scope 1 and Scope 3 emissions. Scope 1 and Scope 3 emissions can be the same emissions once greenhouse gas inventories start to capture multiple facilities and entire value chains. For example, the Scope 1 emissions forecast for the Project's consumers are the same emissions as the "Product Use" Scope 3 emissions forecast for the Project.

The classification of different emission scopes was deliberately developed to avoid double counting, and all IPCC level greenhouse gas reporting only considers Scope 1 emissions to avoid double counting. The Katowice Climate Change Package (a UNFCCC initiative developed in December 2018) provides NDC guidance on reporting clarity, transparency and double counting. The importance of avoiding double counting is well-recognised under international and Australian greenhouse gas reporting frameworks. The Paris Agreement, and the subsequent Katowice Climate Change Package, requires member states to:

- avoid double counting consistent with the guidance adopted by the UNFCCC
- apply robust accounting to avoid double counting consistent with the guidance adopted by the UNFCCC
- provide information on how their cooperative approach applies robust accounting to ensure the avoidance of double counting
- avoid double counting when accounting for anthropogenic emissions and removals corresponding to their NDCs.

The NGER Act in Australia does not provide for double counting and only regulates Scope 1 and Scope 2 emissions. There is no requirement or obligation under Australian law to report Scope 3 emissions, as Scope 3 emissions will be captured by the controlling corporations directly responsible for generating emissions (i.e. Scope 1 emissions). The exclusion of Scope 3 emissions from the reporting requirements under Australian law effectively avoids double counting of Scope 3 emissions.

6.2 Uncertainty

The Scope 3 emissions calculated as part of this assessment use default emission factors. The actual emissions generated at the emission source will depend on the technologies employed by electricity generators. For example, if the coal was exported and used in a supercritical coal-fired power station or in conjunction with carbon capture and storage, then the actual GHG emissions would likely be quite different than if used in a conventional power station.

6.3 Management of Scope 3 emissions

Glencore manages a significant product stewardship and market development program which aims to mitigate the downstream impacts of its products.

Glencore supports low-emission coal technology projects via the Australian coal industry's $1 billion COAL21 Fund. Projects supported by this fund include the Callide Oxyfuel project and the Otway Basin Carbon Capture and Storage project.

Separately, Glencore is involved in the following Projects:

- member of the Callide Oxyfuel project in Queensland
- member of the FutureGen CCS project in the USA
- investigating options for carbon capture and storage in Queensland.

Most of the product coal generated by the Project will be exported to countries who are parties to the Paris Agreement. These countries have, or are in the process of developing, domestic laws, policies, and measures to mitigate greenhouse gas emissions (to achieve their NDC targets). The domestic efforts to achieve NDC targets for each market are summarised in **Table 6.1**.

Table 6.1 A Summary of greenhouse gas mitigation policies in major markets

Country	Summary of the domestic climate change framework in the relevant export customer countries
China	• has introduced several policies to limit emissions (including policies to shut down coal-fired power plants, increase the efficiency of its coal generation fleet and place caps on the annual production capacity of coal), and to promote the development of commercially-viable carbon capture, utilisation and storage (CCUS) technology in order to achieve its NDC of lowering carbon intensity by 60 to 65% from 2005 levels • has introduced carbon pricing policies and has committed to extend their scope and value
India	• has imposed a coal tax on all domestic and imported coal since 2010 (which has been increased three times since its inception), though its NDC indicates that coal (from both domestic and imported sources) will continue to dominate power generation into the future and India has included constructing coal-fuelled power plants with higher efficiency.
Japan	• has highlighted carbon pricing and the use of CCUS technologies as key to achieving its emissions reductions NDC of 25% below 2013 levels by 2030 • made significant progress with several CCUS projects • has imposed import taxes for coal and liquefied natural gas (LNG) • aims to pursue high efficiency in thermal power generation using high-efficiency technologies such as ultra-supercritical and advanced ultra-supercritical.
Malaysia	• has set a renewable energy target of 20% by 2025 (an 18% increase from current levels) as a key mechanism for achieving its NDC of reducing emissions by 40% by 2030 relative to 2005 levels • may present an ideal site for CCUS opportunities in the future (though currently lacks the legal and regulatory frameworks to support such projects).

Country	Summary of the domestic climate change framework in the relevant export customer countries
Philippines	• has resolved to increase the share of renewable energy in its generation mix and is considering the introduction of a carbon tax as some of the strategies for meeting its NDC of reducing emissions to approximately 70% below BAU levels by 2030, though has acknowledged that coal will continue to play a key role in the country • plans to continue constructing new coal-fired power plants into the future.
South Korea	• is looking to increase the share of renewable energy and natural gas while decreasing the share of coal as a key measure for achieving its NDC of 37% below business-as-usual (BAU) levels by 2030 • has imposed import taxes for coal and LNG which act as a carbon tax and seeks to encourage a transition away from coal to renewables and LNG
Taiwan	• has legislated toward reducing reliance on both domestic and imported sources of coal, with plans to increase reliance on renewable energy and impose tax mechanisms on imported fossil fuels as a part of its plan to achieving emissions reductions of 50% below BAU levels by 2030 per its NDC.
Vietnam	• has targeted an increase in reliance on renewable energy, while not discounting the continued use of coal, in its plans to reach its NDC of emissions reductions of 8% below BAU by 2030.

The countries that consume the Project's coal (i.e. the primary source of the Project's Scope 3 emissions) have, or will have, numerous domestic laws and policies in place to achieve long term greenhouse gas mitigation. It is both appropriate, and consistent with the overarching international climate change framework, for the Project's Scope 3 emissions to be regulated and reported by the respective export destinations as Scope 1 emissions generated in those countries. Improving the certainty of Scope 3 emissions forecasts requires site based emission factors for every facility that consumes the Project's products. **Appendix C** also provides a range of technologies that are being employed by key market destinations.

7.0 Conclusion

The Project is a large scale brownfield operation that will produce significant energy commodities over 24 years. The Project's forecast energy use intensity is considered to fall within the normal range when compared with coal mining operations across Australia. The Project was conservatively estimated to generate approximately 10,390,000 t CO_2-e of Scope 1 and 2 emissions, the revised assessment indicates the Project is now expected to generate approximately 6,515,000 t CO_2-e of Scope 1 and 2 emissions.

The Project is also forecast to be associated with approximately 220,424,000 t CO_2-e of Scope 3 emissions. The Project's Scope 3 emissions are beyond the operational control of the Proponent, and the majority of Scope 3 emissions will be generated downstream of the Project, when coal products are combusted by electricity generators and/or coking plants.

The Project may increase the national mitigation effort required to reach Australia's 2030 greenhouse gas mitigation target, however, the Project itself is unlikely to affect the ability for Australia to achieve its national greenhouse gas targets.

The Proponent has incorporated a range of measures into the Project's design to minimise potential greenhouse gas emissions, and improve energy efficiency. Energy efficiency was a key driver for the design of the mine plan as energy usage is a direct driver of cost as well as greenhouse gas emissions. The Project's design inherently minimises greenhouse gas emissions from the mining operations, primarily through energy use reduction initiatives and maximising the utilisation of existing infrastructure.

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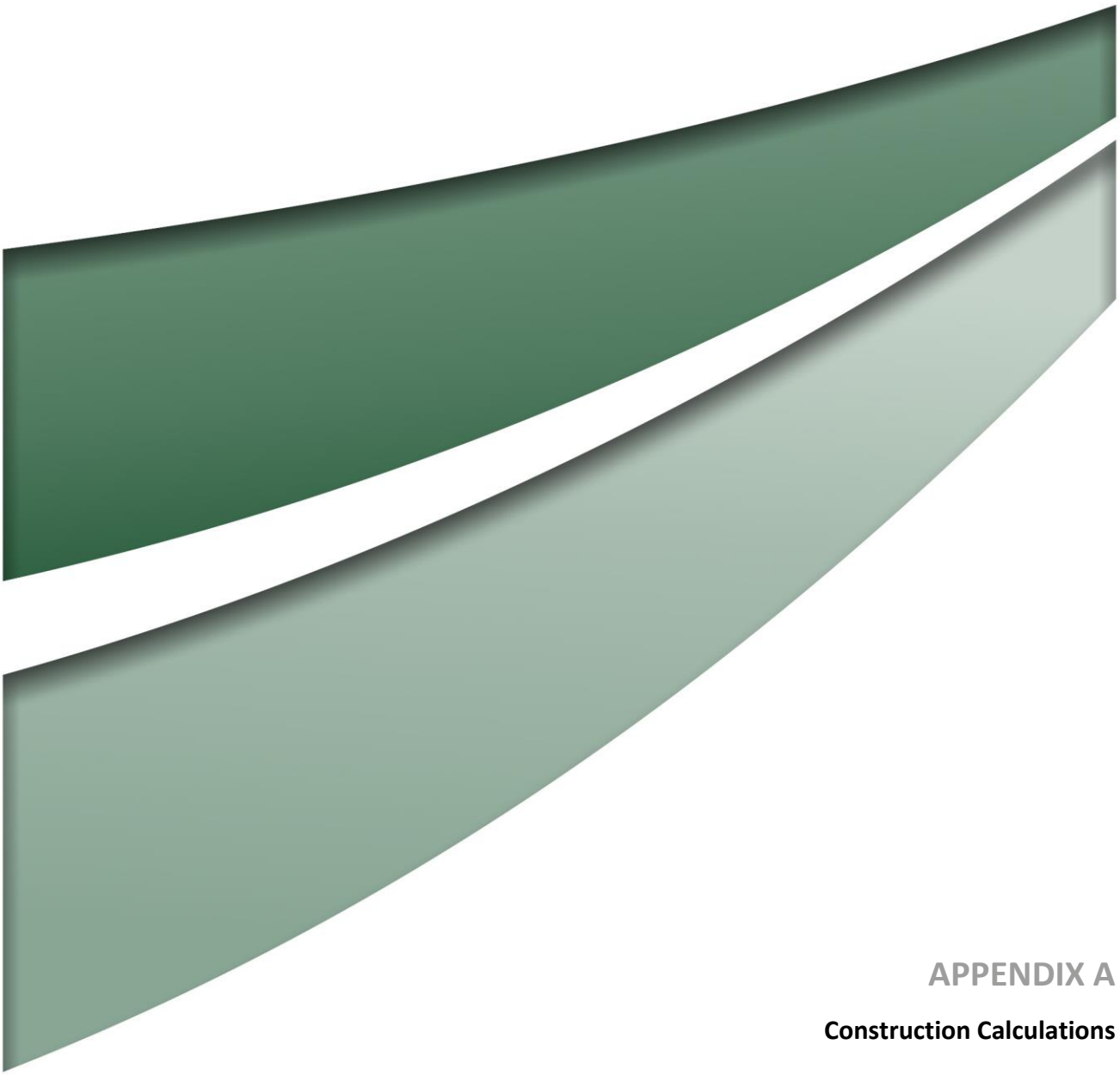


APPENDIX A

Construction Calculations

Appendix A – Construction Calculations

The greenhouse gas emissions for the construction phase of the Project are based on the following assumptions. The following assumptions have been used for calculation purposes only and are not meant to describe the exact specifications of the Project.

The assumptions are:

- Concrete will be sourced from Singleton
- Steel will be sourced from Newcastle
- Road base will be sourced locally
- Bulk density of concrete is 2,400 Kg/m^3
- Bulk density of road base and footings is 2,200 Kg/m^3
- Bulk density of asphalt is 2,250 Kg/m^3
- Payload of trucks is 33 tonne
- The relocation of Ravensworth Homestead will require medium sized rigid trucks to complete 2,100 trips to Broke
- The relocation of the Ravensworth Homestead will involve a round trip of 100 km.

Appendix A – Construction Calculations

Construction Materials

Activity Data			Emission Factors[4]	GHG Emissions
Material Type	Usage	Unit	t CO_2-e/Unit	t CO_2-e
Steel	585	t	1.95	1,141
40 MPa steel reinforced concrete	5,211	t	0.265	1,381
40 MPa fibre reinforced concrete	6,384	t	0.45	2,873
Steel pipe	59	t	1.94	114
Asphalt	4,839	t	0.071	344
Purlins, Girts and Cladding	150	t	2.03	304
			Total GHG emissions (t CO_2-e)	**6,157**

Energy Use during Construction

Activity Data				Emission Factors
				Full Life Cycle
Purchased energy	Usage	Units	GJ	kg CO_2-e/GJ
Diesel	1,748	kL	67,488	73.8
				t CO_2-e
			Total GHG emissions (t CO_2-e)	**4,981**

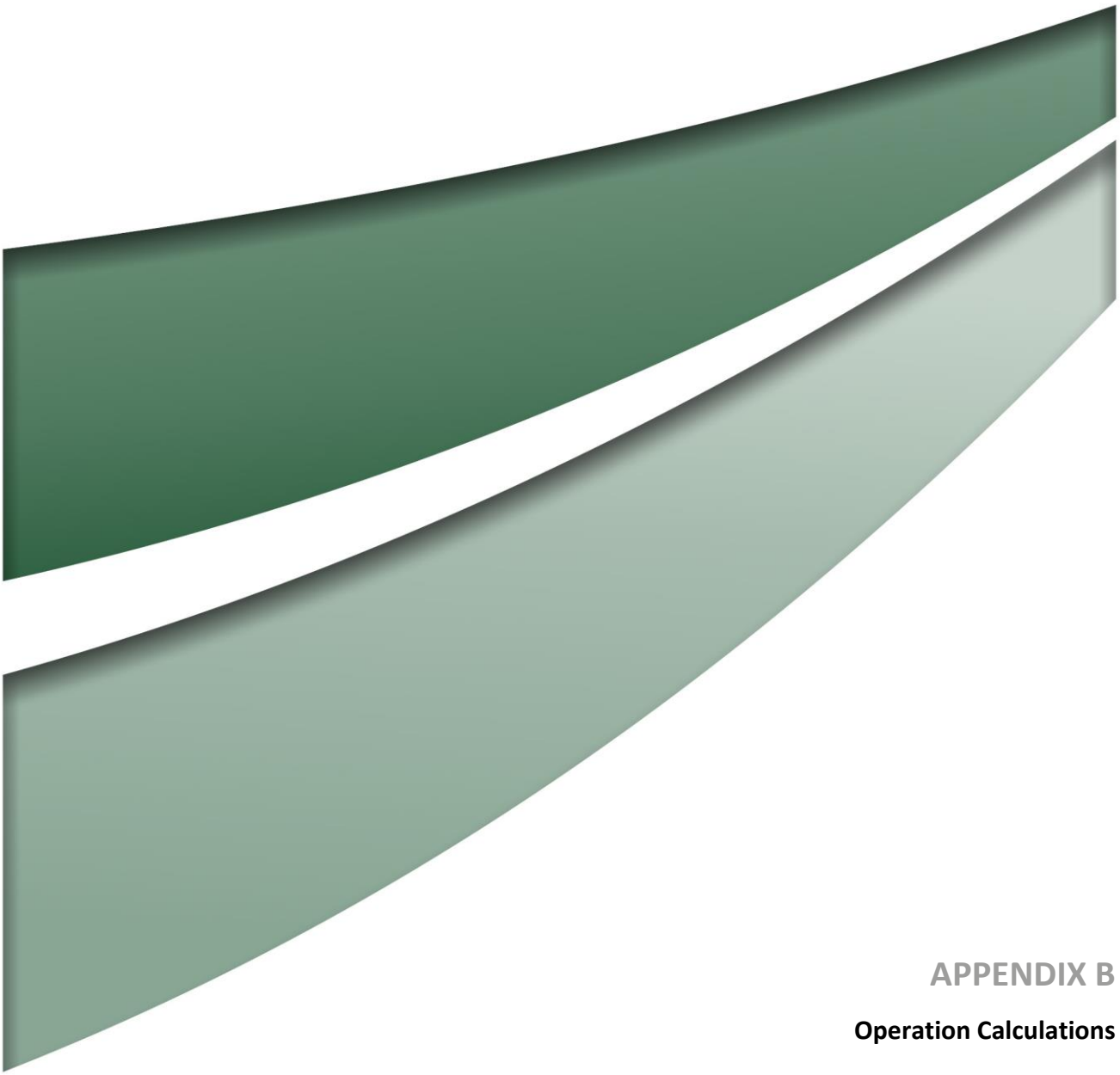
Transport of Materials

Activity Data				Emission Factors
				Full Life Cycle
Purchased energy	Usage	Units	GJ	kg CO_2-e/GJ
Diesel	835	kL	32,250	74.1
				t CO_2-e
			Total GHG emissions (t CO_2-e)	**2,390**

Relocation of Ravensworth Homestead

Activity Data				Emission Factors
				Full Life Cycle
Purchased energy	Usage	Units	GJ	kg CO_2-e/GJ
Diesel	59.850	kL	2,310	74.1
				t CO_2-e
			Total GHG emissions (t CO_2-e)	**171**

[4] Emission factors sources from the University of Bath, Inventory of Carbon and Energy (ICE) v2.0, 2011.



APPENDIX B

Operation Calculations

Appendix B – Calculation of Operational Emissions

Stationary Diesel Use

Activity Data	Energy Use		Emission Factors		
			CO_2	CH_4	N_20
kL	GJ/kL	GJ	kg CO_2-e/GJ	kg CO_2-e/GJ	kg CO_2-e/GJ
970,937	38.6	37,478,168	69.9	0.1	0.2
			t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG emissions (t CO_2-e)			2,619,724	3,748	7,496
				Total GHG Emissions (t CO_2-e)	**2,630,968**

Fugitive Emissions

Activity Data	Energy Use		Emission Factors		
			CO_2	CH_4	N_20
ROM (t)	-	-	kg CO_2-e/ROM t	kg CO_2-e/ROM t	kg CO_2-e/ROM t
135,205,914	N/A	N/A	N/A	25.336	N/A
			t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG emissions (t CO_2-e)			N/A	3,425,585	N/A
				Total GHG Emissions (t CO_2-e)	**3,425,585**

Electricity - GCOP

Activity Data	Energy Use	Emission Factors		
		CO_2	CH_4	N_20
GJ	GJ	kg CO_2-e / GJ	kg CO_2-e / GJ	kg CO_2-e / GJ
162,500	162,500	228	N/A	N/A
		t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG emissions (t CO_2-e)		37,050	N/A	N/A
			Total GHG Emissions (t CO_2-e)	**37,050**

Electricity - MTO

Activity Data	Energy Use	Emission Factors		
		CO_2	CH_4	N_20
GJ	GJ	kg CO_2-e / GJ	kg CO_2-e / GJ	kg CO_2-e / GJ
1,845,000	1,845,000	228	N/A	N/A
		t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG emissions (t CO_2-e)		420,660	N/A	N/A
			Total GHG Emissions (t CO_2-e)	**420,660**

Product Use

Activity Data		Energy Production		Emission Factors		
				CO_2	CH_4	N_20
Product	Product (t)	GJ/Product t	GJ	kg CO_2-e/GJ	kg CO_2-e/GJ	kg CO_2-e/GJ
Bituminous coal	86,143,684	27.0	2,325,879,468	90	0.03	0.2
Coking coal	0	30.0	0	91.8	0.02	0.2
				t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG Emissions (t CO_2-e)				209,329,152	69,776	465,176
					Total GHG Emissions (t CO_2-e)	**209,864,104**

Extraction, Production and Distribution of Energy Purchased - GCOP

Activity Data		Emission Factors		
		CO_2	CH_4	N_20
Purchased energy	GJ	kg CO_2-e/GJ	kg CO_2-e/GJ	kg CO_2-e/GJ
Diesel	38,149,837	3.6	N/A	N/A
Electricity	162,500	28	N/A	N/A
		t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG Emissions (t CO_2-e)		141,889	N/A	N/A
			Total GHG Emissions (t CO_2-e)	**141,889**

Extraction, Production and Distribution of Energy Purchased - MTO

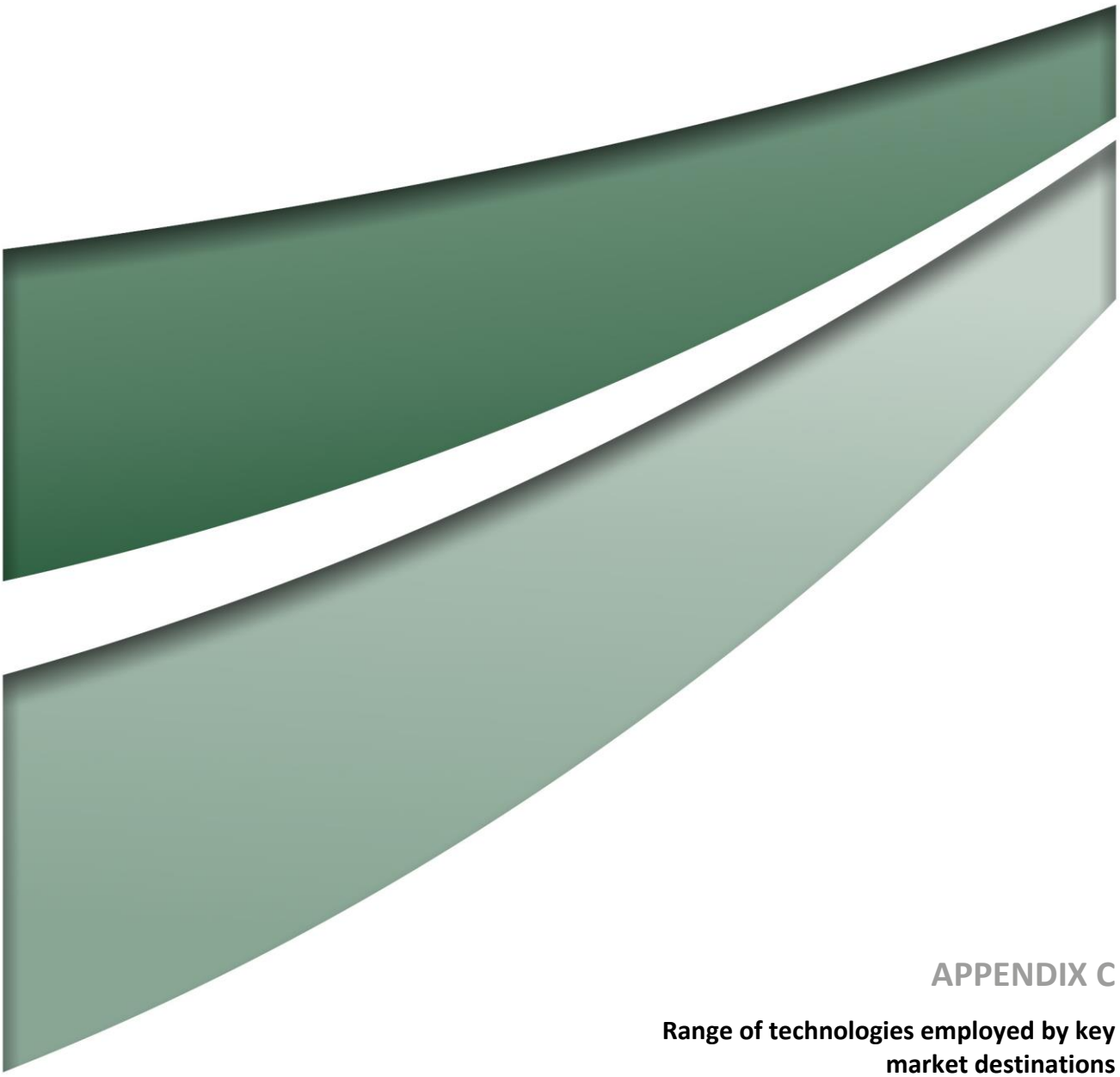
Activity Data		Emission Factors		
		CO_2	CH_4	N_20
Purchased energy	GJ	kg CO_2-e/GJ	kg CO_2-e/GJ	kg CO_2-e/GJ
Diesel	0	3.6	N/A	N/A
Electricity	1,845,000	28	N/A	N/A
		t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG Emissions (t CO_2-e)		51,660	N/A	N/A
			Total GHG Emissions (t CO_2-e)	**51,660**

Product Transport

Activity Data				Emission Factors		
				CO_2	CH_4	N_20
Transport mode	Product (t)	Distance (km)	Tonne km (tkm)	kg CO_2-e/tkm	kg CO_2-e/tkm	kg CO_2-e/tkm
Rail - Export	86,143,684	92	7,925,218,928	0.0054	N/A	N/A
Ship - Export	86,143,684	9,500	818,364,998,000	0.0126	N/A	N/A
				t CO_2-e	t CO_2-e	t CO_2-e
Breakdown of individual GHG Emissions (t CO_2-e)				10,354,195	N/A	N/A
					Total GHG Emissions (t CO_2-e)	**10,354,195**

Materials Transport

Activity Data				Emission Factors		
				Scope 1	Scope 3	Full Life Cycle
Transport mode	Usage	Units	GJ	kg CO_2-e/GJ	kg CO_2-e/GJ	kg CO_2-e/GJ
Truck – Diesel (230 km)	3,266	kL	126,068	70.5	3.6	74.1
Truck – Explosives (130 km)	920	kL	35,512	70.5	3.6	74.1
						t CO_2-e
					Total GHG emissions (t CO_2-e)	**11,973**



APPENDIX C

Range of technologies employed by key market destinations

Appendix C - Range of technologies employed by key market destinations

Country	Implementation of HELE, CCUS and other similar technologies[5]
China	• Included high-efficiency coal in its NDCs to the *Paris Agreement*. • China's Ministry of Industry and Information Technology (MIIT) and Finance Ministry released a 2015-2020 Action Plan on the Efficient Use of Coal. • China has set limits on consumption per kWh rate (another approach to measuring efficiency) of <310 grams/kWh by 2020 for large plants and has consistently improved emissions intensity. • Employing HELE coal-fuelled plants in increasing percentages, supporting research and development to develop new HELE technologies and transition its fleet to larger power plants • Implemented multiple measures to accelerate the deployment of CCUS. These include: o widely promoting low-carbon technologies, with an emphasis on carbon capture utilisation and storage (CCUS); o supporting CCUS pilots and Near Zero Carbon Emissions pilots; o providing grant funding for CCUS research projects promoted by the Ministry of Science and Technology; o amending the Environmental Impact Assessment Guidelines to better address CCUS projects; and o establishing a CCUS capacity building project for government officials and researchers directly involved in CCUS. • A significant focus for China is the application of CCUS for enhanced oil recovery (EOR). China has over 20 CCUS for EOR projects at various stages of development. A number of these EOR projects have been, or will be, linked to CCUS plants and designed to capture the CO_2 generated by coal-fired power plants. For example, the Sinopec Shengli Power Plant, located near the Shengli oilfield in the Shangdong province (the second largest oil field in China), currently possesses an integrated CCUS pilot plant which captures 40,000 tons of CO_2 per annum, with a second phase of the CCUS plant currently under construction and intended to capture up to 1 million tons of CO_2 per annum. Once the second phase of the CCUS plant is complete, all captured CO_2 will be used for EOR to increase oil recovery by 10-15%.
India	• Included high-efficiency coal-fuelled power in its NDC under the Paris Agreement. • As of December 2018, 21% of India's coal-fuelled generation capacity was HELE, but at least 83% of planned and under construction capacity is HELE. In the 5 years to 2023, at least 53 GW of HELE generating capacity is expected to come online in India. • Target coal burn for power generation in 2027 is 828 Mt, but this is highly dependent on significant renewables growth. Any renewables shortfall will contribute to increased coal demand. • According to India's NDC, coal will continue to dominate power generation in the future. The Government has introduced the following initiatives to improve the efficiency of coal-fired power plants: o all new, large coal-based generating stations have been required to use highly efficient supercritical technology; o Renovation and Modernisation (R&M) and Life Extension (LE) of existing old power stations is being undertaken in a phased manner; and o approximately 144 old thermal stations have been assigned mandatory targets for improving energy efficiency.

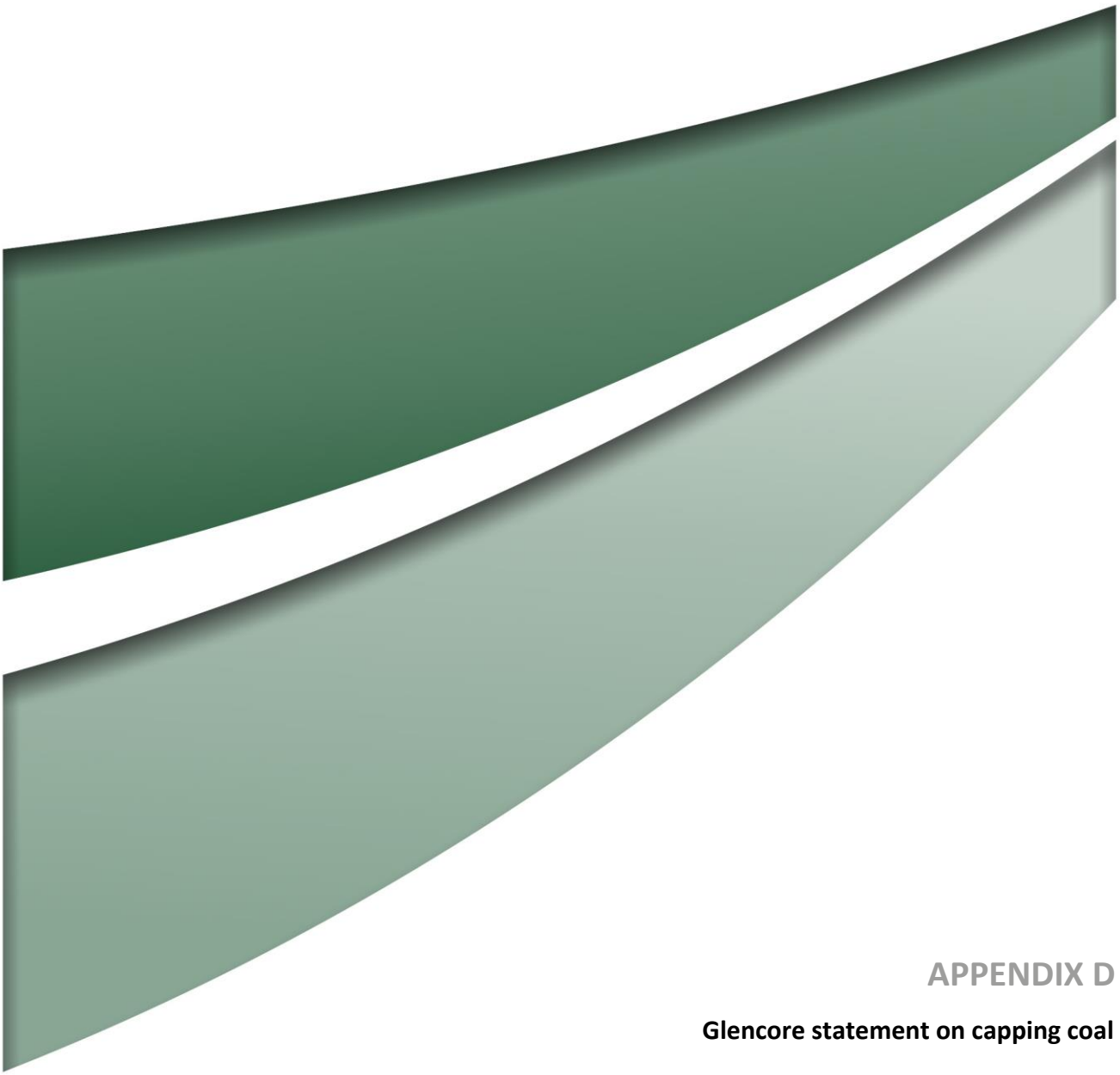
[5] The content in this table has been sourced from: S&P Global Platts World Electric Power Plants Database, December 2018; M Wiatros-Motyka, 'An overview of HELE technology deployment in the coal power plant fleets of China, EU, Japan and USA' (December 2016) and I Barnes, 'HELE Perspectives for Selected Asian Countries' (International Energy Agency Clean Coal Centre, May 2018).

Country	Implementation of HELE, CCUS and other similar technologies[5]

Japan	• A global leader in the application of HELE coal-fueled power plants and built its first USC plant in 1993.
	• 95% of the country's plants are HELE plants.
	• Included high-efficiency coal as part of their contributions to the Paris Agreement.
	• Long-term Low-carbon Vision, published in March 2017, refers to CCUS as a means of achieving emission reductions in the energy sector, as well as centralised/distributed energy management.
	• According to the Global CCS Institute's Global Status Report 2018, Japan has achieved the following major milestones:
	  ○ commenced of CO_2 injections at the Tomakomai CCUS facility by Japan CCUS with the Ministry of Economy, Trade and Industry's full support – this is Asia's first full-cycle CCUS hydrogen plant, which will capture more than 300,000 tonnes of CO_2 by 2020;
	  ○ retrofitted the Toshiba Corporation 49MW Mikawa power plant in Omuta (Fukuoka Prefecture) to accept biomass (in addition to coal) with a carbon capture facility;
	  ○ launched JPOWER and Chugoku Electric Power Company's Osaki CoolGen facility, a 166 MW oxygen-blown IGCC (integrated gasification combined cycle) plant in Osakikamijima (Hiroshima Prefecture), which will separate and capture CO_2;
	  ○ completed construction of Toshiba's carbon capture and utilisation (CCU) system at the Saga City Waste Incineration Plant (on Japan's Kyushu Island), using captured CO_2 for algae culture; and
	  ○ announced (by Kawasaki Heavy Industries) of a Japanese Hydrogen Energy Supply Chain that plans to gasify Australian brown coal in Victoria's Latrobe Valley and transport it by ship to Japan for future decarbonised hydrogen developments.

Malaysia	• Malaysia's NDC has a target to reduce its GHG emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005. • Post-2015 planned or under construction capacity includes 600 MW subcritical and 4,160 MW of USC HELE. • Plans to achieve a 13% efficiency improvement in 2030. • Has set a renewable energy target of 20% (equivalent to 3,991MW) by 2025. Currently the country only sources 2% of its energy from renewable sources. However, it is intended for the target to be met through various policies and frameworks under the *Energy Efficiency and Conservation Act*, a first draft of which is to be presented to Parliament later this year. • Does not have an integrated CCUS legal framework. A scoping study on CCUS in Malaysia was released by the Global CCS Institute, the Clinton Climate Initiative and the Malaysian Ministry of Energy, Green Technology and Water in January 2011. The study found that CCUS technologies present an opportunity to significantly reduce CO_2 emissions in Malaysia. It also found that Malaysia lacks legal and regulatory frameworks that are capable of being applied to the stages of the CCUS project cycle. Despite this, two commercial-scale CCUS projects are currently underway in Malaysia – the K5 Strategic Technology Project (with a CO_2 processing platform due for installation by 2022) and the TNB Janamanjung Project.

Country	Implementation of HELE, CCUS and other similar technologies[5]
South Korea	• As of December 2018, 83% of South Korea's coal-fuelled generation capacity was HELE and at least 90% of planned and under construction capacity is HELE. In the 5 years to 2023, at least 7 GW of HELE generating capacity is expected to come online in South Korea. • South Korea's NDC indicated that it would subsequently develop a detailed plan to implement its mitigation target. To this end, South Korea released a revised roadmap for achieving the 2030 National Greenhouse Gas Reduction Goal in July 2018 (the Roadmap). The Roadmap sets out sectoral targets, including emission reductions of 24 million tonns in the energy conversion sector (power generation, group energy) through policies to reduce fine dust and promote the use of eco-friendly energy.
Taiwan	• Included HELE in its NDC under the Paris Agreement. • As of December 2018, 31% of Taiwan's coal-fuelled generation capacity was HELE and 2.4 GW of planned and under construction capacity is USC HELE. • Taiwan's EPA established a national CCUS strategic alliance in 2011. This alliance brings together domestic experts from government, academia and industry, for the purpose of developing the technology and regulatory framework required for the commercial use of CCUS technology, with the ultimate goal of achieving widespread use of CCUS technology by 2020. Through the alliance, the Taiwan Cement Corporation (in partnership with the Industrial Technology Research Institute) commissioned the world's first CCUS pilot project in the cement industry in 2013, with the two entities agreeing in 2016 to extend their cooperation on the project.
Philippines	• Included HELE in its INDC under the *Paris Agreement*. • The National Framework Strategy on Climate Change 2010-2022 has a long-term objective of facilitating "the transition towards low greenhouse gas emissions for sustainable development". The Strategy sets Key Result Areas to achieve this long-term objective which, relevantly, relate to energy efficiency and conservation and renewable energy. The Strategy sets a goal of doubling the renewable energy capacity in the country from 4,500MW to 9,000MW by 2030.
Vietnam	• Announced plans to continue the buildout of its HELE coal fleet; before 2010, all coal-fuelled power capacity was based on subcritical technology and the first units using HELE supercritical technology were brought online in the 2010-2014 timeframe with an additional approximately 4,200 MW SC and 1,800 MW USC HELE coal-fuelled power plant capacity projected into the future. • Vietnam does not have an integrated CCUS framework, though the government has previously acknowledged the role that CCUS technology could play in assisting Vietnam to achieve its emissions reduction goals.



APPENDIX D

Glencore statement on capping coal

GLENCORE COAL IN AUSTRALIA

March 2019

Frequently Asked Questions (FAQ) about Glencore's Climate Change Announcement

Why has Glencore made this climate change announcement?

The announcement reflects the increased focus our shareholders are placing on climate change issues, including a number of shareholders who belong to the Climate Action 100+ initiative.

What is Glencore's position on climate change?

Glencore has a stated public position that acknowledges the science of climate change and the global ambition to transition to a low carbon economy.

What was included in Glencore's climate change statement?

a) Paris Consistent Strategy/Capital Discipline

Glencore has committed to manage our future global coal production capacity broadly to current levels.

From 2020, Glencore will disclose projected reduction of indirect Scope 3 emissions including mitigation efforts such as investment in carbon capture and storage projects.

- Mitigation efforts in relation to Scope 3 emissions should not be interpreted as liability for or offsetting of our Scope 3 or indirect emissions.
- Our Scope 3 indirect emissions are our customers' Scope 1 direct emissions and it is those parties, rather than Glencore, that have the ability to control the extent of those emissions.
- Scope 1 direct emissions are subject to the climate policies and regulation of the jurisdictions in which those emissions occur. It is for that reason that climate policies and regulation do not seek to regulate Scope 3 indirect emissions at the point of extraction.

From 2020, Glencore will disclose how significant capital expenditure and investments align with the Paris Goals. This includes any new investment in fossil fuel assets.

b) Public Scope 1 and 2 Targets

Glencore is on track to achieve its target of reducing direct Scope 1 emission intensity by 5 % (of 2016 levels) by 2020.

From 2020, Glencore will release new longer-term direct Scope 1 and Scope 2 emission reduction targets.

c) Review of Progress

Glencore will report annually on the progress in meeting its climate change objectives.

Every three years Glencore will review changes to Nationally Determined Contributions (NDCs) under the Paris Agreement and other developments to inform our approach to climate change strategy.

d) Alignment with Taskforce on Climate Related Financial Disclosures (TCFD)

Glencore has accepted the recommendations of TCFD and will disclose the metrics, targets, scenarios we use to manage climate related risks and opportunities.

e) Corporate Climate Change Lobbying

Glencore will do a review of its membership in trade associations including consideration of their stated positions on climate change.

What does this mean for Australian coal employees?

The climate change statement will not have an impact on our coal employees nor will any mines shut ahead of schedule as a result of the production cap.

What does manage our future global coal production capacity broadly to current levels mean?

Glencore has a world-class coal mining business and will continue to have a world-class coal mining business. We have indicated that we will manage our coal production to around 150 Mt per annum going forward to align with the stated cap.

We will not be freezing all our coal projects nor are we exiting coal. Glencore will continue to consider acquisitions, divestments, expansions and projects against our investment criteria.

Glencore will continue to develop a pipeline of coal projects assessed against market conditions, project economics and now the coal production cap.

How will the coal production cap work?

The coal production cap applies to both thermal and coking coal production.

The coal production cap applies to Glencore's global attributable coal production.

When examining the coal production cap, we differentiate between:

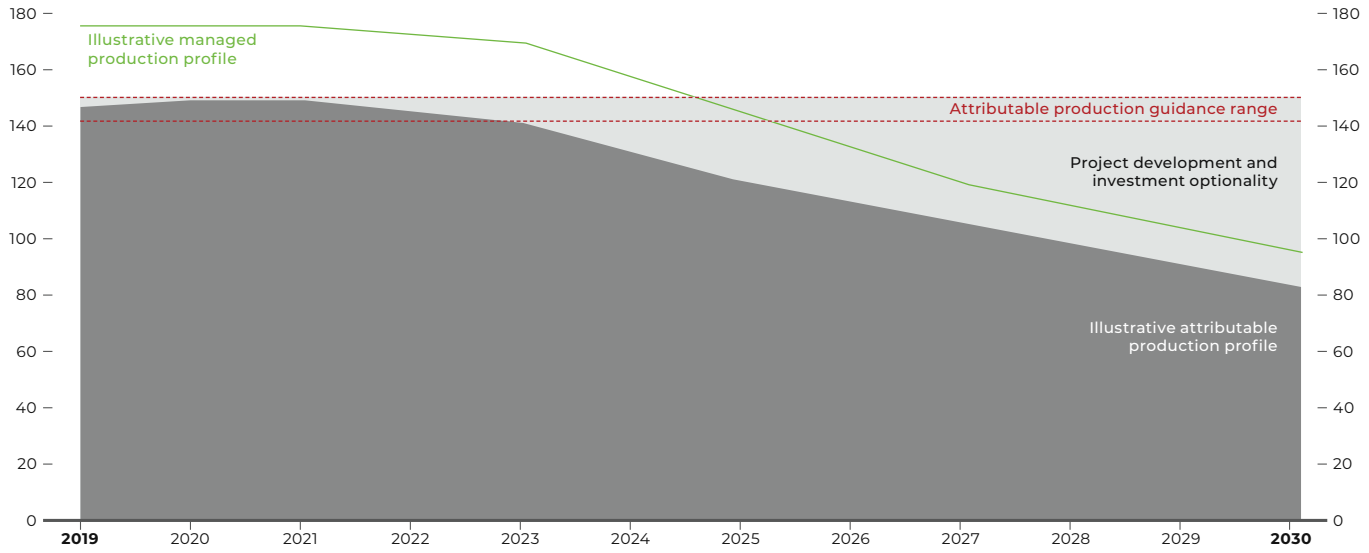
- Managed coal production: which includes the total volume of coal produced from operations in which we have a management role.

  e.g. Joint Ventures like Ravensworth North (Glencore 90% and Itochu 10%) in NSW where Glencore manages operations on behalf of other participants that own a portion of the operation. All of the output of the joint venture is considered to be managed coal production.

GLENCORE COAL IN AUSTRALIA

March 2019

GLENCORE MANAGED AND ATTRIBUTABLE COAL PRODUCTION (Mt)



- Attributable coal production: which includes the volume of coal production in which we have a financial equity interest. For mines that are held in a joint venture ownership structure, Glencore's attributable coal production will be a subset of the managed coal production.

  e.g. Ravensworth North produced 9.1Mt of coal in 2018. Glencore's attributable share in accordance with the Joint Venture agreement is 90% or 8.2Mt.

What's included in the cap and what does this mean for existing coal projects?

All existing mining operations managed by Glencore as at February 2019 are included in the production cap.

It is important to note that the coal production cap has factored in projects currently in the planning phase and planned replacement tonnage from our existing project pipeline.

This includes but is not limited to United Wambo, Glendell North, Mangoola North, Bulga extension and Mt Owen extension.

Does this mean Glencore can't buy new coal assets or start new projects?

No. Glencore can buy new coal assets and commence new projects so long as we manage volumes to remain within the production cap.

The cap also provides the flexibility to acquire interests currently held by joint venture partners in our existing operations.

What does this mean for the Wandoan Coal Project?

The Wandoan Coal Project continues to be under active consideration but we have clearly indicated that market conditions must be appropriate before we will move to develop this resource.

Like any other coal project if or when Wandoan is developed it will need to be managed within the coal production cap.

What is Glencore's global coal production profile to 2030?

The diagram above shows the current coal production profile for Glencore out to 2030 with both the managed production (green line) and attributable production (dark grey section) shown.

Because coal mines extract a finite resource our business needs to continue to develop projects and new mines to simply maintain our current levels of production.

Over time as resources are depleted and mines come to the end of their economic life, without further investment or development of new projects our production levels will decrease. This will create a gap between production levels and the 'cap' which will allow us to make further investments in coal assets, subject to meeting our investment criteria.

FOR FURTHER INFORMATION PLEASE CONTACT:

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APPENDIX 3

CIV Report

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July 07, 2019

Attention: Nathan Donegan
Mt Owen Pty Limited,
PO Box 320
Singleton NSW 2330
Australia

Issued electronically via email to: Nathan.Donegan@glencore.com.au

Subject: Glendell Continued Operations (GCO) Project Capital Investment Value (CIV)

Dear Nathan

Please find attached our Capital Investment Value (CIV) report for the Glendell Continued Operations (GCO) Project.

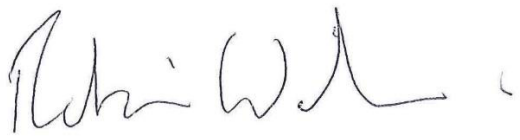
We have prepared the CIV estimate report for this project as contained herein.

Pursuant to the guidelines for creating a CIV estimate within the Environmental Planning and Assessment Regulations 2000 and DoP Circular PS 10-008 and having reviewed all the documentation pursuant to the limitations contained herein, Jacobs consider that a CIV estimate with a value of $ 228,529,000 is suitable for the application.

The CIV includes all costs associated with the project delivery but excludes GST and land costs.

If you have any questions, please do not hesitate to contact myself at rob.watkins@jacobs.com or by mobile 0450 072 488

Yours sincerely



ROB WATKINS MRICS
Head of Cost Management Services

Glendell Continued Operations Project

Glencore

Glendell Continued Operations (GCO) Project Capital Investment Value (CIV)

IA218700 | 3

July 02, 2019

Glendell Continued Operations (GCO) Project

Document history and status

Revision	Date	Description	By	Review	Approved
1	19/06/2019	First Draft for Review	AS	RW	
2	26/06/2019	Final Draft for Review	AS	RW	RW
3	02/07/2019	First Issue	AS	RW	RW

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments
1	Draft Review	19/06/2019	Glencore	First Draft for Review
2	Final Draft	26/06/2019	Glencore	Final Draft
3	First Issue	02/07/2019	Glencore	First Issue

Glendell Continued Operations (GCO) CIV

Project No:	IA218700
Document Title:	Glendell Continued Operations (GCO) CIV
Document No.:	IA218700
Revision:	03
Date:	July 07, 2019
Client Name:	Mt Owen Pty Limited
Client No:	Glendell Continued Operations (GCO)
Project Manager:	Rob Watkins
Author:	Adam Sutton
File Name:	J:\IE\AQ\SYD\Vault\2019 Vault\IA218700 - Mt Owen Glendell Continued Operations\09.00 Sect 9 Reports\IA218700 Mt Owen Glendell Continued Operations CIV 20190702.docx

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Contents

Executive Summary

Jacobs group (Australia) Pty Ltd has reviewed the information provided by Glendell Tenements Pty Limited to determine the Capital Investment Value (CIV) for the infrastructure works associated with the Glendell Continued Operations (GCO) Project.

The CIV value determined herein is **$228,529,000** subject to the assumptions and limitations within this report.

1. Introduction

The Glendell Continued Operations Project proposes to extend the current Glendell mine operations to the north through mining tenements owned by Glencore and its joint venture partner. This study uses engineering design and cost information gained from the Glendell Continued Operations Project concept and Pre-Feasibility studies carried out in the period 2012-2019 and the ongoing Feasibility Design and Studies for the project which are being carried out by WSP, Jacobs, GHD and others.

The Project will produce approximately 140Mt of ROM coal and extend the mine life to 2044. ROM coal from the Project will be processed at the existing Mt Owen Complex coal handling and preparation plant (CHPP).

The Project requires the following works to be completed;

- Relocation of a section of Hebden Road outside of the proposed mine footprint,
- Relocation of Ausgrid 11kV and 33kV overhead power infrastructure along the new Hebden Road alignment
- Relocation of Telstra copper and fibre service along the new Hebden Road alignment,
- Diversion of a section of Yorks Creek north of the proposed mine footprint,
- Construction of a bridge crossing where the new Hebden Road alignment crosses the new Yorks Creek alignment,
- Diversion of Swamp Creek east of the proposed mine footprint to Bettys Creek,
- Construction of a new mine infrastructure area (MIA),
- Construction of services to supply the new MIA including;
    - Glencore 11kV supply from the existing Glendell substation,
    - Water supply from the Mt Owen Fresh Water Dam,
    - Mine water discharge to the Ravensworth East operation, and
    - Fibre connection to the Mt Owen MIA
- Construction of a Heavy Vehicle access road to connect the new MIA to the Glendell Pit Extension
- Relocation of the Ravensworth Homestead to a new recipient site
- Relocation of existing tailings transfer lines
- Relocation of existing water transfer pipes at Dam 22,
- Construction of Glencore 11kV Dam 22 temporary supply,
- Demolition of existing Glendell MIA

Further to the known scope of works the design development is progressing on the progress with the following activities occurring concurrently to the CIV:

- Jacobs under a separate engagement are currently working on pre-feasibility and feasibility studies for GCOP associated works:
    - Yorks Creek diversion
    - Hebden Road realignment
    - Heavy vehicle access road to the new Glendell MIA
    - Swamp Creek
- WSP is working on developing the proposed Glendell MIA scope of works further.
- GHD is working on developing the surface water management for the site.

1.1 Planning Circulars

1.1.1 Circular: PS13-002 - Calculating the genuine estimated cost of development

This circular is to advise consent authorities, applicants and the community what costs associated with a development proposal are to be considered when calculating or providing genuine estimated costs of works under the Environmental Planning and Assessment Regulation 2000 when charging development application fees.

1.1.2 Circular: PS10-008 - New definition of capital investment value

This circular is to advise councils, developers and the community of a new definition of 'capital investment value' under the Environmental Planning and Assessment Regulation 2000 and certain State Environmental Planning Policies.

1.2 Capital Investment Value Definition

The Capital Investment Value is assessed in accordance with the definition of CIV. Capital Investment Value is defined in the Environmental Planning and Assessment Regulation 2000 as:

'Capital investment value of a development or project includes all costs necessary to establish and operate the project, including the design and construction of buildings, structures, associated infrastructure and fixed or mobile plant and equipment other than the following costs:

- Amounts payable or the cost of the land dedicated, or any other benefit provided under a condition imposed under Division 6 or 6A of Part 4 of the Environmental Planning and Assessment Act or planning agreement under that Division,
- Costs relating to any part of the development or project that is subject of a separate development consent or project approval,
- Land costs (including any costs of marketing or selling land), and
- GST (as defined by A New Tax System (Goods and Services Tax) Act 1999 of the Commonwealth).

2. Capital Investment Value

2.1 Basis Of Valuation

The valuation has drawn on previous works undertaken through the project development phase starting pre-2012 and which has been further developed with market sounding, design development, and other project development as the project has been refined and further defined.

The General Arrangements provided by Glencore have been utilized to determine the basis of the current inclusions/ exclusions within the scope of works which is indicated by Figure 1.0.

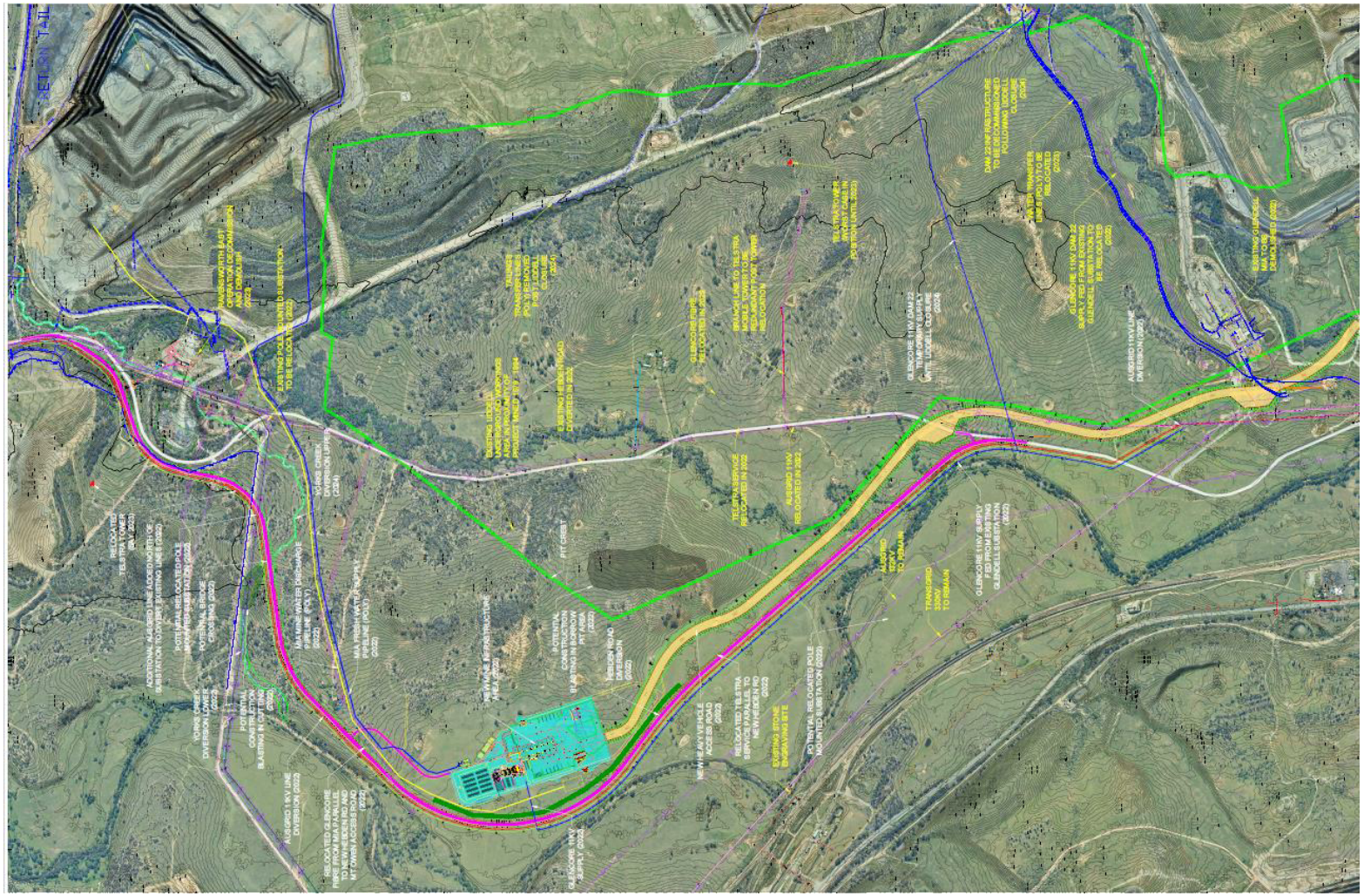


Figure 1.0 General Arrangement 1 (please refer to table of reference documents in annexure for detailed background of General Arrangement)

Prior costing was prepared by PB / WSP and Glencore based on cost-plan exercise with supplementation from market sounding. This estimate format was issued to Jacobs whereby an estimating exercise was undertaken to formulate and apply our own rates to the format, and hence provide validation and benchmarking to the original estimate for the project. Jacobs has not updated the quantities, however has performed an order-of-magnitude check that the quantities are reasonable against the information provided.

The Jacobs Direct rates have been included from a variety of different estimating sources. These include, standard estimating techniques such as building the rates up from first principles estimating and also using the extensive Jacobs database; which is compiled from current and past projects, benchmarked data, market quotations and other relevant information.

Jacobs used its 'body of knowledge' to check quantum and sequencing within the scope for correctness and verify this translates into the estimate for delivering the project.

For the Indirect costs, these have mainly been calculated through benchmarking against other relevant projects and the pricing refined.

The project costing will be further refined as the project is developed similar to Figure 2.0.

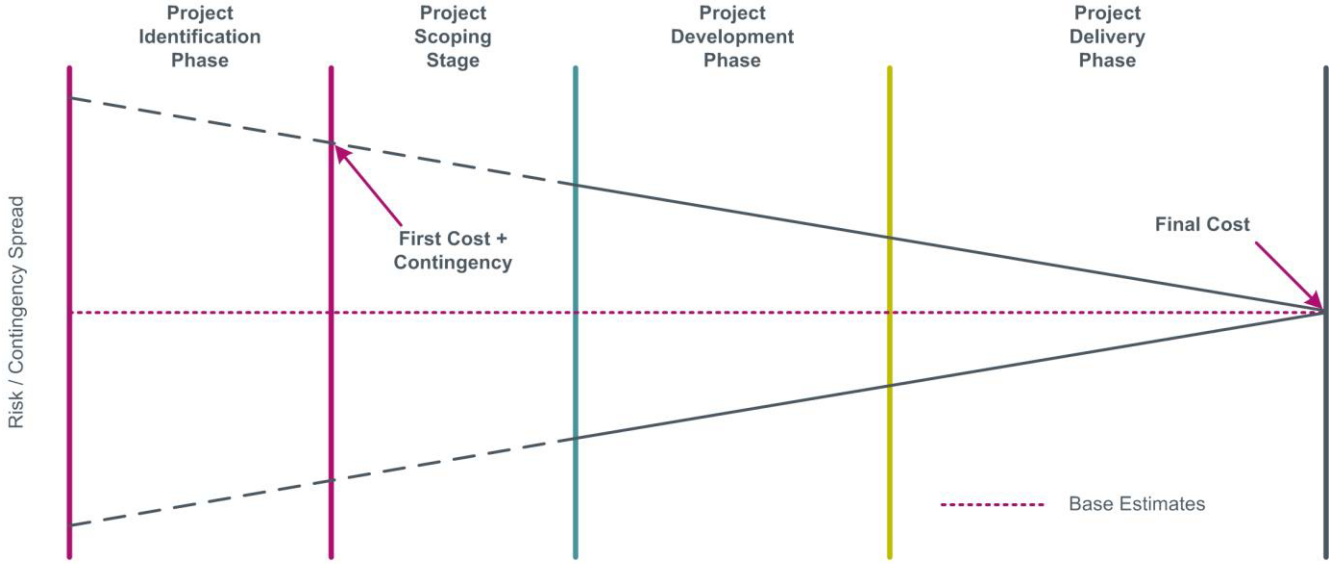


Figure 2.0: Project Costing Development

2.2 Scope of Capital Works

- Detailed Design Costs
- Land, Approvals, Agreements and Obligations
    - Government Approvals – excluded from CIV assessment
    - Legislative Fees – excluded from CIV assessment
    - Aboriginal and European Cultural Heritage (including salvage works and relocation of Ravensworth Homestead) – included

- Land Acquisition – excluded from CIV assessment
- Local Government Authority fees – excluded from CIV assessment
- Mining / Exploration Lease – excluded from CIV assessment
- Utility Agreements – excluded from CIV assessment
- Coal Handling Preparation Plant capital improvements, limited to minor relocation of existing tailings transfer pipelines from Ravensworth and Liddell, and new tailings transfer pipe connection to Liddell tailings storage facility.

- Mining infrastructure area surface capital improvements, including, but not limited to:
  - New MIA;
    - MIA Civil and Earthworks;
    - MIA Buildings & Assembly Areas;
    - MIA Water and Air Services;
    - MIA Electrical, Instrumentation, Communications & Controls;
    - MIA Workshop and Stores
    - MIA Vehicle Wash
    - MIA Fuel & Lube Facility
    - MIA Tyre Change Facility;
    - MIA Ancillary Facilities.
  - Demolition and Decommissioning of existing MIA;
  - Relocation of equipment;
  - HV power reticulation.
- Mine Development – Surface:
  - Watercart fill points;
  - New Heavy Vehicle access road to new MIA;
  - Alluvial Bores
- Onsite infrastructure;
  - Sediment Dams;
  - Dirty Water Drains

- Former Swamp Creek catchment water management
- Flood protection levees for the mining pit
- Borrow Pit
- Site Water
  - Pumps and power supply
  - Pipelines
  - Dirty Water Management System to sediment dams, haul road and MIA
- Raw Water System
- Electricity: incoming 11kV Power Supply
- Communications & Controls

- Offsite infrastructure
  - Roads and Bridges, including Hebden Road Works and intersection upgrades
  - Water management and earthworks, including Yorks Creek Diversion
  - Electricity: Ausgrid 11 kV & 33 kV relocations.
  - Telecommunications supply / relocations: copper and fibre
- Owners management costs.

2.3 Scope Review

The delivery of the works is broken down into physical location-based packages as well as enabling packages (assigned by Glencore) consisting of the following:

- Package 4 – Detailed Design and Execution Readiness
- Package 8 – Land Approvals, Agreements and Obligations
- Package 15 – Coal Handling Preparation Plant
- Package 20 – New Mining Infrastructure Area Work
- Package 30 – Mine Development – Surface
- Package 50 – On Site Civil & Power
- Package 50 – Water Management
- Package 55 - Off Site Power and Communications

- Package 55 - Off Site Road and Water Management
- Package 90 – Project In-directs
- Package 94 – Owners In-directs

2.4 CIV Estimate

Jacobs has checked for reasonableness, and where different, provided rates against the original estimate format that was produced by PB / WSP and Glencore.

Jacobs undertook order of magnitude checks on the quantities based on the information provided and has noted where there are large discrepancies in the cost estimate. In Jacobs' determination of the CIV we have sourced external market rates on recent projects undertaken for RMS/Glencore and others in the area.

Other prices were checked against recent market rates and Jacobs benchmarking database based on other projects. The full estimate is available in Appendix B with the summary tabulated as Table 1.0

Table 1.0: CIV Estimate

WBS	Description	WSP / Glencore Estimate	Jacobs Estimate	CIV Amount	Comments
04.00.00.00	Detailed Design	$5,957,000	$5,957,000	$5,957,000	
08.00.00.00	Land, Approvals, Agreements and Obligation, including: • Aboriginal Cultural Heritage and Archaeology on site working team • Ravensworth Homestead Relocation • Stabilization and repair works • Route works • Recipient site works	$ 24,670,000	$ 24,670,000	$ 24,670,000	Single source quotation received for specialist relocation of Ravensworth Homestead. Market sounding unsuccessful in finding alternative contractors to perform works due to it being highly skilled – high risk work.

15.00.00.00	Coal Handling Preparation Plant Including: • Tailings Relocation – Pumps / Pipes • Tailings Relocation - Power & Comms • Tailings Relocation - Access	$4,600,000	$ 5,685,661	$ 5,685,661	Based on ~ 7 km of DN450 PN16 HDPE pipe w/ Tailings Booster Pump, Duty Point 200 L/s, to connect Mt Owen CHPP tailings process to the Liddell south cut
20.00.00.00	Mining Infrastructure Area - Surface Including: • Civil & Earthworks • Buildings & Assembly Areas • Water and Air Services • Electrical, Instrumentation, Communications & Controls • Workshop(s) and Stores • Vehicle Wash(s) • Fuel & Lube Facility • Tyre Change Facility	$60,909,000	$61,841,761	$61,841,761	Possible savings in internal roadworks only likely to be partially realized in delivery. i.e differences in: - Kerb and gutter - MIA access road - Surfacing (spray seal) - Current steel fabrication rates > than pricing and escalation suggests

	• Ancillary Facilities				
30.00.00.00	Mine Development – Surface Including: • Water and Air Services • Roads • Ancillary	$10,602,000	$10,602,000	$10,602,000	
50.00.00.00	Onsite Infrastructure Including: • Civil & Earthworks • Water and Air Services • Electricity • Communicatio ns & Controls	$ 38,300,000	$ 40,300,000	$ 40,300,000	Water management for the former Swamp Creek catchment, which is part of the Mt Owen Complex mine water management system is currently being reviewed and refined outside of this engagement so as to determine a more cost-effective engineered solution. Allowance for increase in optic fibre allowances to current market rates.
55.00.00.00	Offsite Infrastructure:	$27,995,000	$27,995,000	$27,995,000	

	Including: • Roads & bridges (Hebden Road) • Water Management and Earthworks - – Yorks Creek diversion • Electricity • Telecommunications				
90.00.00.00	Project Indirects	$ 10,109,000	$ 10,109,000	$ 10,109,000	Based on Glencore assessment of requirements from delivery of similar projects/stages.
94.00.00.00	Owners Indirects	$15,976,000	$15,976,000	$15,976,000	Based on Glencore assessment of requirements from delivery of similar projects/stages.
95.00.00.00	Project Contingency	$12,094,741	$25,392,053	$25,392,053	Initial contingency suggested by Glencore / WSP @ 6% of project Value is too low for a project at this phase of development.
	TOTAL	**$211,215,000**	**$228,529,000**	**$228,529,000**	

There is an inherent contingency within the direct cost of the works to allow for any and all cost escalation to bring benchmarking or existing estimates into present worth (2019).

An overall project delivery contingency of 12.5% has been adopted as it is within expectations of best estimating practice for a project at “Project Identification Phase” for a P50 allowance. Anticipated contingencies at this stage of project identification are expected to be between 10-20% for P50. A lower range contingency is acceptable for this development given the works are being undertaken in a known working environment whereby these similar operational improvements have been undertaken previously by the site in this same location.

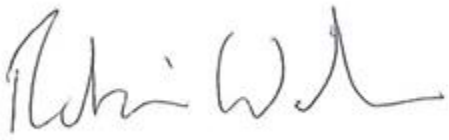
2.5 Exclusions

In accordance with the CIV definition in the Environmental Planning and Assessment Regulation 2000 and DoP Circular PS 10-008, the main exclusions from the CIV summary estimate reviewed are as follows:

- Land costs,
- Costs relating to any part of the project that is the subject of a separate development consent or project approval,
- GST,
- Development contributions, and
- Finance Costs, Fees, Taxes etc.

2.6 Certification

Pursuant to the guidelines for creating a CIV estimate within the Environmental Planning and Assessment Regulations 2000 and DoP Circular PS 10-008 and having reviewed all the documentation, Jacobs consider that a CIV estimate with a value of **$228,529,000** is suitable for the application. This also reflects current market rates for the scope of works outlined, based on the information supplied.



Rob Watkins MRICS

Head of Cost Management Services – Jacobs

02/07/2019

Appendix A. Information Provided to Jacobs as the basis of estimate

Item Issued Electronically	Description
Infrastructure Overview	Infrastructure Overview GA
2173078A-CIV-MEM-002 RevA	MIA Haul Road
LEP-WSP-20.00.00.00-DC-0001-RevC(PPR)	Temporary Maintenance Facility Project Requirements
LEP-WSP-20.00.00.00-RPT-0001-RevA(DesignReport)	Temporary Maintenance Facility Design Report
LEP-WSP-55.00.00.00-MEM-0001-RevA	MIA Options and Earthworks
LEP-WSP-55.00.00.00-RPT-0002-RevA	Hebden Road Relocation, Yorks Creek Diversion, Haul Road to Liddell
2173078A-CIV-MEM-001 RevA	Hebden Road Relocation, Yorks Creek Diversion, Haul Road to Liddell – Memo after Jacobs Review
Annexure 12.3 - Surface water management	Water Management Report
GCOP WBS and Capita est EIS CIV Calculation - Rev B-Items Removed - Rev 4	Glencore Capital Costing Spreadsheet

Appendix B. CIV Estimate

[refer to Glencore Spreadsheet available electronically]

APPENDIX 4

Subsidence Advisory
NSW Approval

117 Bull Street, Newcastle West NSW 2302
Tel 02 4908 4300 | www.subsidenceadvisory.nsw.gov.au
24 Hour Emergency Service: Free Call 1800 248 083
ABN 81 913 830 179

FN00-03990S0
TBA20-00838

Glencore
Nathan Donegan
nathan.donegan@glencore.com.au

Dear Nathan

RE PROPOSED GLENDELL CONTINUED OPERATIONS PROJECT - CONSIDERATION OF RELOCATING, REALIGNING OR ESTABLISHING THE FOLLOWING ITEMS TO THE NORTH WEST OF THE PROPOSED MINING AREA - RAVENSWORTH HOMESTEAD, THE MINE INFRASTRUCUTRE AREA, YORKS CREEK & HEBDEN ROAD AT GLENDELL, RAVENSWORTH; LOT 1 DP 135026, LOT 2 DP 534889, LOTS 3 & 4 DP 232149, LOT 9 DP 6842, LOT 32 DP 545601 & LOT 352 DP 867083; TBA20-00838

NOTICE OF DETERMINATION

I refer to the application detailed above. Subsidence Advisory NSW has determined to grant approval under section 22 of the *Coal Mine Subsidence Compensation Act 2017*.

Approval has been granted, subject to the conditions set out in the attached determination under Schedule 2. The stamped approved plan is attached.

Once relevant documentation to meet the conditions in Schedule 2 is available, please email through to subsidencedevelopment@customerservice.nsw.gov.au quoting reference **TBA20-00838**.

Should you have any questions about the determination, I can be contacted by phone on 02 4908 4300 or via email at subsidencedevelopment@customerservice.nsw.gov.au.

Yours faithfully,

Melanie Fityus
Senior Risk Engineer

7 May 2020

DETERMINATION

Issued in accordance with section 22 of the *Coal Mine Subsidence Compensation Act 2017*

As delegate for Subsidence Advisory NSW under delegation executed 7 May 2020 approval is for the development described in Schedule 1, subject to the conditions attached in Schedule 2.

Determination Date: 7 May 2020

Approval to Lapse on: 7 May 2025

The conditions of approval are imposed for the following reasons:

a) To confirm and clarify the terms of Subsidence Advisory NSW approval.

b) To minimise the risk of damage to surface development from mine subsidence.

Melanie Fityus
Senior Risk Engineer

7 May 2020

SCHEDULE 1

Application No:	**TBA20-00838**
Applicant:	**GLENCORE**
Site Address:	**GLENDELL, RAVENSWORTH**
Lot and DP:	**LOT 1 DP 135026, LOT 2 DP 534889, LOTS 3 & 4 DP 232149, LOT 9 DP 6842, LOT 32 DP 545601 & LOT 352 DP 867083**
Proposal**:**	**GLENDELL CONTINUED OPERATIONS PROJECT - CONSIDERATION OF RELOCATING, REALIGNING OR ESTABLISHING THE FOLLOWING ITEMS TO THE NORTH WEST OF THE PROPOSED MINING AREA - RAVENSWORTH HOMESTEAD, THE MINE INFRASTRUCUTRE AREA, YORKS CREEK & HEBDEN ROAD**
Mine Subsidence District:	**PATRICK PLAINS**

SCHEDULE 2

CONDITIONS OF APPROVAL

GENERAL	
Plans, Standards and Guidelines	
1.	The development being undertaken strictly in accordance with the details set out on the application form, any information submitted with the application and the plans submitted, as amended or as modified by the conditions of this approval. **Note**: Any proposal to modify the terms or conditions of this approval, whilst still maintaining substantially the same development to that approved, will require the submission of a formal application for consideration by Subsidence Advisory NSW. If amendments to the design result in the development not remaining substantially the same as that approved by this approval, a new application must be submitted to Subsidence Advisory NSW.
2.	This approval expires 5 years after the date the approval was granted if construction work has not physically commenced.
PRIOR TO COMMENCEMENT OF CONSTRUCTION	
3.	Provide a signed statement from a relevantly qualified engineers SA NSW conditionally approves the development subject to the project proponents adopting all of the subsidence mitigation strategies for the relocated Ravensworth Homestead, Mine Infrastructure Area, Yorks Creek diversion and Hebden Road realignment as contained in the Glendell Continued Operations Project – Infrastructure Subsidence Assessment – PSM3472-021R (12 November 2019).
POST CONSTRUCTION	
4.	Upon completion of construction, works-as-executed certification by a qualified engineer is to be forwarded to Subsidence Advisory NSW confirming that construction was in accordance with the plans approved by Subsidence Advisory NSW.

Dispute Resolution

If you are dissatisfied with the determination of this application, an appeal may be formally submitted with the Chief Executive Officer for an independent internal review. The application must be made in writing and must provide reasons why the determination should be changed.

GLENDELL
CONTINUED OPERATIONS

GLENCORE

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Hebden Road, Ravensworth
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www.glencore.com.au

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Newcastle

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