GLENCORE

Mount Owen Continued Operations Project

MODIFICATION 2

RESPONSE TO SUBMISSIONS

December 2018

umwelt

GLENCORE

MOUNT OWEN CONTINUED OPERATIONS PROJECT MODIFICATION 2

Response to Submissions

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Mt Owen Pty Limited

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Rev No.	**Reviewer**		**Approved for Issue**	
	Name	**Date**	**Name**	**Date**
FINAL	Barbara Crossley	21/12/2018	Barbara Crossley	21/12/2018

Executive Summary

The Statement of Environmental Effects (SEE) for the Mount Owen Continued Operations Modification 2 (the Proposed Modification) was placed on public exhibition from 9 August 2018 to 5 September 2018. This report provides a response to the submissions made in relation to the Proposed Modification.

The Proposed Modification will enable access to an additional approximately 35 million tonnes (Mt) of run-of-mine (ROM) coal from the North Pit, mining down to the Hebden Seam. Recovery of the additional coal reserves will result in approximately 46 hectares (ha) of additional surface disturbance (area of additional disturbance shown on **Figure 1.3**), representing an increase of approximately 1.8 per cent (%) to the total operational area currently approved under SSD-5850. This change to the North Pit mine plan will allow the extension of the approved mine life through to 2037 (an additional 6 years).

During the public exhibition period 27 submissions were received in relation to the SEE, this included 12 government agency submissions (including DPE), four interest group submissions and 11 community submissions. Two of the community submissions were received after the exhibition period had closed however these have been considered in this response. Of the 15 submissions received from the community and interest groups three submissions were in support of the Proposed Modification.

The most common themes from the nine community submissions objecting to the Proposed Modification include air quality and associated acquisition rights (particularly in Camberwell), climate change and the greenhouse gas and energy assessment followed by final landuse/final voids, biodiversity and groundwater impacts. With regard to those submissions that were supportive of the Proposed Modification, they were centered around the continued employment opportunities and associated economic benefits.

In response to the submissions received in relation to the Proposed Modification, further environmental anaylsis has been undertaken, Mount Owen has undertaken further engagement with relevant government authorities (as requested by DPE) and additional mitigation and management commitments are now proposed.

The key updates include:

- Further refinement of the tabulated air quality model results and further analysis in distinguishing between exceedances of the assessment criteria imposed under SSD-5850, the Voluntary Land Acquisition and Mitigation Policy (VLAMP 2018) and the EPA assessment criteria (2016);
- Further consultation with Department of Planning & Environment - Resources & Geoscience (DRG), Department of Industry – Land and Water (DoI) and Singleton Council; and
- Additional mitigation and management commitments including measures related to air quality, noise, groundwater and surface water monitoring and final land use planning.

Table of Contents

Figures

Tables

Appendices

1.0 Introduction

1.1 Background

The Mount Owen Complex is 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 and consists of the Mount Owen Mine (North Pit) and associated infrastructure, Ravensworth East (including the Bayswater North Pit) and Glendell (Barrett Pit) (refer to **Figure 1.1)**.

Mt Owen Pty Limited (Mount Owen), a subsidiary of Glencore Coal Pty Limited (Glencore), received development consent (SSD-5850) from the Planning Assessment Commission (PAC) for the Mount Owen Continued Operations Project (Continued Operations Project) in November 2016. The Continued Operations Project development consent incorporates all previously approved operations at the Mount Owen Mine and Coal Handling and Preparation Plant (CHPP) (DA 14-1-2004) and Ravensworth East (DA 52-03-99) and allows for continued and expanded mining until 2031. Implementation of this development consent has commenced with the operations at Mount Owen and Ravensworth East Mines now referred to as the 'Approved Operations'. An overview of the Approved Operations is shown on **Figure 1.2**. Glendell Mine continues to operate under a separate consent (DA 80/952) and does not form part of the Continued Operations Project under SSD-5850.

In late 2015, Glencore obtained mining tenements associated with its acquisition of the Integra Underground Mine. Prior to this acquisition, non-Glencore ownership of these tenements restricted the approved North Pit mine plan that formed part of the Continued Operations Project development consent. Mount Owen now proposes to modify development consent SSD-5850 to allow for the optimisation of the North Pit mine plan to access coal reserves from the mining tenements obtained by Glencore through its acquisition of the Integra Underground Mine (the Proposed Modification).

The Proposed Modification will enable access to an additional approximately 35 million tonnes (Mt) of run-of-mine (ROM) coal from the North Pit, mining down to the Hebden Seam. Recovery of the additional coal reserves will result in approximately 46 hectares (ha) of additional surface disturbance (area of additional disturbance shown on **Figure 1.3**), representing an increase of approximately 1.8 per cent (%) to the total operational area currently approved under SSD-5850. This change to the North Pit mine plan will allow the extension of the approved mine life through to 2037 (an additional 6 years).

The Statement of Environmental Effects (SEE) for the Mount Owen Continued Operations Modification 2 (the Proposed Modification) was placed on public exhibition from 9 August 2018 to 5 September 2018. As part of the public exhibition process, 27 submissions were received in relation to the Proposed Modification, including 12 government agency submissions, 4 interest group submissions and 11 community submissions. Two of the community submissions were received after the exhibition period had closed however these have been considered in this response.

This Response to Submissions (RTS) has been prepared by Umwelt Pty Limited (Umwelt) on behalf of Mount Owen to address the key issues raised in the submissions.

The form of this RTS generally follows the requirements of the Department of Planning and Environment (DPE) (2017) Draft Environmental Impact Assessment Guidance Series, Responding to Submissions, which provides direction on analysing and responding to issues raised during the exhibition process and the expected structure and content of the RTS.

1.2 Report Structure

This report provides:

- A brief overview of the exhibited Proposed Modification to provide context for the RTS (**Section 2**);
- An analysis of the issues and themes raised in the submissions (**Section 3**);
- A summary of the actions taken since the exhibition of the SEE for the Proposed Modification (**Section 4**);
- A summary of any changes made to the Proposed Modification (**Section 5**);
- A detailed response to the issues raised in the government, interest group and community submissions (**Section 6**);
- Summary of the revised environmental management and mitigation measures applicable to the Proposed Modification (**Section 7**); and
- References (**Section 8**).

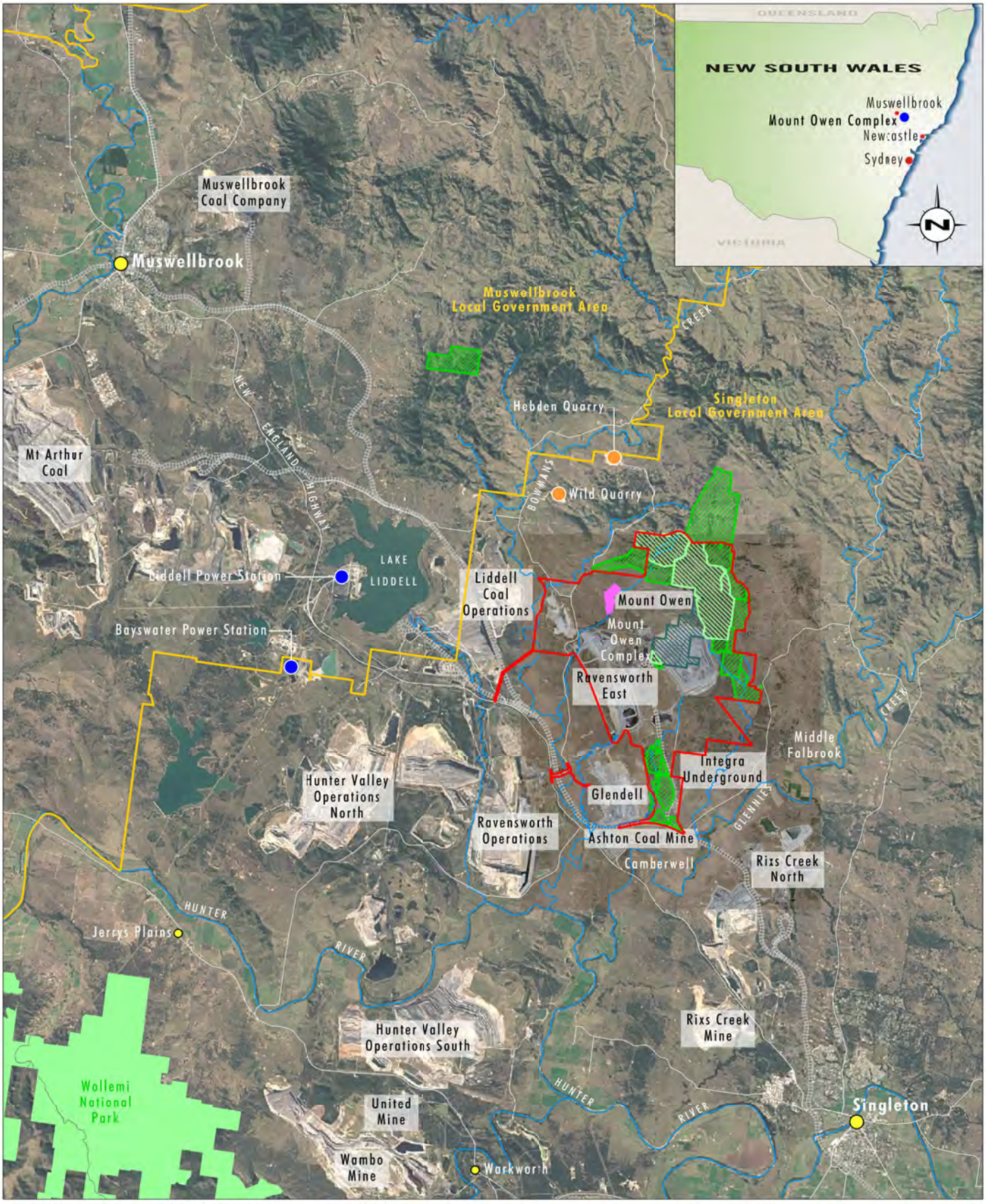

Image Source: Google Earth (2016), Glencore (2017)
Data Source: Glencore (2018), OEH (2013), Forest Corporation of NSW (2013)

0 2.5 5.0 10km
1:200 000

Legend

- SSD-5850 Consent Boundary
- Local Government Area Boundary
- Existing Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Approved Operational Area
- Yorks Creek Voluntary Conservation Area
- National Park
- Road
- Railway
- Drainage line
- Towns
- Power Stations
- Quarry

FIGURE 1.1

Upper Hunter Valley Context and Approved Mount Owen Operations

File Name (A4): R17/3810_238.dgn
20181024 11.21

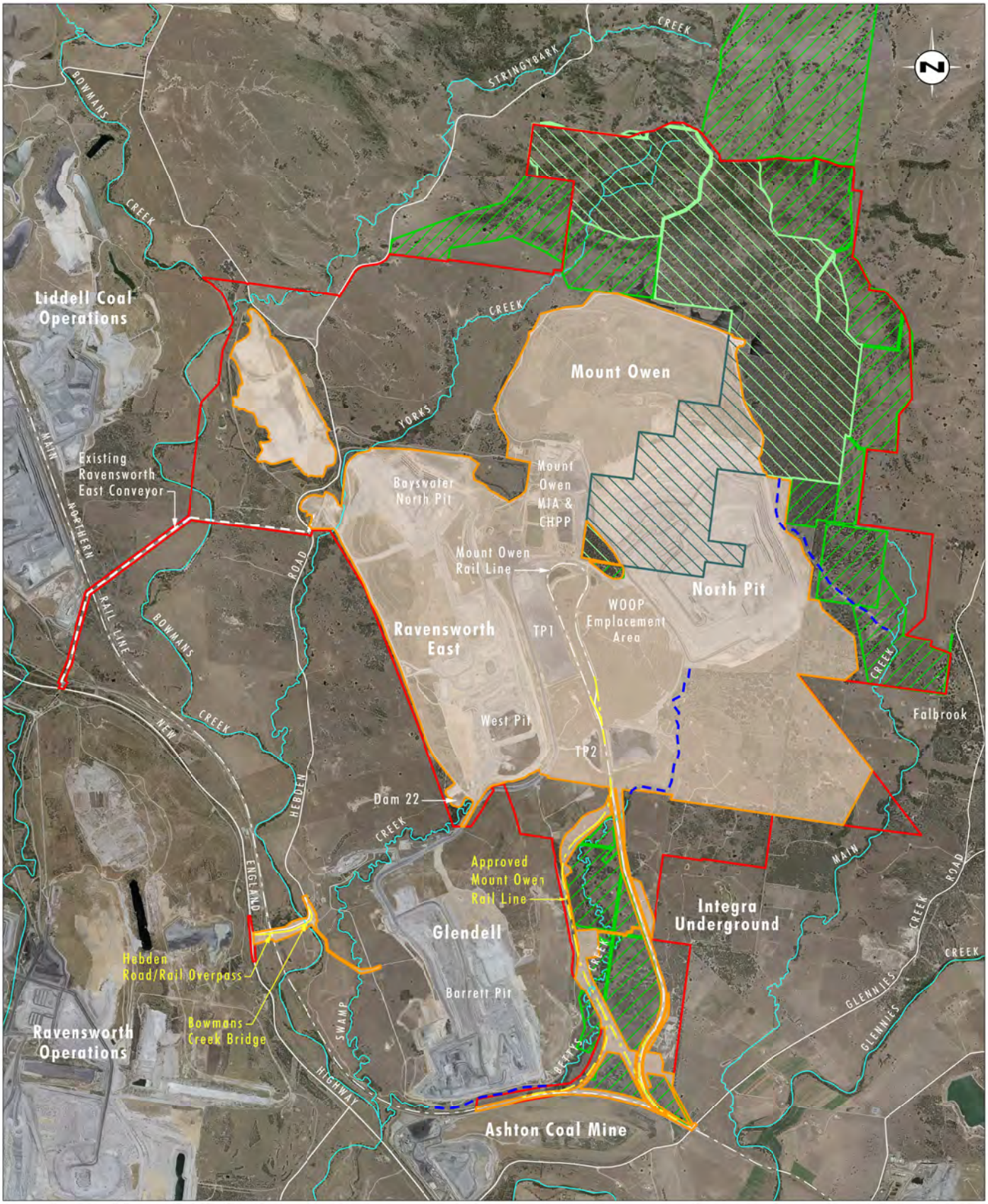

Image Source: Glencore (Feb 2017)
Data Source: Glencore (2018)

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1:60 000

Legend

- SSD-5850 Consent Boundary
- Approved Operational Area
- Existing Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Approved Operational Area
- Existing Bettys Creek Diversion
- Drainage Line

FIGURE 1.2

Approved Operations Overview

File Name (A4): R17/3810_239.dgn
20181213 12.43

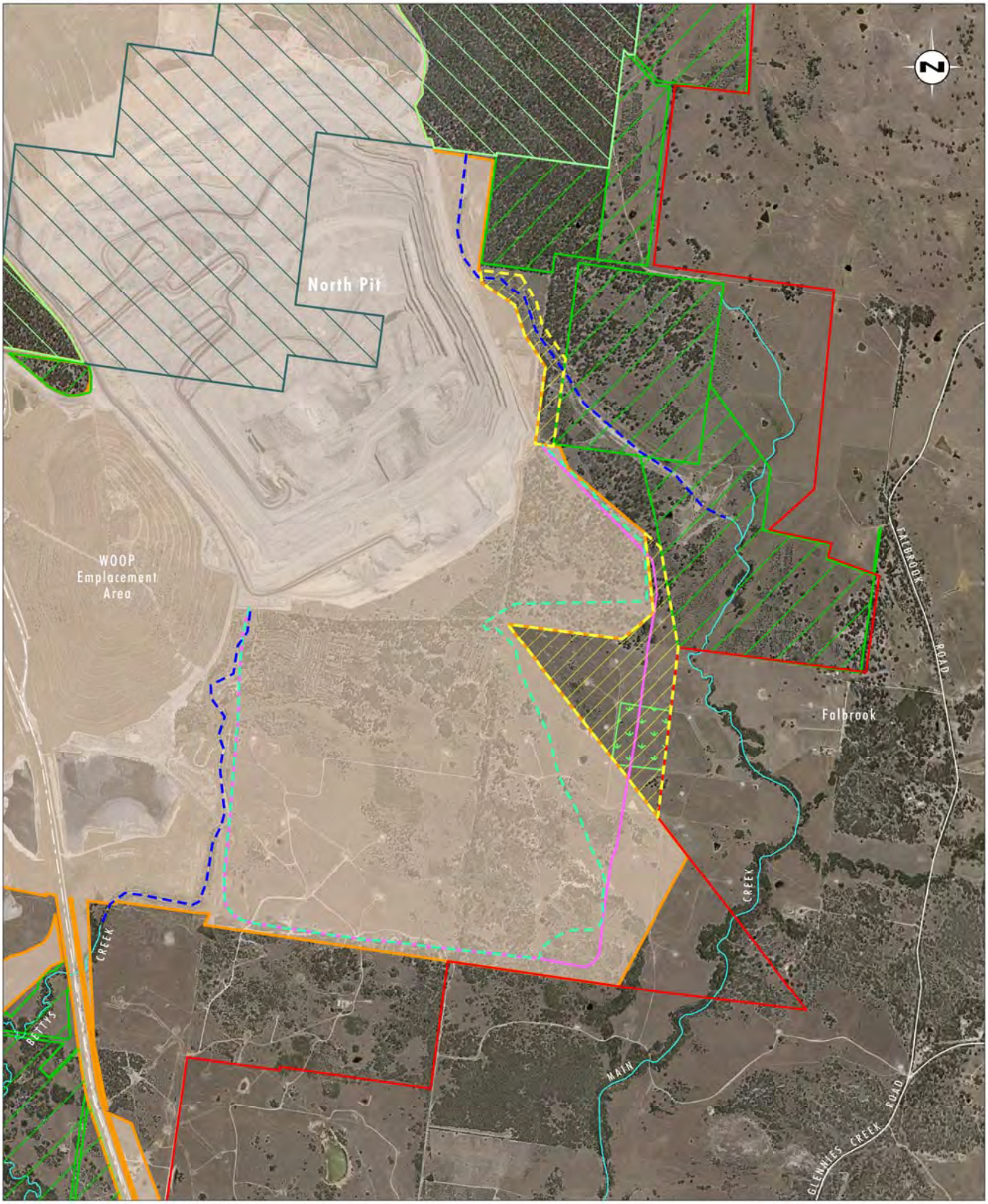


Image Source: Glencore (Feb 2017)
Data Source: Glencore (2018)

0 0.25 0.5 1.0km
1:25 000

Legend

- Proposed SSD-5850 Modification Consent Boundary
- Approved Operations Pit Boundary
- Approved Operational Area
- Additional Disturbance Area
- Proposed Modification Pit Boundary
- Existing Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Approved Operational Area
- Existing Bettys Creek Diversion
- Drainage Line
- Olive Grove (within the Additional Disturbance Area)

FIGURE 1.3

Proposed Modification Overview

File Name (A4): R17/3810_240.dgn
20181211 13.46

2.0 Overview of the Exhibited Proposed Modification

The Proposed Modification relates to approved mining operations within the North Pit only, with no change to the remainder of the Approved Operations including Ravensworth East or the approved coal processing and transportation infrastructure, or other approved infrastructure. In addition, the current approved limits on annual coal production and waste generation will remain unchanged. The Proposed Modification will result in the optimisation of the approved North Pit mine plan providing for more efficient mining operations and access to additional reserves from within the acquired Integra mining tenements.

Prior to the acquisition of the Integra Underground mining tenements, the mine plan design for the North Pit did not allow access to the deeper coal seams and was restricted to the east of the approved North Pit footprint. This resulted in the approved pit floor 'stepping up' as it progressed further southwards and the 'stepping in' of the mine plan along its eastern boundary. The acquisition of the Integra Underground Mine and associated mining tenements has removed this constraint and allows for deeper and extended coal extraction across the proposed modified North Pit. Extraction of the additional coal reserves from within North Pit will be provided through an increase in depth of mining within some areas of the approved North Pit down to the Hebden Seam.

Mount Owen considered a range of constraints to inform the proposed conceptual mine plan design for the Proposed Modification. As part of these constraints studies various mine design options including overburden emplacement schedules, mining progression, fleet numbers and type, and equipment location and scheduling were reviewed. The design options were reviewed with consideration of the following key objectives:

- minimising potential environmental and social impacts, particularly air quality and noise,
- minimising the area of additional disturbance by maximising the use of existing approved disturbed areas and existing infrastructure,
- maximising the recovery of economic coal reserves from within the existing North Pit, and
- maintaining the economic viability of the Proposed Modification.

During the detailed air quality and noise assessments undertaken to support the Proposed Modification, further mine plan refinement was undertaken to ensure that the Proposed Modification can continue to be managed to meet the current SSD-5850 criteria for noise and relevant air quality criteria for surrounding private receiver locations. These refinements included alterations to mine plans and progression, along with a range of operational controls and measures to be implemented over the life of the Proposed Modification. These proposed conceptual mine plans, description of the refinements and proposed management measures are detailed in the SEE.

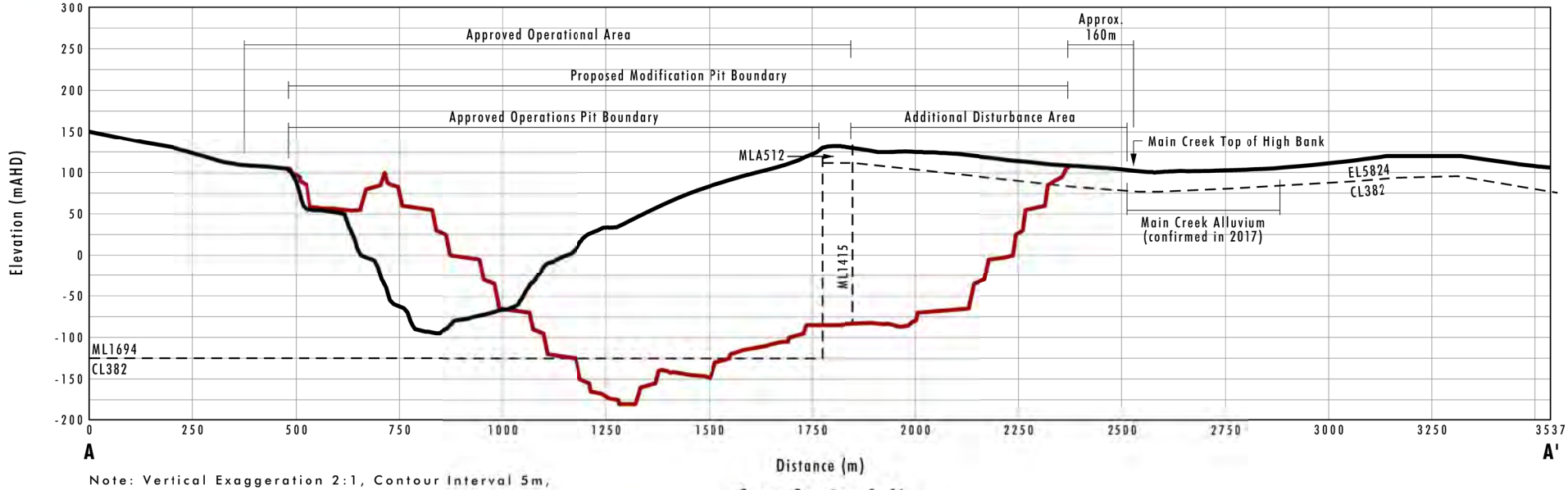
The area of additional disturbance represents the total area that would be disturbed outside of the approved operational areas (refer to **Figure 1.3**). The total operational area for the Approved Operations is approximately 2,534 ha and the area of additional disturbance is approximately 46 ha, representing an increase of approximately 1.8% to the currently approved operational area. The area of additional disturbance also extends beyond the approved SSD-5850 consent boundary (refer to **Figure 1.2**), which is proposed to be amended to accommodate this area, as shown on **Figure 1.3**.

The area of additional disturbance extends further east from the Proposed Modification pit boundary to provide for additional infrastructure such as water management structures and access. In addition, the northern portion of the area of additional disturbance is identified to provide for rehabilitation earthworks. These works will help to shape and improve the final landform of the North Pit to tie into the surrounding topography and earthworks will not increase the height of the emplacement area in this location. These works are located in proximity to the existing approved Bettys Creek diversion, however, no changes are proposed to the existing Bettys Creek diversion in this area which continues through the South East Offset and South East Corridor Offset areas into Main Creek.

Figure 2.1 provides an east-west cross section that shows the location of the approved and proposed mining and disturbance footprints in relation to the surrounding area including Main Creek. The top of high bank of Main Creek, as established through detailed site survey, is located approximately 160 m from the Proposed Modification pit boundary at its closest point. **Figure 2.1** also depicts the confirmed extent of the alluvium associated with Main Creek, which is located approximately 150 m east of the Proposed Modification pit boundary at its closest point.

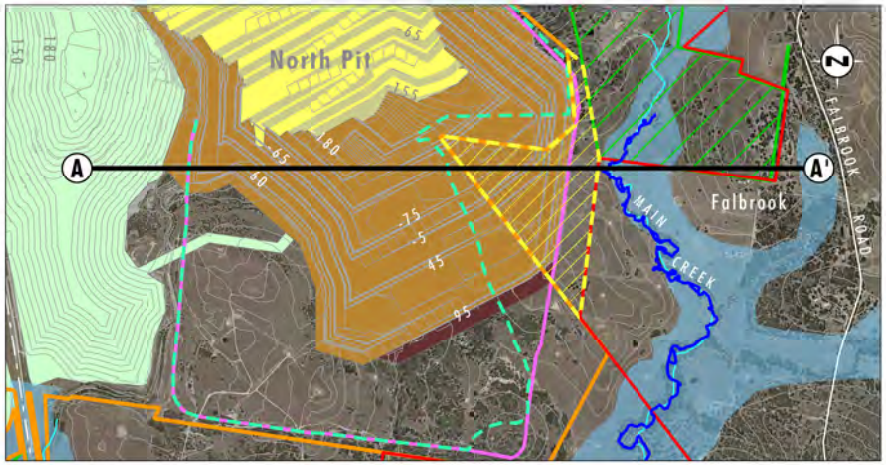
The minimum separation distance of 250 m between the proposed North Pit floor and the approved Integra Underground mining operations will be maintained. All operational and safety measures currently implemented will continue and will be enhanced through the common ownership of these mining operations by Glencore.

In addition to the proposed changes to mining within North Pit associated with the Proposed Modification, Mount Owen is also proposing a number of administrative changes to specific conditions of SSD-5850 relating to water management and management of salvaged Aboriginal archaeology artefacts, as described in Section 2.2.4 of the SEE.



Note: Vertical Exaggeration 2:1, Contour Interval 5m, Tenement Boundaries are Indicative Only

Cross Section A-A'



Plan

Legend

- Proposed SSD-5850 Modification Consent Boundary
- Approved Operations Pit Boundary
- Approved Operational Area
- Additional Disturbance Area
- Proposed Modification Pit Boundary
- Drainage Line
- Approved Operations Year 10 Mine Plan Landform
- Proposed Modification Year 8 Mine Plan Landform
- Main Creek - Top of High Bank
- Refined Alluvium Mapping (AGE 2017)
- Existing Biodiversity Offset Area
- Active Mining Area
- Active Overburden Emplacement Area
- Rehabilitation - Complete
- Topsoil Removal Strip
- Section Line

Image Source: Glencore (Feb 2017)
Data Source: Glencore (2018)

0 125 250 375m
Vertical Scale 1:7 500

0 250 500 750m
Horizontal Scale 1:15 000

0 0.625 1.25 1.875km
Plan Scale 1:37 500

File Name (A4): R17/3810_252.dgn
20181213 11.28

FIGURE 2.1

North Pit Cross Section Approved Operations (Year 10) and Proposed Modification (Year 8)

3.0 Submissions Analysis

3.1 Submissions Overview

A total of 27 submissions were received in relation to the SEE, this included 12 government agency submissions (including DPE), four interest group submissions and 11 community submissions. Two of the community submissions were received after the exhibition period had closed however these have been considered in this response. Of the 15 submissions received from the community and interest groups, three submissions were in support of the Proposed Modification.

The request for the RTS from DPE (10 September 2018) included identified matters to be addressed, including specific matters raised by the other government agencies and the community.

Table 3.1 provides a reference to where each of the matters raised by DPE have been addressed in this RTS.

Table 3.1 Checklist of Matters Addressed in Response to DPE Request

DPE Matters to Consider	RTS Reference
Resource and Economic Assessment	6.11 Economics 6.11.1.2
Air Quality **EPA assessment criteria** **Proportional contributions of other mines** **Rixs Creek North or Rixs Creek Continuation**	6.1 Air Quality 6.1.1.1 Appendix 1 6.1.1.1
Noise **Assessment methodology** **Proposed monitoring methodology**	6.2 Noise 6.2.1.1 6.2.1.2
Water Resources **Water discharges** **Groundwater monitoring**	6.4 Surface Water 6.4.1.2 6.3 Groundwater 6.3.1.2
Waste Management **Tailings volumes and licensing**	6.14 Waste Management 6.14.1.2
Rehabilitation **Additional topographic variation** **Final void** **Singleton Council final land use strategy** **Transect figure clarification**	6.7 Visual Amenity 6.7.1.1 6.9 Mine Closure and Rehabilitation 6.9.1.2 6.9.1.2 6.9.1.1
Voluntary Planning Agreement	4.1 Consultation 4.1.2 Singleton Council 6.12 Voluntary Planning Agreement 6.12.1.2

In addition to the DPE request, 11 other government agency submissions are addressed in this Report, including :

- Environment Protection Authority (EPA)
- Department of Industry – Land and Water (DoI)
- Department of Planning and Environment - Resources & Geoscience (DRG)
- Singleton Council
- Office of Environment and Heritage (OEH)
- Department of Planning & Environment - Resources Regulator (Resources Regulator)
- Roads and Maritime Services (RMS)
- Subsidence Advisory NSW
- NSW Health Hunter New England Local Health District
- NSW Heritage Council
- NSW Dams Safety Committee.

None of these government agencies identified that they oppose the Proposed Modification, and two agencies had no comment on the SEE. Several agencies made submissions seeking further clarification regarding aspects of the assessment of the Proposed Modification and these submissions are discussed further in **Section 6.0**.

3.2 Interest Group Submissions

Submissions were received from four interest groups, with one indicating support and three objecting to the Proposed Modification.

3.2.1 Supporting Submissions

A submission from the Hunter Business Chamber provided support for the Proposed Modification, with the primary focus being on economic benefits for the Hunter Region.

Specific economics benefits noted included:

- Economic returns for the workforce, suppliers, and local and regional communities.
- Ongoing employment of the existing workforce of up to 660 people.

3.2.2 Objecting Submissions

The three interest group (Hunter Communities Network, Land and Environment Planning and Hunter Environment Lobby) submissions that objected to the Proposed Modification outlined a range of issues. Environmental impacts were the most prominent issues which most frequently included air quality, ecology and final landform concerns. Social impacts relating to acquisition rights, health (due to air quality) and the future of the coal mining industry in relation to climate change impacts were also discussed.

The issues raised in these submissions are discussed in detail in **Section 6.0** of this report.

3.3 Community Submissions

Eleven individual community submissions were received during the exhibition period. Two of the community submissions were received after the exhibition period had finished, however these submissions have been considered and are addressed in **Section 6.0**. Of the submissions received, two were in support of the Proposed Modification while nine submissions stated their opposition.

A content analysis was undertaken of all community submissions, to understand the key issues raised by the community in relation to the Proposed Modification.

3.3.1 Supporting Submissions

The community submissions in support of the Proposed Modification relate to the associated economic benefits including local and regional employment benefits as well as local and regional economic flow on effects, in addition to State and Commonwealth government revenue.

Comments from the supporting submissions included:

> *As a local resident this mining extension would go a long way to supporting the local economy and continued to provide jobs for the existing workforce.*
>
> *I believe that the extended operations at Mount Owen Mine is essential for the continued economic benefit this mine brings to the region, state and Nation.*

3.3.2 Objecting Submissions

The relevant issues from the nine submissions objecting to the Proposed Modification have been grouped into themes (refer to **Figure 3.1**). The most common themes of objections were air quality and associated acquisition rights (particularly in Camberwell), climate change, followed by final landuse/final voids, biodiversity and groundwater impacts.

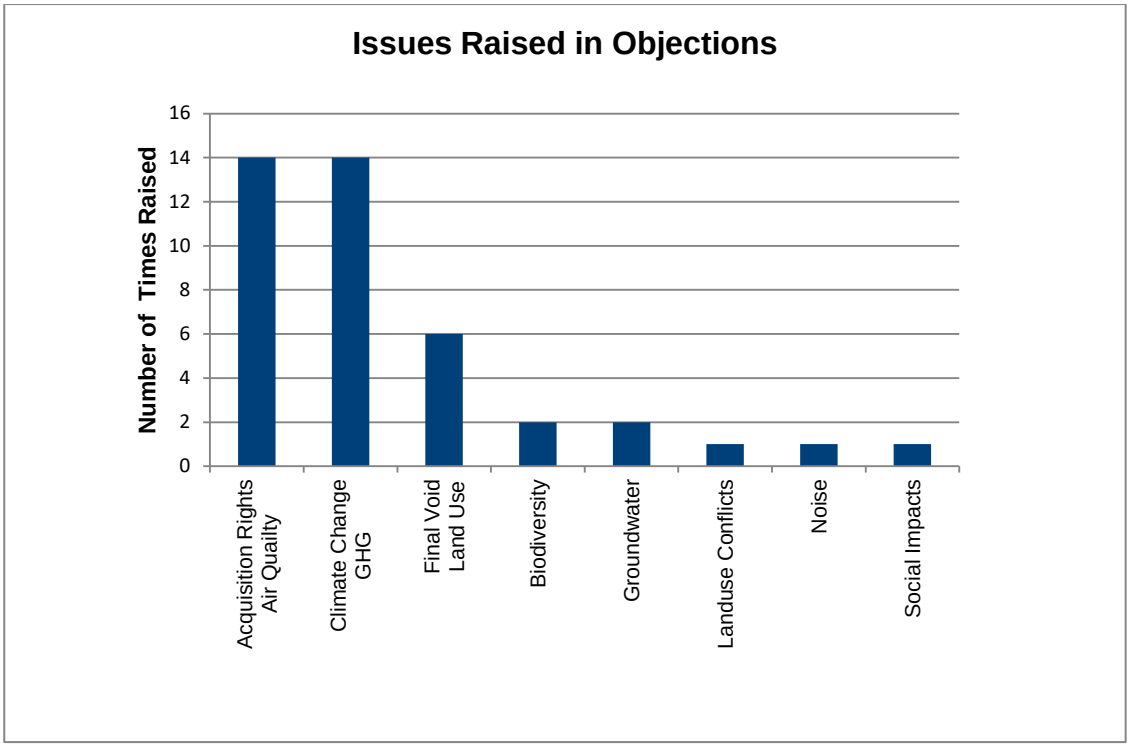


Figure 3.1 Key Themes of Objecting Submissions

A response to the issues raised in the objections is provided in detail in **Section 6.0** of this report.

4.0 Actions taken since Proposed Modification Exhibition

This section provides an overview of the actions taken during the preparation of the RTS document including additional consultation undertaken and any additional environmental assessment.

4.1 Consultation

Since the completion of the exhibition period Mount Owen has undertaken further consultation with DRG and Singleton Council, as requested by DPE.

4.1.1 Department of Planning and Environment – Resources & Geoscience

A meeting was held with DRG on 27 November 2018 to discuss the issues raised in DRG's submission in relation to perceived discrepancies in the total ROM coal values and mine life presented in the SEE and the detail provided to DRG during previous consultation during the preparation of the SEE. The perceived discrepancies in the data were a result of the mine plan refinements made during the later stages of the development of the SEE and this issue has now been resolved with DRG. Specific detail in relation to the issues raised by DRG in their submission is provided in **Section 6.11.1.**

4.1.2 Singleton Council

Additional consultation was undertaken with Singleton Council in relation to both the Voluntary Planning Agreement (VPA) for the Proposed Modification, and the Final Landuse Strategy. Glencore met with Singleton Council on 4 October 2018 and 6 December 2018 to discuss an offer to increase the value of the existing VPA for the Mount Owen Continued Operations Project to cover the extended mine life associated with the Proposed Modification. Following further discussions and correspondence with Singleton Council an agreement has been reached on the revised VPA for the Prooposed Modification (refer to **Section 6.12** for further detail).

During the meeting with Singleton Council on 6 December 2018 the development of the Final Landuse Strategy for the Proposed Modification was also discussed. Mount Owen understands the importance of the development of a Final Landuse Strategy for the Mount Owen Complex and is committed to the development of a strategy.

The high level final landuse analysis undertaken as part of the development of the SEE (refer to Section 6.10.3 of the SEE) indicates the Mount Owen Complex could provide strategic opportunities for a variety of potential final land uses, given the extensive infrastructure and accessibility. However, all final land use options will be considered closer to mine closure as they will be dependent on demand at the time and will be subject to further approval. The Mount Owen Mine operations are proposed to extend to 2037, and the proposed Glendell Continued Operations Project, if approved, would utilise the Mount Owen Complex infrastructure until around 2045. As part of the detailed mine closure planning, to commence five years prior to planned cessation of mining, a detailed Final Landuse Strategy will be developed which will consider the optimal final land use based on Local and State Government strategic planning and Glencore strategic requirements, the economy and the demand/need for the land uses being considered at the time (refer to **Section 6.13** for further detail).

4.2 Additional Environmental Assessment

The development of the SEE for the Proposed Modification included updating all the relevant technical studies undertaken to support the original Mount Owen Continued Operations Project to meet contemporary assessment standards and ensure that any changes as a result of the Proposed Modification were clearly defined.

As requested by the DPE and EPA, further air quality assessment has been undertaken to clearly define the Proposed Modification in relation to the relevant EPA standard in addition to conducting an analysis in relation to the Voluntary Land Acquisition and Mitigation Policy (VLAMP, 2018). It should be noted that the most recent VLAMP (2018) was published after the application for the Proposed Modification and SEE was lodged on 31 July 2018. As outlined in **Section 6.1**, this most recent VLAMP (2018) is not applicable to the Proposed Modification as the Proposed Modificaiton does not involve increases to the approved noise or dust impacts of the Approved Development. The further analysis did not identify any additional private properties as being subject to acquisition rights as a result of the Proposed Modification. Detailed discussion regarding the additional analysis is provided in **Section 6.1** in order to address the submission from the EPA.

5.0 Proposed Modification changes

In addressing the submissions received during the exhibition period for the Proposed Modification further detail has been provided in respect of the various aspects of the Proposed Modification, however this has not resulted in any material changes to the description of the Proposed Modification.

Mount Owen completed a detailed prefeasibility study through the development of the Proposed Modification which sought to minimise the predicted environmental impacts. As discussed in the SEE, Mount Owen currently operates in accordance with a range of management plans that include detailed management and mitigation measures to meet the existing criteria and requirements of SSD-5850. Mount Owen is committed to the continuation of this approach to the management of the modified operations in order to continue to meet the existing SSD-5850 criteria. As discussed in **Section 2.0**, the conceptual mine plans were subject to continual refinement through the preparation of the SEE including alterations to mine plans and progression of mining, along with modelling of the use of a range of operational controls and measures over the life of the Proposed Modification, in order to reduce the potential environmental impacts.

The mitigation and management measures associated with the Proposed Modification as discussed in Section 2.3 of the SEE are reproduced in **Section 7.0**, and also include additional measures identified through the RTS process.

A minor mapping amendment has been made to the 'Approved Operational Area' indicated on Figure 1.2 of the SEE. The amendment was made to include Dam 22 (refer to **Figure 1.2**), Dam 22 was approved under the original Ravensworth East approval (DA 52-03-99) and therefore forms part of SSD-5850.

Since the submission of the SEE, Mount Owen has also acquired property 22, which was subject to acquisition rights under the existing SSD-5850 consent. The landownership figure has been updated to reflect this change, as discussed in **Section 6.1**.

Mount Owen has also committed to the development of a Final Landuse Strategy. Mount Owen will continue consultation with Singleton Council and assist if required in the development of a regional landuse strategy for the Singleton LGA post mining. The Final Landuse Strategy will be developed as part of the mine closure plan (commencing 5 years prior to closure), as discussed in **Section 6.13**.

6.0 Responses to Submissions Received

The following section provides a response to the issues raised in submissions on the Proposed Modification. The key themes raised in the submissions are summarised in ***bold italic*** text with the response provided below in normal text.

6.1 Air Quality

The Air Quality Impact Assessment (AQIA) for the Proposed Modification was prepared to assess the potential air quality impacts associated with the Proposed Modification relative to the Approved Operations. Air quality issues, particularly potential cumulative air quality impacts have been raised by the DPE, EPA, NSW Health and a number of community submissions, in relation to the Proposed Modification. The EPA also requested that the Proposed Modification AQIA prepared by Jacobs Pty Limited (Jacobs), (Jacobs, 2018) be amended to distinguish between exceedances of the assessment criteria imposed under SSD-5850 and the recently introduced revised EPA assessment criteria (2016) and the Voluntary Land Acquisition and Mitigation Policy (VLAMP, 2018). The revised tabulated results in response to this matter are provided in **Appendix 1**.

The air quality assessment criteria adopted for the Approved Operations and applicable to the current development consent are the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DEC 2005a). The relevant air quality criteria for the Approved Operations, in accordance with Schedule 3, Condition 16 of the current development consent (SSD-5850), are provided in **Table 6.1**.

Table 6.1 Air Quality Criteria for Particulate Matter and Deposited Dust (Approved Operations)

Pollutant	Averaging Period		[d] Criterion
Particulate matter PM_{10}	24 hour		[b] 50 µg/m^3
	Annual		[a] 30 µg/m^3
Total suspended particulate (TSP) matter	Annual		[a] 90 µg/m^3
[c] Deposited dust	Annual	Maximum increase in deposited dust level	[b] 2 g/m^2/month
		Maximum total deposited dust level	[a] 4 g/m^2/month

Notes:

[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).

[b] Incremental impact (i.e. incremental increase in concentrations due to the development on its own).

[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed to by the Secretary.

As discussed in the AQIA and SEE, air quality impacts associated with the Proposed Modification have been assessed against the revised air quality criteria set by the EPA as part of their Approved Methods (EPA, 2016). For reference these criteria are outlined in **Table 6.2** and are applicable to existing and potential sensitive receptors such as residences and schools.

Table 6.2 Approved Methods (EPA, 2016) Impact Assessment Criteria (Proposed Modification)

Substance	Averaging time	Criterion	Source
Particulate matter (PM_{10})	24-hour	50 µg/m^3	EPA/DoEE (2016)
	Annual	25 µg/m^3	
Particulate matter ($PM_{2.5}$)	24-hour	25 µg/m^3	EPA/DoEE (2016)
	Annual	8 µg/m^3	
Particulate matter (TSP)	Annual	90 µg/m^3	EPA/NHMRC (1996)
Deposited dust	Annual (maximum increase)	2 g/m^2/month	EPA/NERDDC (1988)
	Annual (maximum total)	4 g/m^2/month	
Nitrogen dioxide (NO_2)	1-hour	246 µg/m^3	EPA/NEPC (1998)

The Approved Methods (EPA, 2016) introduces a revised, more stringent criterion for annual average PM_{10} as well as new criteria for $PM_{2.5}$ 24-hour and annual average. The criteria (annual average) applicable to the Approved Operations for PM_{10} is 30 µg/m^3. Whilst there was no adopted criteria for $PM_{2.5}$ at the time of the assessment of the Approved Operations, $PM_{2.5}$ levels associated with the Approved Operations were modelled (PAE, 2016).

It is also noted that as part of the amendment to the National Environment Protection Measures (NEPM), which informs the Approved Methods (EPA, 2016), the EPA aims to move towards a more stringent PM_{10} and $PM_{2.5}$ criteria by 2025, however this approach is not currently adopted by relevant State legislation at this time. Accordingly the Proposed Modification is assessed against the current criteria detailed in the Approved Methods (EPA, 2016) as these criteria would need to be applied by the consent authority in accordance with the provisions of Clause 12AB of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) (2018 amendment).

It should also be noted that Clause 12AB of the Mining SEPP includes non-discretionary development standards for mining in relation to cumulative air quality levels, which does not include cumulative impact assessment criterion for 24-hour PM_{10}:

> *The development does not result in a cumulative annual average levels greater than 25 µg/m^3 of PM_{10} or 8 µg/m^3 of $PM_{2.5}$ for private dwellings*

The object of Clause 12AB of the Mining SEPP is to: *identify development standards on particular matters relating to mining that, if complied with, prevents the consent authority from requiring more onerous standards for those matters (but that does not prevent the consent authority granting consent even though any such standard is not complied with).*

The VLAMP 2018 was gazetted on 21 September 2018, following submission of the SEE for the Proposed Modification. The VLAMP 2018 also provided for updates to the Mining SEPP to bring the air quality criteria in line with the NEPM standards and current EPA criteria.

It was noted in the SEE, that at that time the draft revised VLAMP also refined the application of this policy to modifications of consent and stated:

> *The policy commences from the date that it is gazetted, and applies to:*
>
> - *Modification applications that involve increases in the approved dust or noise impacts of a development.*

The adopted final VLAMP 2018 also includes these provisions.

As detailed in the SEE and the following sections, the Proposed Modification is not predicted to result in an increase to approved air quality impact on sensitive receptors relative to the Approved Operations. No additional private receptors will be impacted, than that identified under the VLAMP 2014 for the Approved Operations. Accordingly, the VLAMP 2018 does not apply to the assessment of the Proposed Modification. Nevertheless, in order to respond to the request by DPE and EPA, **Section 6.1.1** and **Appendix 1** provide the requested information in relation to analysis in relation to the VLAMP 2018 criteria.

As discussed in the SEE, various mine design options were reviewed in developing the conceptual mine plans for the Proposed Modification, with consideration of minimising the potential air quality impacts. Given the Proposed Modification conceptual mine plans include minimal increase to the total disturbance area (1.8%), and do not increase the total annual maximum production, the level of emissions and air quality impact associated with the Proposed Modification is predicted to be relatively consistent with the Approved Operations. The existing Air Quality Management Plan, including the standard emission management measures and the proactive and reactive air quality management measures implemented as part of the Approved Operations will continue to be adopted for the Proposed Modification.

This section of the RTS report includes a response to the submissions from agencies (DPE, EPA and New England Health) and the interest groups and community in relation to air quality issues.

Note, the Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

6.1.1 Agency Submissions

6.1.1.1 DPE

The EPA has requested additional information with respect to the Air Quality Impact Assessment (AQIA). In particular, the EPA has requested that predicted exceedances of the impact assessment criteria be clearly identified in the assessment. The AQIA should distinguish between exceedances of the assessment criteria imposed under SSD 5850, which are applied incrementally in accordance with the Voluntary Land Acquisition and Mitigation Policy (VLAMP), and exceedances of the EPA's assessment criteria, which are applied cumulatively in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2016). Clarification has also been requested with respect to $PM_{2.5}$ emissions from diesel plant and equipment.

The tabulated results presented in the AQIA have been revised to address the request from the EPA, refer to **Appendix 1**. As a result of this review no additional private properties have been identified as exceeding the relevant criteria applicable to the Proposed Modification, however the impacts associated with the Proposed Modification have been further defined and presented as requested by the EPA. A response to the EPA submission is provided in **Section 6.1.1.2**.

The majority of community submissions raised concerns regarding the cumulative air quality impacts of the proposed modification, particularly in relation to Camberwell. NSW Health also raised concerns regarding the assessment of cumulative impacts in the AQIA and the difficulty of achieving air quality goals in the locality, particularly during drought periods. The Department requests a detailed response to these concerns, including further discussion regarding:

- ***the proportional contributions of the various mining operations to particulate matter concentrations in the locality;***
- ***existing mitigation and/or acquisition rights in Camberwell, following the determination of Ashton Coal Mine South East Open Cut Project (Modification 1) on 27 August 2018; and***
- ***the VLAMP (2018).***

In particular, the AQIA should provide an assessment of cumulative PM_{10} and $PM_{2.5}$ concentrations in the event that the Ashton South East Open Cut Project does not proceed.

It would also be useful to provide a summary, preferably in table format, of privately-owned residences in Camberwell and to the south-east of the proposed extension area, which hold acquisition and/or mitigation rights, and to identify the relevant development consent or project approval under which those rights are granted.

The proportional contributions of the various mining operations to particulate matter concentrations in the Camberwell area have been examined by extracting results from the model described in the AQIA (Jacobs, 2018). Specifically, the predicted annual average PM_{10} concentrations at property 152, located in the centre of Camberwell, have been collated for all years of assessment for the Proposed Modification and for all source contributions including background levels (refer to **Figure 6.1**). 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 introduced EPA criterion of 25 µg/m^3 in the Camberwell area (refer to Figure 9 of the AQIA).

The 2014 meteorological year was utilised for the air quality modelling, which was considered the most appropriate due to high data capture rate, similar wind patterns to other years, rainfall being slightly below average and air quality conditions which showed similarities to other years. In addition measured PM_{10} levels from the Camberwell (EPA) monitor were at the recently introduced 25 µg/m^3 annual average criteria**.** **Figure 6.1** highlights the relative PM_{10} contributions from background levels and all surrounding mining operations. The figure provides a comparison between the 2014, Year 2, Year 8 and Year 15 representative modelled years for the Proposed Modification. Modelling results indicate that PM_{10} contributions peak in Camberwell in Year 2 (2020) and show a decline in the Year 8 and Year 15 modelling predictions, as production at surrounding mines decrease and/or cease. In order of significance the contributions for the worst case year (Year 2) are predicted to be ranked as follows:

- Background (39%)
- Ashton including South East Open Cut (SEOC) Project (15%)
- Rix's Creek North (11%)
- Ravensworth Surface Operations (10%)
- Glendell (9%)
- Rix's Creek including Rix's Creek Extension (6%)
- Mount Owen Continued Operations, Proposed Modification (4%)
- Liddell Coal Operations (3%)
- Hunter Valley Operations (2%)
- Integra Underground (1%).

Subsequent to the lodgement of the application for the Proposed Modification and supporting SEE, an application was lodged by Mount Owen for a minor extension to the Glendell Mine (DA 80/952 Modification 4) - lodged on 13 November 2018. It is noted that this minor modification to the Glendell Mine is not predicted to result in any incremental increase in dust emissions and will occur within the currently approved mine life of the Glendell Mine.

The annual average PM_{10} contribution from the Proposed Modification at Camberwell is predicted to be less than 2 µg/m^3 in the worst case year. This value reflects the distance and direction of the Mount Owen and Ravensworth East Mines relative to Camberwell and is consistent with the predicted contributions associated with the Approved Operations (refer to Table D2 of Appendix D in PEL 2014). It can be seen from **Figure 6.1** that emissions from the Proposed Modification would not be the main contributor to annual average PM_{10} concentrations at this location. It should also be noted that the modelled cumulative PM_{10} levels are predicted to exceed the recently introduced 25 µg/m^3 EPA annual average criterion in Year 2, Year 8 and Year 15 (should the Ashton SEOC Project commence) without the contribution from Mount Owen, either the Approved Operations or the the Proposed Modification.

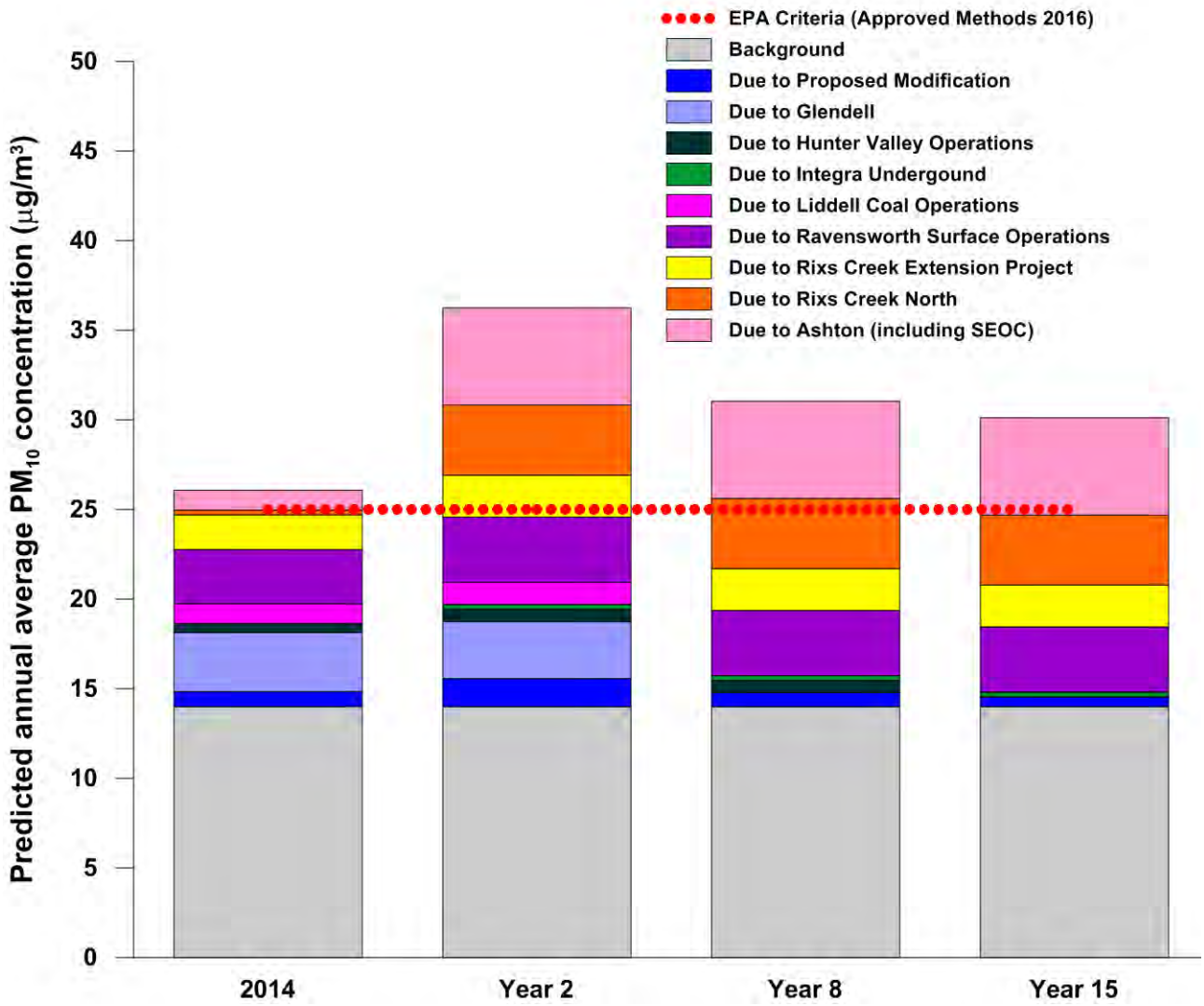


Figure 6.1 Proposed Modification – Predicted annual average PM_{10} concentrations in Camberwell (Property ID 152) from all approved nearby mine sources

The Ashton SEOC Project (MP 08_0182) was approved by the Land and Environment Court (LEC) in April 2015. A specific condition was applied to MP 08_0182, under Schedule 2 Condition 10A – which requires Ashton to *purchase, lease or licence property 129 before carrying out any development work under the project approval*. The LEC recognised at the time that imposing condition 10A limited the ability to immediately commence the Ashton SEOC Project. To address this an additional condition (Schedule 2, Condition 5A) was included which allows the ability to request a two-year extension to the standard 5 year lapse date for the Ashton SEOC Project Approval.

The Ashton SEOC Project site is located in close proximity to Camberwell. The majority of the properties in Camberwell are now owned by various mining operations or have acquisition rights under other mining development consents. However, there are six remaining properties in private ownership which have voluntary acquisition rights under MP 08_0182 only. In January 2017 Ashton Coal Pty Limited (Ashton) submitted an application to modify MP 08_0182 to include a new commencement condition and provide for minor administrative amendments. The commencement condition proposed included:

The Proponent Shall:

(a) notify the Secretary in writing of the date of commencement of development under this approval; and

(b) may only commence development under this approval once the Secretary has agreed in writing that all prerequisites to the commencement of development under this approval have been met.

Note: the prerequisites under the approval include the approval of management plans etc that are required to be approved prior to the commencement of construction. Any conditions requiring the proponent to acquire any property do not operate until the notice under this condition has been issued to the Secretary that would require that the proponent notifies the Secretary of the Ashton SEOC's commencement.

The modification stated that *"a proponent 'takes up' a project approval and therefore, approval requirements should not apply until after this approval is 'taken up'"*.

In determining the Ashton SEOC Project modification application, the Independent Planning Commission (IPC) assessed that the commencement condition proposed by Ashton was not warranted, and should not be incorporated into the conditions of consent of MP 08_0182. The IPC also confirmed that Ashton could not be required to comply with any of the conditions of consent, including voluntary acquisition, until they decide to 'take up' the approval, which will be determined through compliance with Condition 10A of the existing consent.

The modelling results indicate that the Ashton SEOC Project (should it commence) would be the largest contributor to annual average PM_{10} concentrations in Camberwell. MP 08_0182 will lapse in April 2020, however Ashton could seek a two year extension to the lapse date. Should the Ashton SEOC Project commence, the properties within Camberwell subject to acquisition rights under MP 08_0182 are able to pursue acquisition with Ashton.

Should the Ashton SEOC Project not proceed, the predicted cumulative annual average PM_{10} concentrations corresponding to Year 2, Year 8 and Year 15 at Camberwell (Property ID 152) are 30, 25 and 24 $\mu g/m^3$ respectively.

Table 6.3 provides a summary of privately-owned residences, and privately-owned vacant land located in close proximity to the Mount Owen Complex including Camberwell and surrounds which hold acquisition and/or mitigation rights, and the location of theprivately owned residences is shown on **Figure 6.2**. The relevant development consent or project approval which provides the acquisition rights is also indicated.

Table 6.3 Summary of Private Residences within Camberwell and surrounds with Acquisition and Mitigation Rights

Residential Property ID	Mount Owen Continued Operations SSD-5850	Glendell DA 80/952	Ashton SEOC MP 08_0182	Ravensworth Surface Operations DA 09_0176	Rixs Creek North 08_0102	Rixs Creek Extension SSD-6300	Integra Underground 08_0101	Ashton Underground DA309-11-2001
Camberwell Residences								
143		M	B, M		M			
144a			A, M	A, M				A
144b, 144c			A, M			A[1]		
145			A, M		A	A[1]		A
147			A, M		A	M[1]		A
150			A, M					
152		M	B		M			
154			A, M					
155		M	A, M		M			
156			A, M					
Other residences (Refer to Figure 6.2 for locations)								
4					M			
5					M		A	
007b					M			
10					M			
12					M			
13	M							
19	M							
21	A, M							
23	A, M							
93	M							
105	A, M				A		A, M	
111		M			A	M[1]		
112					M			
114	A, M							
115	A, M							
122		A, M					A	
127a		A, M	B		A	M[1]		
127b		A, M	B		A	M[1]	M	
127c		*		*	A			*
127d	*	*	*	*	A			*
133[2]	A, M							

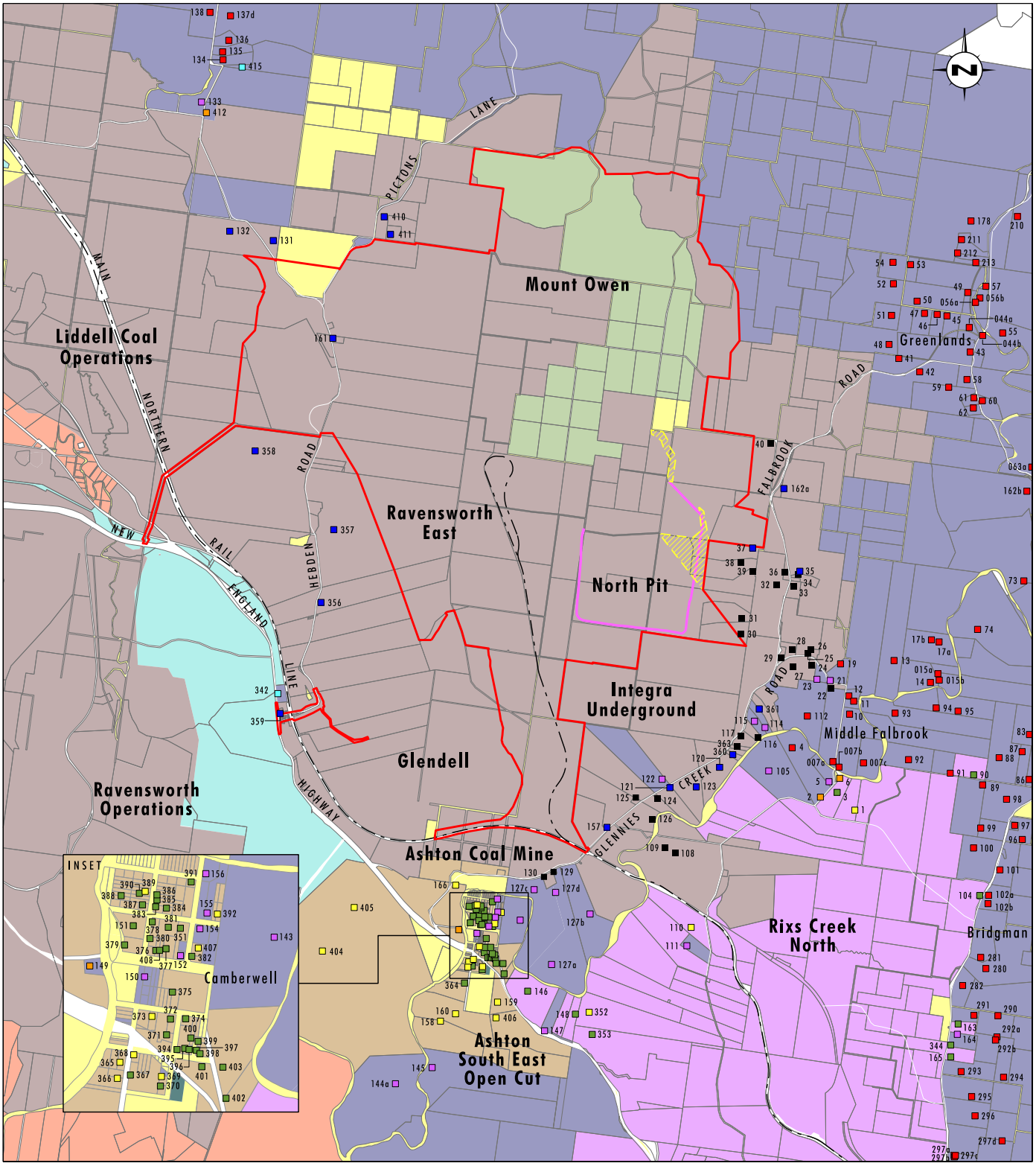
Residential Property ID	Mount Owen Continued Operations SSD-5850	Glendell DA 80/952	Ashton SEOC MP 08_0182	Ravensworth Surface Operations DA 09_0176	Rixs Creek North 08_0102	Rixs Creek Extension SSD-6300	Integra Underground 08_0101	Ashton Underground DA309-11-2001
Privately owned vacant land								
Lot 3/DP1111313			A		A	A[1]		
Lot 1/DP121623			A			A[1]		
Lot 1/DP1136411			A			A[1]		A
Lot 52/DP252692						A[1]		
Lot 53/DP252692						A[1]		
Lot 54/DP252692						A[1]		
Lot 4/DP1166047			B					
Lot 5/DP1166047			B					
Lot 175/DP1002770			B					
Lot 106/DP855187			B					

NOTE: A = acquisition on request | B = Ashton SEOC acquisition noise trigger | M – Mitigation rights
[1] - Proposed acquisition (DPE, SSD Assessment Rix's Creek Continuation of Mining Project (2018)
[2] - As per SSD-5850, Mount Owen is only required to acquire Lot 31 DP6842 and Lot 2 DP1175728 within property 133
*Dwelling constructed after project approval granted

Further to the acquisition rights identified in **Table 6.3**, the Ashton SEOC Project development consent provides acquisition rights to all privately owned residences or vacant private land affected by more than 25%, where exceedances of noise criteria (shown in the consent) occur.

It is noted that all the development consents or project approvals identified in **Table 6.3** include reference to applicable cumulative noise acquisition criteria. The exception is that the noise acquisition criteria included in the Ashton SEOC Project development consent (Schedule 3, Condition 5) relates to Project Only noise impacts. However, the Project Only noise impacts identified in the noise impact assessment undertaken to support the Ashton SEOC Project indicated that the relevant Project Only noise criteria would be exceeded at all privately owned properties within Camberwell.

The tabulated results provided in the AQIA have been updated to provide an assessment of cumulative PM_{10} and $PM_{2.5}$ concentrations in the event that the Ashton SEOC Project does not proceed (refer to **Appendix 1**). The modelling results indicate that annual average PM_{10} levels in Camberwell will exceed the 25 µg/m^3 criterion for all modelled years should the Ashton SEOC Project commence. Should the Ashton SEOC Project not commence, the worst case modelling year (Year 2) annual average PM_{10} levels in Camberwell are predicted to exceed the 25 µg/m^3. However the model predictions also indicate that cumulative annual average PM_{10} levels from existing and proposed operations are predicted to reduce to approximately 24 µg/m^3 at Camberwell for Years 8 and 15 under both the Approved Operations and Proposed Modification. The VLAMP 2018 is discussed further in **Section 6.1.1.2**.



Data Source: Glencore (2018)

0 1 2 4 km

Scale 1:90 000

Legend

- Proposed SSD-5850 Modification Consent Boundary
- Additional Disturbance Area
- Proposed Modification Pit Boundary
- Ashton Coal
- Bloomfield Collieries
- Hunter Valley Operations
- Crown Land
- Glencore
- Government Authority
- AGL Macquarie
- Private
- State Forest
- Community Infrastructure
- Glencore Owned
- Glencore Owned - Vacant
- Other Mine Owned
- Other Mine Owned - Vacant
- Private
- Private - Subject to Acquisition Rights
- Private Infrastructure

FIGURE 6.2

Land Ownership

File Name (A4): R17/3810_245.dgn
20181218 13.27

The Department requests clarification regarding the column heading "Cumulative (no SEOC or RCN)" in Appendix E of the AQIA. Please confirm whether this is intended to refer to the Rix's Creek Continuation Project, rather than Rix's Creek North.

The "RCN" in the column labelled "Cumulative (no SEOC or RCN)" referred to Rix's Creek North, not the Rix's Creek Extension Project which is currently under assessment. The Rix's Creek Extension Project is included in the model however the results for this scenario (model scenario without RCN) were included to help understand the relative contribution of Rix's Creek North, which is currently operating in close proximity to the key area of interest to the south east of Mount Owen Mine.

6.1.1.2 EPA

Explicit estimation of diesel particle emissions – the proponent needs to provide explicit quantification of $PM_{2.5}$ emissions from diesel plant and equipment proposed for use by the development.

The AQIA requires explicit estimation of particle emissions from diesel-powered plant and equipment and commitment to adopting reasonable and feasible emission controls. Diesel particle emissions have not been estimated and explicitly documented in the SEE or AQIA. It is noted that nitrogen oxide emissions from diesel plant and equipment were estimated and assessed, however diesel particle emissions were not considered in equivalent detail.

- ***Particle emissions from diesel engines are predominantly $PM_{2.5}$ and diesel engines are a significant source.***
- ***The consent for current approved operations includes a requirement for the applicant to include an initial baseline estimate of emissions of $PM_{2.5}$ from all diesel engines used for the development in their air quality management plan, clause 19(e) of Schedule 3. Clause 19(e) requires that the air quality management plan be approved by the DPE prior to commencement of development under the consent.***
- ***The required information has not been made available to the EPA to review – to inform recommended conditions of approval or EPL conditions.***

An initial baseline estimate of emissions of $PM_{2.5}$ from all off-road mining fleet diesel engines used for the approved development is provided in the Mount Owen Complex Air Quality Management Plan (Mount Owen, 2018) (AQMP).

The AQMP has been reviewed and approved by DPE.

Table 6.4 provides the estimates of PM_{10} and $PM_{2.5}$ emissions due only to diesel plant and equipment exhausts which were included in the Proposed Modification AQIA. Emission factors for "Industrial off-road vehicles and equipment" from the EPA's 2008 Air Emissions Inventory (EPA 2012) were used for the calculations below. These factors relate to diesel exhaust and evaporative emissions. It should be noted that these estimates are based on generic emission factors for the industry and are not specific to data produced directly from the Original Equipment Manufacturers (OEMs) of equipment used at the Mount Owen Mine.

Table 6.4 Estimate of PM_{10} and $PM_{2.5}$ emissions from Diesel Engines

Year	Fuel Consumption from data provided by Mount Owen (L/y)	Emission Factors (kg/kL)		Emissions (kg/y)	
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
2	50,999,945	2.84	2.75	144,840	140,495
8	46,767,575	2.84	2.75	132,820	128,835
10	21,512,920	2.84	2.75	61,097	59,264

By comparison, the National Pollutant Inventory (NPI) provides emissions factors for diesel vehicle exhausts related to heavy good vehicles (>25 t GVM). An emission factor of 1.2 kg/m^3 (1.2 kg/kL) is provided for PM_{10} and 1.1 kg/m^3 (1.1 kg/kL) for $PM_{2.5}$ (NPI, 2008). Comparison of the NPI factors with the EPA factors highlight the potential variability of emissions, depending on the referenced emission factors. This further reinforces the position that the EPA's 2008 Air Emissions Inventory (EPA, 2012) emission factors provide a more conservative base for the assessment.

The emission control measures proposed by Mount Owen, as outlined in the approved Air Quality Management Plan (Mount Owen, 2018), include:

- Servicing all machinery in accordance with maintenance contracts and adopting original equipment manufacturer recommendations for maintenance.
- Targeting the maintenance so equipment remains fit for purpose over its whole life cycle.
- Defining failure modes, effects and criticality.

Additional Exceedances of the EPA's Impact Assessment Criteria – the proponent needs to provide additional information (tabulated results and updated conclusions), specifically identifying all receptors (private and mine owned) that are predicted to exceed the EPA's impact assessment criteria for $PM_{2.5}$, PM_{10}, TSP and dust deposition. The revised assessment should include annotation to indicate any residences predicted to exceed due to the modification.

AQIA states (p13) "the Proposed Modification is not predicted to result in any increase in impacts relative to the Approved Operations". Additionally, the AQIA concludes (p75) that "Excluding community or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive locations which are predicted to experience a Proposed Modification contribution of greater than 50 µg/m3 for maximum 24-hour average PM_{10} concentrations".

However, Figure 19 of AQIA shows there are non-mine owned receptors for which cumulative concentration of 24-hour PM_{10} are predicted to exceed the EPA's impact assessment criterion of 50 µg/m3. Appendix E tabulates results for the identified receptors. Twenty-seven of these exceed the EPA's cumulative impact assessment criterion for 24-hour PM_{10}, all but one of them appear to be due to the modification proposal.

EPA notes that the AQIA uses the criteria in Voluntary Land Acquisition and Mitigation Policy to assess change in predicted impacts. Consistent with the EPA's advice on the original Mt Owen Continuation proposal, the assessment should consider the EPA's impact assessment criteria – which apply on a cumulative basis.

The AQIA should be revised to include additional information (tabulated results and updated conclusions), specifically identifying all receptors (private and mine owned) that are predicted to exceed of the EPA's impact assessment criteria ($PM_{2.5}$, PM_{10}, TSP and dust deposition). The revised assessment should include annotation to indicate any residences predicted to exceed due to the modification

The tabulated results have been revised as per the EPA's request above and **Appendix 1** provides the tabulated model results for all receptors for $PM_{2.5}$, PM_{10}, TSP and dust deposition. These results have been reformatted to include tests and assessments against the VLAMP 2018 and the EPA impact assessment criteria (EPA, 2016). As discussed in **Section 6.1**, although any exceedances of the VLAMP 2018 have been identified, the VLAMP 2018 does not apply to the Proposed Modification. A scenario with and without the Ashton SEOC Project is also provided.

The conclusions from this revised assessment are as follows:

- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience 24-hour or annual average $PM_{2.5}$, annual average TSP or annual average dust deposition levels above the criteria outlined by the EPA (2016).

- There is a potential for PM_{10} concentrations to exceed the EPA's 24-hour average cumulative impact criterion at 48 private sensitive receptors without acquisition rights, of which 21 were determined to have potential for an exceedance to be influenced by the Proposed Modification. This conclusion is based on modelled instances where the inclusion of the Proposed Modification led to predicted additional days above 50 $\mu g/m^3$ (24-hour average) ranging in the order of 1 to 3 days per year (that is, relative to modelled cumulative impacts without any contribution from Mount Owen (either the Approved Operations or the Proposed Modification).

- The AQIA undertaken to support the Mount Owen Continued Operations (PAE, 2014) did not follow the same method as the AQIA for the Proposed Modification (Jacobs, 2018) for the assessment of cumulative PM_{10} 24-hour impacts. For the previous assessment, a monte carlo simulation was undertaken to assess the cumulative PM_{10} 24-hour impacts associated with the Approved Operations at selected sensitive receptors only. Accordingly, it is not possible to quantify the extent of change that the Proposed Modification makes to predicted cumulative PM_{10} 24-hour impacts relative to the Approved Operations. However, a comparison was made between the Approved Operations and the Proposed Modification in the AQIA, in terms of the maximum predicted extent of potential impacts. This comparison showed that the predicted maximum contributions of the Proposed Modification to air quality would be, for the most part, less than the predicted maximum contributions of the Approved Operations. It is noted that the AQIA does not include modelling of reactive management measures that can be undertaken by Mount Owen in the event that elevated dust levels are identified. The potential impacts will continue to be managed in accordance with relevant approval conditions and the existing management processes currently implemented at the Mount Owen Complex as outlined in the approved Air Quality Management Plan.

- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience annual average PM_{10} levels above the criteria outlined by the EPA (2016).

- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience 24-hour $PM_{2.5}$, 24-hour PM_{10}, TSP or dust deposition levels above the criteria outlined in the VLAMP (2018). Two private sensitive receptors (property 4 and 112) are predicted to experience annual average $PM_{2.5}$ and annual average PM_{10} levels in excess of the VLAMP (2018) criteria on more than 25% of the property. However at these locations the VLAMP (2018) has been determined as not applicable as the VLAMP (2018) only applies to "Modification applications that involve increases in the approved dust or noise impacts of a development". The currently predicted annual average $PM_{2.5}$ and PM_{10} concentrations at property 4 and 112 due to the Proposed Modification are not higher than those predicted for the Approved Operations.

<u>ACARP Emission Factors – for proponent and consultant to note</u> – ACARP factors are not generally supported by the EPA for routine use in air quality impact assessments in NSW.

The AQIA references the use of particle emission factors derived from ACARP Project C22027 (ACARP factors). EPA advises that the ACARP factors are not routinely adopted in air quality impact assessments in NSW. The EPA understands that peer review of the ACARP factors, commissioned by the Commonwealth (under the NPI program) raised significant issues with the project and uncertainty with the derived factors. Further, the EPA understands that additional work to address some of the

shortcomings from the ACARP project was proposed but the project factors have not been finalised and endorsed under the NPI framework. The use of the ACARP factors therefore adds to assessment uncertainty and the EPA does not generally support the use of the ACARP factors in air quality impact assessments at this time.

Notwithstanding the issues associated with the ACARP factors, the EPA is not requesting a complete revision of the AQIA. This is due to the relatively minor scale of the modification – in terms of air emissions – noting that the rate of extraction and mining methods are not proposed to change. On this basis, provided all assessment results are produced using a consistent methodology, results can be interpreted in relative (change in impact) as well as absolute terms.

It is recommended that the proponent and their consultant be advised that the ACARP factors are not generally supported by the EPA for routine use in air quality impact assessments in NSW.

Noted. To clarify, the ACARP factors were referenced in the AQIA and compared with the US EPA and NPI factors but were not used in the development of the emission inventories or the air quality modelling.

6.1.1.3 NSW Health

With reference to Appendix 6 Air Quality Impact Assessment, page 50, Figure 19: Predicted maximum 24-hour average PM_{10} concentrations due all sources (cumulative), shows multiple private receptors predicted to exceed the 24 hour PM_{10} goal in years 2, 8, and 15. In responding to this finding, it is stated on page 47:

"As noted previously many locations in the model domain are expected to experience cumulative maximum 24 hour average PM_{10} concentrations above 50 µg/m^3 on at least one occasion each year, similar to the status of existing conditions (2014) and consistent with the outcomes of predicted impacts for the Approved Operations. This includes the background contributions. Therefore, the trigger for whether a receptor is predicted to be impacted by the Proposed Modification was defined as the Proposed Modification contribution greater than 50 µg/m^3. This is consistent with the application of the impact assessment criteria in the current development consent; SSD-5850. Excluding community or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive locations which are predicted to experience a Proposed Modification contribution of greater than 50 µg/m^3 for maximum 24-hour average PM_{10} concentrations." EPA's "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" shows how assessment of air pollution from developments should be done. The proponent is required to model the change in PM_{10} concentration associated with that development at the location of sensitive receptors.

Refer to **Section 6.1.1.2** which provides an overview of the revised tabulated results and discussion regarding the predicted impacts associated with the Proposed Modification.

We question the definition of the trigger for impact in the paragraph above. This definition uses the current 24 hour maximum PM_{10} goal for all sources as the goal for contribution from the proposed development alone and ignores the cumulative impact from other sources. The private receptors are impacted by the proposed modification and background sources as demonstrated by the predicted exceedances of 24 hour PM_{10} goals. While they may have been subject to exceedances in the past, it would appear that the proposed modification would maintain and continue the exceedance of the PM_{10} 24 hour goals which should reasonably be interpreted as an impact. This appears to be a consideration of reduction of existing production activities to achieve air quality goals. The Hunter Valley is subject to intensive mining. Periods of drought make it challenging to maintain PM_{10} air quality goals. Multiple development proposals at times suggest that their contribution alone will be minor, but the intensive nature of coal mining in the Hunter Valley leads to significant cumulative impacts.

Refer to **Section 6.1.1.2** which provides an overview of the revised tabulated results and discussion regarding the predicted impacts associated with the Proposed Modification.

While not predicted to exceed the daily or annual $PM_{2.5}$ goals at private receptors, we note the contours of cumulative $PM_{2.5}$ for the annual goal of 8 µg/m^3 are very close to private receptors (Figure 29). The National Environment Protection Council have an aim to move to annual average and 24-hour $PM_{2.5}$ standards of 7 µg/m^3 and 20 µg/m^3 by 2025 during the life of this project. Based on this assessment it would be difficult to achieve the annual goal in the future.

The AQIA has been prepared in accordance with the Approved Methods (EPA, 2016). There is currently no State legislation regarding the aim to move to more stringent $PM_{2.5}$ criteria by 2025. Accordingly, the Proposed Modification is assessed against the current criteria detailed in the Approved Methods (EPA, 2016) as these criteria would be applied by the consent authority in accordance with the provisions of Clause 12AB of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2018.

We note the challenges associated with achieving air quality goals in the Hunter during droughts and request that a conservative approach to assessment be undertaken to protect air quality.

The AQIA has adopted a conservative approach through utilising monitoring data from the 2014 calendar year, which considered both the longer-term air quality and meteorological conditions in order to identify a representative modelling year. As discussed in Section 5.1 of the AQIA, one of the reasons the 2014 calendar year was selected as the meteorological year was because rainfall was slightly below the long-term average, as the preference was for a slightly drier than average year. Other conservative aspects of the assessment included:

- Not accounting for any daily operational controls that will be implemented in response to adverse weather conditions, and
- Assuming that all other open cut mines in the region will be operating at their approved maximum production levels.

The aspects of the assessment outlined above will have led to an over-estimation of emissions to air and, consequently, predicted impacts that are likely to over-state actual impacts.

6.1.2 Interest Group Submissions

6.1.2.1 Hunter Communities Network

The air quality assessment fails to recognise the high levels of air pollution recorded at the Camberwell regional air quality monitor. This area of the Hunter is totally surrounded by open cut coal mining operations. These are the key source of dust pollution.

The EPA currently operate an air quality monitor in Camberwell, the results from this monitor have been included in the modelling for the AQIA. Contributions to air quality in Camberwell and the predicted impacts associated with the Proposed Modification are discussed in **Section 6.1.1.1** and **6.1.1.2**.

The assessment of fine particle pollution ($PM_{2.5}$) is inadequate and does not account for existing high levels above the new national standards adopted in 2015.

This area of the Hunter Region is subject to unacceptably high levels of mine generated air pollution combined with power station and excess mine related traffic on the New England Highway. These cumulative impacts have not been assessed.

Assessment of the Proposed Modification against the VLAMP 2018 and the EPA impact assessment criteria (EPA, 2016) is provided in **Section 6.1.1.2**.

It is untenable for an increase in air pollution to be approved until 2037.

Mount Owen is committed to the ongoing development and implementation of mitigation measures to minimise dust, diesel and blast fume and to minimise prolonged impacts associated with the increased mine life. Whilst it is acknowledged that the Proposed Modification represents an extension to the Mount Owen Mine life and the associated impacts, the implementation of operational controls and the refinements to the mine plans associated with the Proposed Modification indicate the air quality impacts associated with the Proposed Modification are consistent with the Approved Operations.

The high levels of air pollution recorded at the Camberwell regional air quality monitor are a major threat to the remaining private residents at Camberwell. The modification proposes to increase mining impacts closer to Camberwell at the southern end of the pit and to continue mining to the north of Camberwell for an extended period of time.

The cumulative air quality impacts of this modification should trigger acquisition rights for Camberwell villagers. This is an important consideration particularly in light of the current application by Ashton Mine to have Camberwell acquisition rights from that project revoked.

Hunter Communities Network considers that any approval of increased mining activities in this area of the Hunter should provide acquisition rights for all remaining private residents after the application of a full social impact assessment.

The current acquisition status of the properties in Camberwell is discussed in **Section 6.1.1**. The acquisition of the properties in Camberwell under the Ashton SEOC Project (MP 08_0102) has not been revoked. The recent modification confirmed that Ashton is required to comply with the conditions of consent, including voluntary acquisition, once they decide to 'take up' the approval, which will be determined through compliance with Condition 10A of the existing consent, refer to **Section 6.1.1**.

As discussed in **Section 6.1.1**, the PM_{10} contribution from the Proposed Modification is predicted to be less than 2 µg/m^3 in Camberwell, which is consistent with the predicted contributions associated with the Approved Operations. The individual contributions to cumulative air quality from the surrounding mining operations is presented in **Figure 6.1** which indicates theProposed Modification would not be the main contributor to annual average PM_{10} concentrations at this location. It is also important to note that the modelled cumulative annual average PM_{10} levels are predicted to exceed the 25 µg/m^3 EPA criterion in Year 2, Year 8 and Year 15 (should the Ashton SEOC Project commence) without the contribution from the Proposed Modification or the Approved Operations, and as mining progresses the contribution from the Proposed Modification or the Approved Operations decreases by more than 50% from Year 2 to Year 15.

6.1.2.2 Hunter Environment Lobby Inc.

It is common knowledge that population health here in the Hunter is in one of the poorest states for the whole country – particle pollution of $PM_{2.5}$ and PM_{10} are very much higher than the average. Open cut coal mines are a big offender.

We see that it is imperative that the current high levels of air pollution regularly recorded at Camberwell in particular are recognised and taken into account. Camberwell is very close to the main Singleton suburb of Singleton Heights and local GP's have been warning for many years of the increasing prevalence of asthma in school age children and younger.

Contributions to air quality in Camberwell and the predicted impacts associated with the Proposed Modification are discussed in **Section 6.1.1.1** and **6.1.1.2**. The AQIA modelling has been undertaken in accordance with the EPA Approved Methods (EPA, 2016) assessing the Proposed Modification against current air quality assessment criteria.

We see that the remaining private residents of Camberwell should be eligible for acquisition rights – they live in some of the worst areas of the Hunter. It is akin to wind tunnel effects where mines intrude on people's lives and health.

As discussed above, the PM_{10} contribution from the Proposed Modification is predicted to be less than 2 $\mu g/m^3$ in Camberwell, which is consistent with the predicted contributions associated with the Approved Operations. Additionally the modelled cumulative annual average PM_{10} levels are predicted to exceed the 25 $\mu g/m^3$ EPA criterion in Year 2, Year 8 and Year 15 (should the Ashton SEOC Project commence) without the contribution from the Proposed Modification or the Approved Operations, and as mining progresses the contribution from the Proposed Modification or the Approved Operations decreases by more than 50% from Year 2 to Year 15.

6.1.3 Community Submissions

The community submissions included comments regarding the cumulative air quality levels in Camberwell including:

- ***It is imperative that the current high levels of air pollution regularly recorded at Camberwell are recognised and taken into account. The World Health Organisation lists particle pollution as a carcinogen. This community is bearing the cumulative impact of mining throughout the valley. There is no threshold below which PM_{10} does not cause respiratory symptoms and diseases, and contribute to strokes and heart attacks. In one example last November PM_{10} levels were recorded at 229.7 parts per million. The National Environment Protection Measure states that levels above 100 are deemed hazardous. The rolling average for Camberwell that day was 97.3, which is very poor. The exceedances are in stark contrast to a 2011 Hunter New England Health review of Upper Hunter air quality that said five coarse particle exceedances a year would be acceptable.***

- ***The extension of the mine life is certainly also not in the public interest of the local residents of Camberwell. The air quality standards in the locality are already routinely breached. It is simply not fair that their health and quality of life is compromised by air pollution from coal mining, with no redress.***

- ***Air pollution levels in the Hunter are regularly exceeding safe levels and the cumulative impact upon Camberwell of several open-cut mining complexes and two coal-fired power stations is particularly severe. It is time the NSW government took its' fiduciary "Duty of Care" to citizen's health seriously and put that ahead of the relatively small financial gains (less than 2% of State revenue is derived from royalties from all sources). The financial burden of extra health care directly attributable to $PM_{2.5}$ and 10 particulates largely caused by mining and coal-power is estimated at $600 million annually. This dollar cost does not include the emotional cost of people seeing their much-loved homes becoming inhospitable and unsaleable (Stranded assets) at the same time as their health deteriorates.***

- ***Camberwell has been decimated by coal-mining and the few remaining residents have not even been granted acquisition rights which would, at least, give them an opportunity to move to a healthier environment.***

- ***The people of Camberwell must be identified as key receptors of very poor air quality that will be cumulatively increased by this proposal. The air quality assessment is inadequate.***

- ***The air pollution at Camberwell is already too high.***
- ***The air quality in the village of Camberwell is already in the exceedance, 2017 it was above the national standard and well above the world health organisation standard.***
- ***Air quality and pollution impacts human and environmental health, the area already experiences high levels of poor air quality.***
- ***All residents have the right for clean air and mitigations has not proven effective, the number of exceedances has shown this is accurate.***

The AQIA includes an assessment of cumulative impacts, further detail regarding the cumulative impacts in Camberwell are presented in **Section 6.1.1**. As discussed in **Section 6.1.1**, the annual average PM_{10} contribution from the Proposed Modification in Camberwell is predicted to be less than 2 µg/m^3. It can be seen from **Figure 6.1** that emissions from the Proposed Modification make a comparatively minor contribution to PM_{10} concentrations at this location.

Additionally the analysis indicates that the cumulative PM_{10} levels are predicted to exceed the annual average 25 µg/m^3 EPA criterion in Year 2, Year 8 and Year 15 (should the Ashton SEOC Project commence) without the contribution from the Proposed Modification or the Approved Operations, and as mining progresses the contribution from the Proposed Modification or the Approved Operations decreases by more than 50% from Year 2 to Year 15.

The high levels of air pollution recorded at the Camberwell regional air quality monitor are a major threat to the remaining private residents at Camberwell. The modification proposes to increase mining impacts closer to Camberwell at the southern end of the pit and to continue mining to the north of Camberwell for an extended period of time.

The Proposed Modification does not propose to extend the southern limit of the North Pit, therefore mining operations will not occur closer to Camberwell than currently approved. Mount Owen is committed to the ongoing development and implementation of mitigation measures to minimise any prolonged environmental impacts associated with the increased mine life.

The SEE provides assessments on noise and air quality that may impact the surrounding land uses and sensitive receptors. The modelling for both air and noise impact on property 112 shows that there is not a significant impact on the current dwelling location, however the degree of error in the modelling is not sufficient to conclusively justify this position given the closeness of the isobars (Appendix 6 of SEE). Modelling is also based on a cumulative 24hr measure. Dust or noise impacts are not predominantly destructive over this time scale but more so in smaller time periods i.e. hourly.

The air quality modelling has been undertaken in accordance with the EPA Approved Methods (EPA, 2016). As discussed in the AQIA a conservative approach to the establishment of the assumed background levels and the modelling has been applied which follows that the predicted impacts of the Proposed Modification are also conservative, that is the predicted impacts are likely to over-state the actual impacts.

As discussed in **Section 6.1.13**, the AQIA has adopted a conservative approach through utilising monitoring data from the 2014 calendar year, which considered both the longer-term air quality and meteorological conditions in order to identify a representative modelling year. As discussed in Section 5.1 of the AQIA, one of the reasons the 2014 calendar year was selected as the meteorological year was because rainfall was slightly below the long-term average, as the preference was for a slightly drier than average year. Other conservative aspects of the assessment included:

- Not accounting for any daily operational controls that will be implemented in response to adverse weather conditions.

- Assuming that all other open cut mines in the region will be operating at their approved maximum production levels.

Mount Owen has undertaken additional consultation with the owners of property 112, with the air quality specialist from Jacobs to further explain the air quality modelling and the interpretation of the results. The air quality impacts identified in the AQIA are consistent with the Approved Operations and in accordance with the relevant impact criteria.

Mount Owen will continue to consult with surrounding landowners in relation to ongoing operations and air quality monitoring, management and mitigation measures that Mount Owen will provide.

The water in our tanks have become undrinkable and the grey dust which cumulates on our roof, enters the tank, our water turns a grey colour, it has impacted our health. Our solar panels need constant cleaning.

As part of the Approved Operations, and in accordance with SSD-5850, Mount Owen inspects rainwater tanks at privately owned residences within four kilometres of the approved mining limit at least every two years, with cleaning being carried out should the inspection identify that this is required.

The AQIA predicts no exceedances of the annual average dust deposition criteria (4 g/m^2/mth) at private sensitive receptors.

We request that Mt Owen Pty Limited (Mount Owen), a subsidiary of Glencore Coal Pty Limited (Glencore), review the current acquisition approach. Should the modification be approved we request that conditions of consent incorporate air and noise monitoring at a scale and detail to accurately reflect our position. Should this show an impact on our property, not solely the dwelling location, we request reasonable justification for acquisition referral.

As required, the air quality modelling and the identification of any impacted properties has been undertaken in accordance with the EPA Approved Methods (EPA, 2016), refer to **Section 6.1.1** for further detail. This submission was made by a property located in the Middle Falbrook area (to the southeast of the North Pit). As part of the AQIA a detailed review of the air quality monitoring network was undertaken which confirmed that the meteorological and air quality monitoring network currently operated by Mount Owen (refer to Figure 6.1 in the SEE) is suitably set up to measure the key air quality parameters, compliance with air quality criteria, and to allow for the contribution of mining activities to be determined. This existing monitoring network is proposed to continue to be operated as part of the Proposed Modification.

6.1.3.1 Acquisition status of private properties in Camberwell

Comments were also received regarding the acquisition status of the remaining private properties within Camberwell, including:

- ***Residents who can no longer live in the area should be given the right to demand the mining industry buys their property so they can settle elsewhere. The remaining private residents of Camberwell should be eligible for acquisition rights.***
- ***The extension of the mine life is certainly also not in the public interest of the local residents of Camberwell. The air quality standards in the locality are already routinely breached. It is simply not fair that their health and quality of life is compromised by air pollution from coal mining, with no redress. As an absolute minimalist consideration, the few remaining private landholders of Camberwell must have acquisition rights.***

- ***The people of Camberwell must be identified as key receptors of very poor air quality that will be cumulatively increased by this proposal. They must be granted acquisition rights if this modification is approved.***

- ***The right of acquisition needs addressing, and the industry should be held accountable for the cumulative impact on this village.***

- ***No resident should be denied the right for acquisition on request as Glencore owns so many mines that the cumulative impact from this mega mine situation has contributed to the poor air quality, that they should be held accountable, as they state is economic to the state, so there it is economic to impacted that they have the right to leave.***

- ***The impacted should have the right to hold account of the mine if they don't deliver the on the statements they make that the air quality will be controlled, but how many times have we heard these words when actually when it comes to the crunch, the impacts hold these residents are captives in their homes and remove their rights of freedom to have a window open or to drink clean water from a tank.***

- ***Residents who can no longer live in the area should be given the right to demand the mining industry buys their property so they can settle elsewhere. The remaining private residents of Camberwell should be eligible for acquisition rights.***

As discussed in **Section 6.1.1**, the recent modification to the Ashton SEOC Project did not revoke the acquisition rights of the properties within Camberwell, rather it was confirmed by the IPC that the original intent of the conditions of the Ashton SEOC Project approval (MP 08_0182) was to provide acquisition to the properties in Camberwell should the Ashton SEOC Project commence. The IPC also confirmed that Ashton could not be required to comply with any of the conditions of consent, including voluntary acquisition, until they decide to 'take up' the approval, which will be determined through compliance with Condition 10A of the existing consent.

The modelling results indicate that the Ashton SEOC Project (should it commence) would be the largest contributor to annual average PM_{10} concentrations in Camberwell. MP 08_0182 will lapse in April 2020, however Ashton could seek a two year extension to the commencement timeframe. Should the Ashton SEOC Project commence the properties within Camberwell subject to acquisition rights under MP 08_0182 are able to pursue acquisition with Ashton.

As previously discussed in **Section 6.1.1**, the potential air quality impacts associated with the Proposed Modification are considered to be consistent with the Approved Operations and the AQIA indicates that the contribution from the Proposed Modification is predicted to be less than 2 $\mu g/m^3$ (PM_{10} annual average), which will reduce as the mining operations progress. Additionally the cumulative annual average PM_{10} levels (should the Ashton SEOC Project commence) are predicted to exceed the 25 $\mu g/m^3$ EPA criterion in Year 2, Year 8 and Year 15 without the contribution from the Proposed Modification or the Approved Operations.

6.2 Noise

6.2.1 Agency Submissions

6.2.1.1 DPE

The Department has some reservations regarding the assessment methodology applied in the Noise Impact Assessment (NIA). The Department's preferred approach is to consider the worst-case noise impacts of a proposal, and to determine whether these impacts would meet the Project Specific Noise

Levels, subject to the application of all reasonable and feasible mitigation measures. By contrast, the NIA has applied an 'iterative approach', providing a series of 'optimised scenarios' to demonstrate that the modified development can comply with the existing noise criteria. The NIA states that various 'operational noise controls were...systematically implemented via a predictive process within the noise model, using a hierarchy of control options . . . to reduce the probability of exceedance of the noise criteria at the receivers of interest. This required multiple scenarios to be tested through the model; gradually refining and amending the type and level of operational controls applied for each meteorological scenario until the optimal combination was identified. '

Section 3.4 of the NIA provides an overview of the hierarchy of control options. However, it is not clear which control options were employed in the optimised scenarios.

The Department requests further information and justification regarding the assessment approach in the NIA. The RTS should clearly demonstrate that noise levels generated by the modified development are expected to comply with the existing noise criteria.

Modelling Overview

The Noise Impact Assessment (NIA) (Umwelt, 2018a) has been undertaken in accordance with the EPA Industrial Noise Policy (INP) (2000) and in a manner consistent with the Department's preferred approach. The application of "all reasonable and feasible mitigation measures" has been undertaken in the NIA and includes the simulation of current operational noise mitigation measures such as:

- Careful mine design including the orientation and elevation of main haul roads and the provision of less exposed overburden emplacement locations. These mine design processes are key mitigation measure informed by operational experience with potential impacts.

- The placement of machinery in less exposed locations under worst case meteorological conditions (a current mitigation measure undertaken by Mount Owen Mine in response to real-time noise monitoring and included in the current Noise Management Plan).

- The use of achievable equipment sound power levels for the proposed mining fleet.

The application of these reasonable and feasible controls in the NIA modelling replicates current operational practices at the Mount Owen Complex. The selection of mitigation measures modelled in the NIA was undertaken in consultation with relevant mine operation personnel to ensure that the models reflect achievable operational outcomes and represents best practice proactive and reactive mitigation measures. These mitigation measures are combined with the use of real-time noise monitoring to confirm the effectiveness of these measures. In addition, the adoption of 90% of meteorological conditions within the NIA modelling methodology to test the performance of the proposed reasonable and feasible mitigation measures is far more conservative and rigorous than the use of the prevailing conditions approach outlined in the INP (2000) and the Noise Policy for Industry (NPfI), 2017.

The use of the terminology "iterative approach" to describe the application of reasonable and feasible mitigation measures to the NIA modelling denotes the rigorous design, modelling and re-testing cycles used to ensure that the selection of mitigation measures provides achievable results under a range of potential real-world scenarios. This detailed modelling technique results in a more robust outcome, rather than simply relying on the selection of one set of possible controls.

The outcomes of the NIA, represented by the noise isopleths in Section 6.2 of the SEE are clear indicators that the noise levels predicted to be generated by the Proposed Modification under 90% worst case weather conditions are expected to comply with the existing SSD-5850 noise criteria.

NIA Modelling Approach

To investigate the effectiveness of the different control strategies the Proposed Modification was modelled in the Environmental Noise Model (ENM) using well-established modelling and analysis processes. The primary objective of the noise modelling process was to provide a prediction of the sound pressure level generated by the Proposed Modification at each receiver location for comparison against relevant noise standards. In this case, the relevant noise standards were the existing noise criteria under SSD-5850 and the existing Environmental Project Licence (EPL) 4460. If the predicted sound pressure levels exceeded the relevant noise criteria at a receiver location, control strategies were implemented in the model to reduce the noise emission level at the respective receiver location. The noise impact analysis of the Proposed Modification used an iterative process to assess the effectiveness of different noise control management measures that could be implemented during different stages of the mine life under different meteorological conditions.

The noise modelling of the Proposed Modification investigated a range of technically feasible noise control strategies that could be implemented over the long, medium or short term, which included the redesign of the later stages of the proposed mine plans. The probabilistic noise modelling approach was used to investigate the percentage of the time different feasible noise control strategies need to be implemented to meet the desired noise standards and to inform the mine design team on the effectiveness of the redesign of the mine in the latter stages of the mine's life.

As discussed in the SEE and the NIA, consistent with the Approved Operations, operational noise controls will continue to be implemented over the life of the Proposed Modification in order to meet the existing noise criteria. The implementation of these controls is consistent with the Approved Operations however the frequency and intensity of the use of the controls will change as a result of the Proposed Modification.

The refinements made to the operations for the optimised scenarios presented in the NIA were based on step-by-step changes to operational activities, centred on the following hierarchy of control options:

- Relocate or shut down ancillary equipment in exposed locations (e.g. rehabilitation and pre-strip dozers)
- Employ first-gear reverse for dozers in exposed locations
- Strategically relocate or shut down ancillary equipment (road construction maintenance, extra water cart(s), drill(s))
- Move activities to lower dumps, or night dumps
- Shut down exposed dozers and/or replace with rubber tyred dozers, and reduce speed of all other dozers
- Reduce speed of trucks, and
- Implement shutdown options based on waste/coal priority.

The hierarchy of control options was used in the NIA to enable the assessment of the potential noise impacts with indicative controls in place. The actual implementation of control options to ensure relevant noise criteria are met, will vary on a range of factors at any given time, including specific meteorological conditions, information from the real time noise monitoring system, and operational considerations at that time. The protocols for the implementation of these controls are well established and defined in the approved Mount Owen Complex Noise Managament Plan (NMP), (Mount Owen, 2017) .

It should be noted that the maximum level of control required to meet the existing noise criteria at each of the receiver locations identified in Schedule 3 Condition 5 of SSD-5850 is only required for the worst case meteorological conditions that are applicable according to the definitions in Appendix 4 of SSD-5850. The actual implementation of operational controls would occur on a sliding scale from initial machine relocations up to the maximum operational constraint proposed, dependent on the actual meteorological conditions at the time of operations.

Consistent with the approach to noise mitigation and management as part of Approved Operations, Mount Owen has committed to the ongoing implementation of noise control measures to minimise noise emissions to the extent practicable and to meet the existing noise criteria at surrounding private residences as part of ongoing operations. As a result of the Proposed Modification, the NMP will be amended to revise the protocol for the implementation of operational noise controls relevant to the Proposed Modification and the suitability of the noise management controls is to be assessed on an annual basis as part of ongoing review of operational risks to the Proposed Modification.

Outcomes

The noise models in the NIA demonstrate that the Proposed Modification can achieve the relevant noise criteria at all receiver locations under all temporal variations. The noise control strategies implemented in the NIA are considered representative of the control strategies that could be implemented over the life of the mining operation. During the operational stage of the Proposed Modification the selection of the noise control strategies to be implemented by the mine will depend on the receiver location being affected, the prevailing meteorological conditions at the time and the prioritisation of the production requirements. Over the life of the mine the production prioritisation will change to accommodate geological and geotechnical issues, waste management, coal quality, raw coal demand and the mine plan design that effects the drill and blast program, haul routes and lengths, and equipment placement.

During 2017 and to date during 2018, no exceedance of the noise criteria under SSD-5850 has occurred, indicating the existing noise monitoring network (including real-time noise monitoring) and operational noise controls are effective in the mitigation of noise impacts associated with the Approved Operations. The approach taken by Mount Owen is designed to maintain the current highly effective standard for the implementation of the noise control measures required for effective noise management.

The EPA has requested further detail regarding Glencore's proposed noise monitoring methodology. In particular, the EPA has requested clarification as to how noise contributions from the Mount Owen Complex would be distinguished from other mining operations in the locality.

A response to the submission from the EPA is provided below.

6.2.1.2 EPA

The proponent needs to provide appropriate noise compliance monitoring methodology that can be used to isolate/separate the noise contribution generated from the Mount Owen mine from adjacent mining operations.

In reviewing the noise assessment, the EPA is satisfied with the proposed noise limits. However, based on the information in the SEE, the proponent has not provided adequate information on an appropriate noise compliance monitoring methodology that can be used to separate the noise generated from the Mount Owen mine from adjacent mining operations. The EPA notes that the current Project Approval did not require this, but it is now relevant in respect of the proposed modification and EPA's support for the project.

The Approved Operations currently operate in accordance with an approved NMP (Mount Owen, 2017) subject to SSD-5850, which details the noise compliance monitoring methodology. The existing noise monitoring program at Mount Owen Complex is detailed in the NMP and includes a combination of unattended continuous noise monitoring and attended noise monitoring.

To determine the contribution of the Proposed Modification separate from the noise being generated from other adjacent mining operations Mount Owen will adopt a noise monitoring protocol guided by compliance monitoring practices outlined in Chapter 7, 'Monitoring Performance', of the Noise Policy for Industry (EPA 2017) (NPfI) and in Chapter 11, 'Reviewing Performance', of the INP (which the Project was assessed under). Both document guidelines are similar in intent, the diference being that the NPfI includes more detail. A brief summary of both guidelines is provided below:

NPfI Procedures

Section 7.1.1 of Chapter 7 titled, 'Options for noise monitoring', provides four options being:

1. Direct measurement at a receiver location;
2. Direct measurement at alternative or intermediate location/s;
3. Unattended monitoring; and
4. Modelling.

INP Procedures

In Chapter 11, options on how to 'determine the LAeq contribution from a particular industrial noise source' are provided in Section 11.1.2, 'Notes on Noise Monitoring', under the heading 'Determining the noise contribution from a development'. These options are:

1. Measuring existing noise levels with and without the premises operating;
2. Measuring the noise emissions from each of the premises at reference locations and then calculating the noise-emission levels back to the receiver; and
3. Using an accepted noise model calibrated for the particular locality and source.

All monitoring and data evaluation will be in accordance with regulator guidelines. The proposed compliance assessment methodology for the Proposed Modification will follow the guidance provided in the INP and NPfI.

In relation to the Proposed Modification, the feasibility of the available options considered when developing noise monitoring procedures to evaluate the noise contribution from the Proposed Modification are discussed in the following sections.

Direct measurement

Direct measurement is the primary method for determining compliance for the Proposed Modification. During measurement the consultant will use 'professional judgement' to 'determine the level of noise from the source under investigation' using standard monitoring practices. In the case of the Proposed Modiification there is also the need to evaluate if the Proposed Modification is a signifcant contributor. Specific protocols to be used in conjunction with direct monitoring to determine noise contributions will be developed and included in the NMP.

It should be noted that it is not feasible to start and stop operations of this scale during compliance monitoring as identifed as one of the available options in the NPfI.

Direct measurement at alternative or intermediate location/s

As noted in the INP this 'may be a viable option' requiring in advance 'well-established theoretical and/or empirical relationships between the intermediate location and the receiver location in terms of noise exposure', which may not be practicable for a specifc operational scenario as opposed to theoretical scenarios used for NIA modelling or project noise management planning. Additionally, there may be no suitable reference locations available for all monitoring sites that would be sufficiently far from a source operation to incorporate meteorological effects while also allowing measurement of that source in isolation.

The use of alternative or intermediate locations for monitoring will depend on specific location and surrounding terrain conditions.

Unattended monitoring

It is noted that this method 'should not generally be used as the sole means to determine compliance with a noise limit', rather, it 'can be used in conjunction with recorded noise and post processing and analysis to confirm sound sources and levels'. The NPfI notes that this option is really a noise management methodology rather than a compliance monitoring technique as it may be difficult to distinguish the subject noise source from ambient noise.

This method, while proposed for use in management of noise from operations (using the existing real-time noise monitoring network), is not proposed as a component of compliance monitoring procedures or to determine relative contributions from other mining sources.

Modelling

This method is recommended in the regulatory guidelines for situations where 'it will be impossible to determine whether a development is satisfying noise limits using direct measurement at a compliance location or intermediate locations', which may be the case at times for the Proposed Modification due to other noise sources. While in most cases compliance will be able to be determined by direct measurement following the protocols in Sections 3 and 4, where this is not possible, modelling will be used. This is consistent with the procedures in both the INP and NPfI.

It will be possible to obtain accurate topographical, operational and meteorological data for the monitoring period such that a noise model can be used to estimate relative contributions of the Proposed Modification separate from other mines.

As required by SSD-5850, the NMP is circulated to the EPA and the DPE for comment prior to approval by the Secretary of the DPE. Mount Owen proposes to include a specific protocol for noise compliance monitoring that enables the separation of the noise generated from the Proposed Modification from adjacent mining operations based on the INP and NPfI guidance framework outlined above. Mount Owen proposes to continue the NMP approach as it also allows for improvements to the monitoring regime to be implemented over time throughout the life of the project and as technological advances become available and practicable to implement.

Further amendments to the NMP are recommended to update the attended and continuous monitoring network as mining progresses, as described in the SEE, Section 6.2.5.3 and detailed in the NIA.

6.2.1.3 NSW Health

The SEE states that by continuing to implement all reasonable and feasible noise controls the predictive noise modelling demonstrates that the proponent can meet the existing noise criteria and not increase impacts on private receivers relative to the Approved Operations.

In order to minimise any adverse health effects on the surrounding community, the complaints management measures in the Noise Management Plan should include a mechanism that ensures remedial action will occur within an acceptable time-frame should problematic noise generation occur.

It is noted that the 2017 Annual Review for Mount Owen Complex indicates there was only one noise complaint received.

A dedicated Community Contact Line is in operation 24 hours per day, seven days a week. All complaints are thoroughly investigated, including use of digital audio files, environmental and meteorological monitoring data, in conjunction with operating records to determine any likely cause. Feedback to the complainant is provided as quickly as possible. Complaints are reported to senior management and feedback is provided to mine planning and production personnel, where relevant.

Real time noise monitoring (unattended monitoring) is used to assist with the investigation of complaints or noise related issues and to inform the site (via alarms) that noise levels are elevated and are nearing compliance limits. Each real time noise monitoring unit is designed to send alerts advising mining personnel that noise at the monitor is approaching performance criteria. Action can then be taken to modify the operations where appropriate.

As detailed in the approved NMP, the real time noise monitors have been setup to record directional, low frequency noise sources. Alarms have been set up to trigger if the noise source from the area of influence (direction of the operation) exceeds the predetermined level for a pre-defined period. Noise alarms are generally set for the evening and night time period, as during the day other sources of noise can set off the alarms. The alarms will continue to be triggered every 15 minutes if the noise from the area of interest continues above the trigger limit. In the event an alarm is triggered, the site records actions taken in response to the alarms in accordance with site procedures.

During 2017, and to date during 2018, no exceedance of the noise criteria under SSD-5850 has occurred.

Further detail in relation to noise and complaints management which is provided on the Mount Owen Complex website www.mtowencomplex.com.au.

6.2.2 Community Submissions

The SEE provides assessments on noise and air quality that may impact the surrounding land uses and sensitive receptors. The modelling for both air and noise impact on property 112 shows that there is not a significant impact on the current dwelling location, however the degree of error in the modelling is not sufficient to conclusively justify this position given the closeness of the isobars (Appendix 6 of SEE). Modelling is also based on a cumulative 24hr measure. Dust or noise impacts are not predominantly destructive over this time scale but more so in smaller time periods i.e. hourly.

The NIA was undertaken in accordance with the EPA Industrial Noise Policy (INP) (2000) and other current and relevant guidelines and policies relating to environmental noise resulting from the Proposed Modification. Noise modelling is not based on a 24 hour measure. The relevant noise prediction period varies in accordance with approved standards depending on whether the noise prediction is for short term (1 minute) sleep disturbance issues up to longer term (15 minute measurements) for longer day (7 hour), and night (9 hour) periods, which are used to evaluate amenity issues.

Modelling of noise and dust impacts is generally conservative, in that it will usually overpredict impacts as a precautionary approach. Should the Proposed Modification be approved, monitoring programs acceptable to EPA and approved by DPE will be implemented to determine the actual noise levels and dust levels, which will determine compliance with the relevant criteria at sensitive receptors including property 112.

6.3 Groundwater

6.3.1 Agency Submissions

6.3.1.1 DoI Water

Distance Proximity to Alluvial Aquifer Boundary - the proponent is required to install a low permeability barrier wall should the mine pit intercept or significantly interfere with the alluvial aquifer groundwater resource of Main Creek. Triggers for its implementation should be detailed in the Water Management Plan. (The NSW Aquifer Interference Policy 2012 should be addressed - refer to Submission Appendix A for additional information).

As detailed in Section 3.2.2 of the SEE, to inform the development of the conceptual mine plans for the Proposed Modification further detailed survey and assessment of the upper reaches of Main Creek was completed to confirm and map the extent of the Main Creek alluvium. The assessment of the extent of alluvium included review of available published data sets, in addition to detailed fieldwork comprising geophysical survey and targeted test pits. It is considered unlikely that the Proposed Modification will intercept or cause a direct take from the alluvial aquifer associated with Main Creek. However, it is recognised that the boundaries of alluvium can vary and the Mount Owen Complex Surface and Groundwater Response Plan (Mount Owen, 2017) will be updated to include the requirement for the installation of a low permeability barrier if further monitoring confirms any future interception of the alluvium.

Should the Proposed Modification be approved, the Mount Owen Complex Water Management Plan (WMP) will be updated to include the implementation of an appropriate monitoring program to determine if the Proposed Modification is likely to cause a significant impact on the alluvial aquifer water resource of Main Creek. A trigger action response plan (TARP) will be developed to guide the implementation of appropriate responses such as monitoring and mitigation measures (including the installation of a low permeability barrier if required). Triggers for the implementation of mitigation measures will be included in the updated WMP. Reference to a 'significant impact' will be in accordance with the NSW Aquifer Interference Policy (DPI Water 2012), Table 1 – Minimal Impact Considerations for Aquifer Interference Activities.

Licensing - Glennies Creek Water Source - the model impact projections identify a cumulative predicted peak take of 3 ML/y from the Glennies Creek Water Source alluvial aquifer during mining and 28 ML during the post mining period. The NSW Water Register identifies the presence of just two WALs totalling 10 units (ML). Glencore reports that they have consulted with the licence holders about a trade acquisition without success. Glencore have submitted a supplementary document outlining their preferred approach to address the licensable take with a transfer of entitlement from the Jerrys Water Source where they hold a surplus of alluvial access unit shares. However, Clause 72 of Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009 (the Plan) only permits trade into the Glennies Creek Water Source provided there is no net increase in shares from Plan commencement date, listed at 0 shares. Hence, there is no possibility for the transfer to legally occur at this point in time. Clause 72 also restricts trade from surface water to alluvial groundwater.

When interpreting the predicted changes in groundwater flow due to the Proposed Modification it is important to consider the predicted volumes in context. The predicted take of 3 ML/year for the Approved Operations and Proposed Modification is significantly lower than the previously predicted take of 15 ML/year modelled for the Continued Operations Project. Additionally the predicted change in flow due to both the Approved Operations and the Proposed Modification is distributed across a wide area which is considered to be undetectable and unmeasurable within the groundwater regime.

The predicted long term Quaternary alluvium groundwater take inclusive of the Approved Operations and Proposed Modification from the Glennies Water Source associated with depressurisation effects peaks at 27 ML/year, approximately 500 years post cessation of mining in North Pit. In considering the predicted long term groundwater take it is important to note the model predictions are for relatively small volumes of water centuries into the future which would be difficult to distinguish from natural variability within the groundwater system.

The supplementary documentation referenced by DoI Water in their submission, is a consultation letter (dated 8 August 2018) that was provided to DoI Water at a site meeting at Mount Owen Mine on 8 August 2018. The consultation letter outlined the proposed licencing strategy for the Proposed Modification, which is consistent with the licencing strategy that was accepted for the Continued Operations Project.

Further correspondence received from Ryan Shepherd (A/Manager Regional Water Regulation (East)), on 31 October 2018, confirms that the DoI now consider the proposed licencing strategy is appropriate providing the Proposed Modification is also subject to the current condition of consent that ensures Mount Owen has secured adequate entitlement prior to the actual take occurring.

Consent condition Schedule 3, Condition 26 of SSD-5850 states that *the Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations on site to match its available water supply*.

As detailed in the SEE, continued monitoring and modelling validation will occur in accordance with consent condition Schedule 3, Condition 26 of SSD-5850, in order to refine the water take predictions such that Mount Owen has all necessary licences for the Proposed Modification.

It is noted that Clause 72 of Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009 (the Plan) currently only permits trade into the Glennies Creek Water Source provided there is no net increase in shares from the Plan commencement date (listed at 0 shares). The licencing strategy to account for any predicted take from the Glennies Water Source (surface and alluvial) associated with the Proposed Modification will be met through the diversion of catchment areas from the Jerrys Water Source to the Glennies Water Source (or purchasing the appropriate WALs, or a combination of these approaches), not the transfer of licences from the Jerrys Water Source to the Glennies Water Source. While the transfer of water from the Jerrys Water Source to the Glennies Water Source must be accounted for as 'take' from the Jerrys Water Source, this is not a transfer of water licences from one source to the other as there is no net 'take' from the Glennies Water Source which would require licensing.

The Glennies Water Source is significantly constrained in terms of the number of units available. As discussed in the SEE, Mount Owen has current surface water allocations under the Hunter Unregulated WSP. Although Clause 72 also currently restricts trade from surface water to alluvial groundwater within the Glennies Water Source, it is understood that the trading rules are due to be reviewed in 2019 and at some point in the future, the transfer of surface water licences currently held by Mount Owen to alluvial licences may be possible. Mount Owen believe by allowing the use of surface water allocations the protection of downstream environmental values and water users can be achieved. Glencore will continue to engage with DoI water through the review process.

Mount Owen has investigated the availability of the two Glennies Water Source alluvial WALs (10 units) currently identified on the NSW Water Register and investigations in relation to acquiring relevant WALs will be ongoing.

6.3.1.2 EPA

The proponent needs to provide a revised groundwater monitoring plan. Note: The proposed modification of the pit boundary will remove existing monitoring bores SMO023, SMCO02 and SMO028. These bores monitor the deeper Permian formations, and are important for detecting any impacts on Bettys and Main Creeks.

Offset Monitoring Bores - the proposed modification pit boundary will remove three existing monitoring bores: SMO023, SMCO02, and SMO028. All three bores monitor the deeper Permian formations. Removal of these bores would cause blind spots in the existing monitoring network, possibly negating indications of impact to Bettys Creek and Main Creek. The establishment of three or more monitoring bores to counter the loss of the three existing bores is not proposed in the modification proposal.

Monitoring bores SMO023, SMC002 and SMO028 are located within the approved North Pit disturbance area and were therefore approved for removal consistent with SSD-5850. As identified by the EPA, these bores are vibrating wire piezometer (VWP) installations targeting the deeper Permian hard-rock formations at significant depth (down to approximately 210 m) and do not monitor the alluvial water resources of Bettys Creek and Main Creek. There is no measurable connectivity between the two water resources at the locations being monitored prior to mining. The ongoing groundwater monitoring program is recorded in the approved Groundwater Management and Monitoring Plan (Mount Owen, 2017)which will be revised should the Proposed Modification receive approval.

Two additional nested monitoring bores were installed in 2017 in the areas of greatest predicted drawdown in Bettys Creek (NPZ109S and NPZ109D) and Main Creek (NPZ108S and NPZ108D) alluvials, as idenitified in the groundwater modelling for the Continued Operations Project. A third nested monitoring bore was installed in Main Creek (NPZ107S and NPZ107D) adjacent to the area of additional disturbance for the Proposed Modification (**Figure 6.3**).

Rock Fractures from Mine Blasting - Review of the Blast Impact Assessment and the Groundwater Impact Assessment reveal rock blasts resulting from the expansion of the proposed mine modifications are predicted to extend 12m beyond the pit edge. The distance between the pit edge, the mapped extent of alluvium, and Main Creek is 150m and 160m respectively. To ensure fracturing does not extend further, routine monitoring of the pit edge and blast cracks should continue. Similarly, routine monitoring of Main Creek and its floodplain should continue to ensure subsurface fractures do not drain the alluvial system towards the mine void.

As discussed in Section 6.3.5.3 of the SEE, as part of current operational procedures, Mount Owen will continue to undertake regular stability and cracking monitoring along the high wall after blasting, in order to monitor any potential impact of blasting on Main Creek and the associated alluvium.

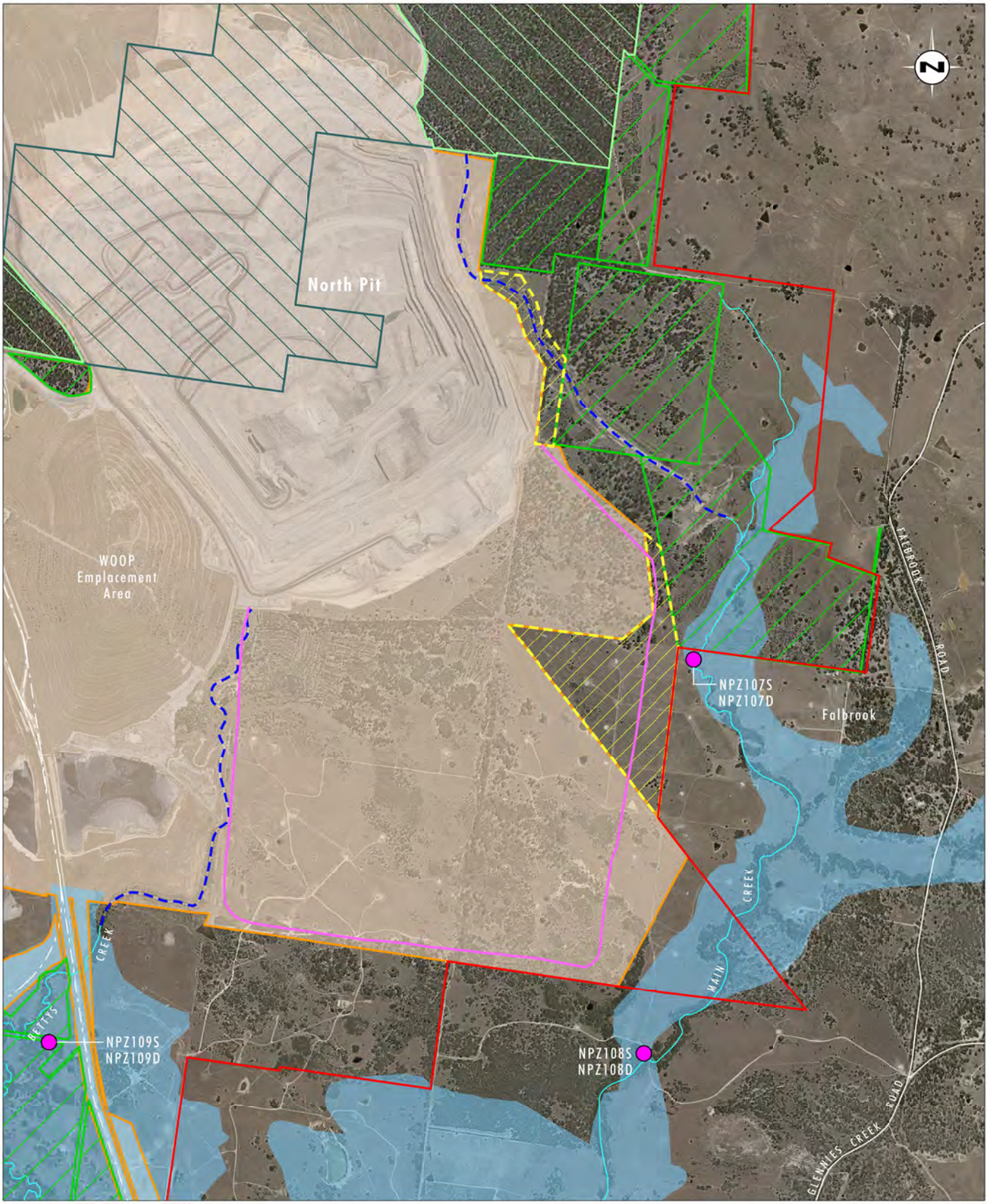


Image Source: Glencore (Feb 2017)
Data Source: Glencore (2018)

0 0.25 0.5 1.0km
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Legend

- Proposed SSD-5850 Modification Consent Boundary
- Approved Operational Area
- Additional Disturbance Area
- Proposed Modification Pit Boundary
- Existing Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Approved Operational Area
- Existing Bettys Creek Diversion
- Installed Groundwater Monitoring Location
- Refined Alluvium Mapping (AGE 2017)
- Drainage Line

FIGURE 6.3

Additional Groundwater Monitoring Locations

File Name (A4): R17/3810_251.dgn
20181213 11.26

Impacts to Alluvial Aquifers - The alluvial systems of the Glennies Creek tributaries overly the Permian formations currently mined at Mount Owen. The mine void at the cessation of mining activities will act as a groundwater sink for the local hard rock aquifers (Permian rocks) across the mine area. The void will continuous fill until an equilibrium is reached when the re-pressurisation of the Permian formations returns to pre-mining levels. The report estimates that equilibrium will be reached at -65m AHD. Salinity in the void will increase due to evaporation of surface water. However, as the void water level will be below that of alluvial systems (around +100m AHD), the possibility for saline impact on alluvial systems is negligible.

There is a potential for the saline surface water in the mine void to recharge the Permian layers and increase the salinity of the hard rock aquifers. It is therefore suggested monitoring continue well past mining activities have ceased.

Groundwater from hard rock aquifers will gradually seep into the final void and re-pressurise the Permian strata slowly over time. Final void water levels are predicted to be about 120 to 140 m below pre-mining groundwater levels. A steep hydraulic gradient between the final void and the groundwater systems will remain creating a permanent 'sink' for groundwater flow but will result in an undetectable drawdown from the alluvial aquifers, consistent with the Approved Operations.

Ground and surface water monitoring will continue to be undertaken in accordance with the WMP during rehabilitation and closure of the Mount Owen Complex. The required post closure water management and monitoring measures to be implemented as part of the establishment of the final landform and ongoing management of the site will be investigated and confirmed through the development of the Mine Closure Plan for the Mount Owen Complex (to be prepared when the remaining life of mine is less than 5 years).

6.3.2 Interest Group Submissions

6.3.3 Community Submissions

Detrimental water impacts are also highlighted in the report, with the abandoned mining pits forming saline lakes over time. The scale and the size of these voids will sterilise that land for any future use for other industries.

Post-mining water will evaporate from the proposed final void lake surface drawing in groundwater from the surrounding geological units and forming a sink in the groundwater regime. The water balance model developed for the Proposed Modification indicates the evaporation from the proposed final void lake surface will concentrate salts in the lake slowly over time. The gradually increasing salinity will not pose any risk to surface water sources as the final void will remain a permanent sink with a steep hydraulic gradient between the proposed final void and the surrounding Permian strata.

The analysis also indicates that the void water will have a salinity level, measured as total dissolved solids (TDS), of approximately 5,200 mg/L at the time of equilibrium. TDS levels ranging from 1,500 mg/L to 7,000 mg/L are considered to be moderately saline.

The Food and Agricultural Organisation of the United Nations (FAO, 2013) provide the following categories for assessing salinity based on TDS concentrations (ranging from fresh to extremely saline) at the following levels:

- Fresh water <500 mg/L
- Brackish (slightly saline) 500 to 1,500 mg/L
- Moderately saline 1,500 to 7,000 mg/L

- Saline 7000 to 15,000 mg/L
- Highly Saline 15,000 to 35,000 mg/L
- Brine >35,000 mg/L.

A TDS concentration greater than 4,500 mg/L is generally considered unsuitable for irrigation however salinity in the range of 5,000 to 10,000 mg/L is considered suitable for some stock watering (mature cows and sheep), recreation, industrial water use and for the maintenance of natural ecosystems. It is considered that the final landform has a variety of potential post-mining uses including renewable energy generation, industrial/manufacturing uses, industrial agriculture, specialized training facilities, active recreation, aquaculture, waste management, ecological restoration, research and education, as outlined in Table 6.22 in the SEE.

6.4 Surface Water

6.4.1 Agency Submissions

6.4.1.1 DPE

The EPA has requested a detailed assessment of all mine and sediment dam discharges, and associated impacts on downstream receiving waters.

A response to the EPA submission is provided below.

6.4.1.2 EPA

Sediment dam water discharges are likely to contravene s120 of POEO Act and HRSTS Regulation –Table 3.3 in Appendix 10 shows eight proposed sediment dam volumes. These dams are proposed to be designed and managed in line with the Blue Book (Managing Urban Stormwater: Soils and Construction Volumes 1 and 2E) for 5-day 95th percentile rainfall events and discharge above the criteria to Bettys Creek and Main Creek. The SEE estimated that 41 ML per year are likely to be discharged from these sediment dams, which is a reduction of 39 ML per year from the previous approved development consent.

The assessment of water quality show that the dirty water dams, should they discharge to waters, would likely contravene Section 120 of the POEO Act and the HRSTS Regulation. This can be demonstrated by the SEE water quality analysis that show:

- ***electrical conductivity of dirty water dams (sediment dams) ranged from 600 to 4170 µs/cm (Section 2.3.4 of Appendix 10);***
- ***pH and electrical conductivity of dirty water dams and mine water dams are above surrounding waters (see box plots Figures A to C of Appendix A in Appendix 10 for comparison); and***
- ***dirty water systems (sediment dams) have metal concentrations that exceed the clean water dams and surrounding waterways. (Figures S to U and Figures AA to AE Appendix A of Appendix 10).***

Discharges from the dirty water dams (sediment dams) must meet section 120 of the POEO Act and the HRSTS Regulation. The HRSTS Regulation requires that all water with an electrical conductivity of more than 400 µs/cm must be managed as part of the mine water system and only discharged in accordance with the HRSTS Regulation. As the Mount Owen Mine is part of the GRAWTS scheme this would relate to Mount Owen. Environment Protection Licence 4460 for Mount Owen does not authorise any discharges unless they meet section 120 of the POEO Act.

The environmental impact of sediment dam water discharges has not been assessed – The proponent needs to provide full assessment of all mine and sediment dam discharges including a mixing zone assessment, assessment of the likely impacts on aquatic habitat and aquatic biota which should include a description of the habitat, geomorphology and limnology and assessment of downstream impacts on other receiving waters.

Further to the above, and given that the continuation project and modification propose to discharge 41 ML per year from sediment dams, the proponent has failed to undertake any environmental impact assessment of the discharges of sediment dams on Main Creek, Bettys Creek and Glennies Creek. The SEE has identified that sediment dams will be required as part of this modification and that this modification will result in a reduction of 39 ML per year of outflow from sediment dams from the approved development, with a likely 41 ML per year of discharge from sediment dams by year 8.

Mount Owen does not have a licence to discharge mine water under the Protection of the Environment Operations (Hunter River Salinity Trading Scheme (HRSTS)) Regulation 2002, Section 6. As a legacy of previous active participation in the HRSTS, Mount Owen holds a residual five credits in the HRSTS. These credits are proposed to be transferred to another Glencore mining operation actively participating in the HRSTS.

The Mount Owen Complex Water Management System (WMS) is designed to enable Mount Owen to manage and operate the Approved Operations to meet licence conditions within the requirements of the POEO Act, taking account of both historical and current water qualities in the surrounding watercourses, and current and future downstream water users.

Water management is undertaken in accordance with the approved WMP (Mount Owen, 2018) (consistent with the requirements of SSD-5850) which provides a management framework for all aspects of water management including the Sediment and Erosion Control Plan, the Surface Water Management and Monitoring Plan, the Groundwater Management and Monitoring Plan, the Surface and Groundwater Response Plan and the Creek Diversion Plan.

The objectives of the WMP and functions of the WMS are to:

- satisfy regulatory requirements, including meeting required performance criteria;
- divert clean water around mining operations to minimise capture of upslope runoff and separate clean water runoff from mining activities;
- segregate mine impacted water and runoff from undisturbed and revegetated areas with better water quality to minimise the volume of mine impacted water that requires reuse;
- reuse mine impacted water within the WMS and within the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) to reduce reliance on raw/clean water (that is, extraction from Glennies Creek); and
- minimise adverse effects on downstream waterways (including hydraulic and water quality impacts).

Consistent with the Approved Operations, no planned mine water discharges will occur from the Mount Owen Complex as a result of the Proposed Modification with any surplus water transferred via the GRAWTS. The GRAWTS, through the managed use of shared water storages and water reuse across multiple mine sites, minimises the total volume of water extracted from surrounding watercourses and reduces the need for excess water to be discharged to the Hunter River via the Hunter River Salinity Trading Scheme (HRSTS). Discharge from the GRAWTS utilises the licenced discharge points at either Ravensworth Operations or Liddell Coal Operations.

The purpose of the sediment dams within the dirty water management system is to manage runoff from disturbed areas. The sediment dams do not include runoff from areas exposed to coal or water used in coal processing or from coal stockpile areas. The dirty water management system is, and will continue to be, designed in accordance with Managing Urban Stormwater: Soils and Construction (the Blue Book), Volumes 1 and 2E - Mines and Quarries (Landcom 2004 and DECC 2008) to manage runoff from the 5 day, 95th percentile rainfall event (i.e. a rainfall depth of 51.3 mm). The selected design criteria is in excess of the minimum recommended design criteria for sediment dams as outlined in Volume 2E of the Blue Book (DECC, 2008) which is the 5 day, 90th percentile rainfall event (i.e. a rainfall depth of 35.9 mm). Volume 2E of the Blue Book (DECC, 2008) indicates that for the 95th percentile design storm event the indicative average annual sediment basin overflow frequency will be 1 to 2 spills per year. These spills will only occur from sediment dams within the dirty water system and not from the mine water system, which is contained on the mine site within systems designed to a higher design criteria. The design criteria for mine water is containment for events up to and including the 1 per cent Annual Exceedance Probability (AEP) 24 hour storm event (i.e. a rainfall depth of 80.8 mm).

The spill volumes presented in the Surface Water Impact Assessment (Appendix 10 of the SEE) consider all modelled spills from dams for three mine stages for the full range of historical rainfall conditions (i.e. over 100 years of rainfall data). These numbers represent the full predicted spills over the range of meteorological conditions and include spills that would be detained within the WMS, as opposed to solely the volumes of spills that may enter the local drainage systems under high rainfall conditions.

The EA 2014 has established a site-specific trigger value (SSTV) for electrical conductivity as 2,200 µs/cm. It is unclear why this value was chosen by the proponent, except that it is the upper limit of the Australian and New Zealand Environment Conservation Council ("ANZECC") default trigger value for eastern New South Wales. The actual default trigger values for lowland rivers are between 125 and 2200 µs/cm. choosing the upper limit of this default value is misleading without an adequate assessment of regional and local water quality data and the riparian and instream habitat and biota to be protected. Figure H of Appendix 10 show that only three points are above 2,200 µs/cm electrical conductivity for water quality monitoring data from Main Creek from 2008. It appears that the mean, medians and a large percentage of electrical conductivity data are well below 2,200 µs/cm. There is no tangible explanation of why 2200 µs/cm is an acceptable SSTV. This is even more pertinent when an environmental assessment of Main Creek has not been undertaken to assess the impacts of the mine and sediment dam discharges against the water quality objectives of the water source. An assessment of environmental values of the water source has not been undertaken, apart from a stygofauna assessment of the alluvium. The stygofauna assessment of Main Creek alluvium did not find any stygofauna with the depth of alluvium in the mid to upper creek not sufficiently established to support these macroinvertebrates.

The water quality monitoring of Main Creek only extends back to 2008. By this time the Creek is likely to have been impacted by mining with the Mount Owen mine and Ravensworth East mine already well developed and ongoing. An assessment of potential impacts on Glennies Creek, as the receiving water source for Main Creek, should have also been undertaken as this water source has environmental and community value which has not been considered at this time.

An assessment of a continuous water quality data from 1993 to present for Glennies Creek at Falbrook shown in Figure 1 below (https://realtimedata.waternsw.com.au/) shows a mean daily electrical conductivity of 415 µs/cm and 90th percentile values of 650 µs/cm. Any assessment of mining and dam discharges should also consider downstream impacts on this water source.

As detailed in the approved Surface Water Management and Monitoring Plan (Mount Owen, 2017), the trigger values developed for the surface water monitoring program for the Mount Owen Complex are based on monitoring results, however where the 80th percentile value was lower than the ANZECC (2000) guidelines, the ANZECC (2000) default trigger values have been selected as the trigger value for the relevant parameter. As monitoring continues the results will be reviewed and the trigger values updated if required. Any update to the trigger values will be undertaken in accordance with the methods outlined in the ANZECC (2000) guidelines.

There are currently three water quality monitoring locations on Main Creek (one upstream, one mid-stream and the third downstream of the Mount Owen Complex). Water quality will continue to be monitored at these locations consistent with the Approved Operations. It is noted that Main Creek is an ephemeral stream and regularly has no flow, and as a result salinity levels can be elevated without the influence of mining. Watercourse monitoring will continue which includes monitoring of the Upper Bettys Creek Diversion and Main Creek on an annual basis for watercourse stability and stream health. Mount Owen will include two additional surface water quality monitoring points on Glennies Creek, one located upstream and one downstream of the junction with Main Creek to provide improved understanding of the influence of Main Creek on the environmental and community values associated with Glennies Creek.

The updated Mount Owen Surface Water Management and Monitoring Plan will also include water quality monitoring provisions to monitor for acid rock drainage (ARD) generation.

As previously discussed management of potential water quality impacts throughout the life of the operations will be undertaken through the ongoing implementation of the WMS. In conjunction, a series of erosion and sediment control measures will be implemented during operation and rehabilitation stages to contain mine affected water and protect downstream environments from contamination.

Through the management of dirty water and mine water within the WMS over the life of the operations, reduction of peak flood flows and management of flow velocities to control scour potential in Main Creek, with consideration of the proposed mitigation measures, it is not anticipated that water quality in any downstream waterways (including Glennies Creek) will be adversely impacted as a result of the Approved Operations or the Proposed Modification.

6.4.1.3 OEH

More information is required about changes to the flood risk to Hebden Road. More information is required in the Surface Water Impact Assessment by Engeny Water Management (Appendix 11 of the Statement of Environmental Effects) to enable OEH to adequately assess the increased flood risk on Hebden Road from this project. The flood impact assessment identifies that there will be adverse flood impacts over Hebden Road resulting from the proposed flood mitigation measures. Although these impacts are described as negligible, the changes in peak flows, depths and velocity are not quantified. Hebden road is a public road and any adverse changes in flood risk needs to be defined in the assessment report.

OEH recommends that the proponent quantify changes in peak flows, depths and velocity over Hebden Road resulting from the proposed flood mitigation measures.

Mount Owen previously committed to providing additional off-line detention capacity at the Ravensworth East mine infrastructure area and the implementation of flow conveyance at Hebden Road, in order to address potential flooding issues in Yorks Creek in the vicinity of Hebden Road.

Revised flood mitigation works are now proposed under the Proposed Modification, consisting of the following:

- Dam 5 Spillway Culvert - Conversion of the top 63 ML of dam storage into detention attenuation volume through modification of the existing outlet structure, and

- Dam 6 Spillway Culvert - Conversion of the top 84.5 ML of dam storage into detention attenuation volume through modification of the existing outlet structure.

As discussed in Section 6.5.4.2 of the SEE and Section 5.3.1 of the Surface Water Impact Assessment (Engeny, 2018), the potential impacts of flooding with the proposed changes to flood mitigation works on Yorks Creek were assessed by WSP Parsons Brinckernoff (2017) using a hydrologic model (XP-RAFTS) and a hydraulic model (HEC-RAS) to represent the catchment areas and creek system.

The modelling indicated negligible increases in peak flows, depths, velocity and time of high hazard conditions for vehicles over Hebden Road for the proposed flood mitigation measures when compared to the flood mitigation measures proposed for the Approved Operations final landform scenarios.

As requested by OEH additional data regarding the modelling outcomes is included below.

The modelling indicates minor increases in peak flood depths over Hebden Road with no changes to peak flood hazard categories over Hebden Road during the 5% and 10% AEP events. The modelling indicates an increase in flood hazard category for the 1% AEP event results, from Wading Unsafe to Damage to Light Structures, i.e. the road would still remain impassable to vehicles. However, it should be noted that the increase in flood hazard category between the Approved Operations and the Proposed Modification final landforms during the 1% AEP flood event is driven by an increase in peak velocity of 0.01 m/s and an increase in peak flood depth of 0.01 m. This is reflected by a negligible change in velocity X depth (V X D) values (refer to **Table 6.5**). The change in the flood impact hazard at Hebden Road between the Approved Operations and the Proposed Modification final landforms is considered to be negligible..

Table 6.5 Modelled Peak Flood Depths – Over Hebden Road

Scenario	1% AEP	5% AEP	10% AEP
Approved Operations Final Landform	0.75 m	0.55 m	0.49 m
Proposed Modification Final Landform	0.76 m	0.58 m	0.49 m

Table 6.6 Modelled Peak Flood Hazard Categories – Over Hebden Road

Scenario	1% AEP	5% AEP	10% AEP
Approved Operations Final Landform	Wading unsafe	Wading unsafe	Vehicles unstable
Proposed Modification Final Landform	Damage to light structures	Wading unsafe	Vehicles unstable

Table 6.7 Modelled Peak velocity X depth (VXD) – Over Hebden Road

Scenario	1% AEP	5% AEP	10% AEP
Approved Operations Final Landform	0.99	0.61	0.51
Proposed Modification Final Landform	1.01	0.67	0.52

6.4.2 Community Submissions

That water is so precious that we continue to destroy the whole water network system, How many now are experiencing in our state related to lack of water and yet we continue to destroy the one resource that sustains life.

As discussed in Sections 6.5.2 and 6.5.2.1 of the SEE, the WMS at the Mount Owen Complex is an integrated system which manages the water from the Mount Owen, Ravensworth East and Glendell Mines. The GRAWTS allows greater flexibility in the management of water by Mount Owen and other participating operations, allowing increased recycling of water between operations which limits the requirement to extract water from surrounding watercourses. Mount Owen currently hold the required WALs to account for the predicted water take during mining operations. As discussed in **Section 6.3.1**, Mount Owen are proposing a licencing strategy to address the predicted post mining water take.

As per the Approved Operations, the Mount Owen EPL (EPL 4460) does not permit the discharge of water from the premises to the environment and does not allow for discharge of mine water under the Hunter River Salinity Trading Scheme (HRSTS). There are no licensed discharge points from the Mount Owen Complex to any creek systems. Water captured within the WMS is reused on site with surplus water transferred from the Mount Owen Complex to storages within the GRAWTS in accordance with existing approvals. There is also approval for the GRAWTS to discharge from Ravensworth Operations and Liddell Coal Operations licensed discharge points, in accordance with the HRSTS.

Consistent with the Approved Operations, the proposed conceptual final landform proposes a natural landform design incorporating micro-relief design elements through the life of the operation, conservation (including establishing native vegetation and habitat corridors) and water management to return additional catchment to Main Creek, reduce dirty water catchment and expedite return of clean water to the natural catchments. The final landform design incorporates drainage lines to convey upstream catchment runoff away from the final void and into downstream watercourses (particularly Main Creek). The final void recovery analysis for the Proposed Modification indicates that the void will likely reach equilibrium water level at approximately -65 mAHD. At this level the void would have a freeboard (i.e. vertical elevation to spill point) of approximately 155 m resulting in there being negligible risk of potential spill to the environment.

6.5 Biodiversity

6.5.1 Agency Submissions

6.5.1.1 DRG

The Division requests to be consulted in relation to the proposed location of any biodiversity offset areas (both on-site and off-site) or any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration or potential for sterilisation of mineral or extractive resources.

Should the biodiversity offset strategy for the Proposed Modification include a land based offset option, Mount Owen will consult with DRG during the review of the biodiversity offset strategy, following determination.

6.5.1.2 OEH

The Biodiversity Assessment Report provides insufficient details on the biodiversity offset package for OEH to assess. Chapter seven of the BAR provides a summary of the proposed biodiversity offset strategy which may include a land-based offset (the Fallbrook Biodiversity Offset site) secured by a Stewardship Agreement, or buying and securing appropriate credits from the open market, or payment into the Biodiversity Conservation Fund, or a combination of these options. Appendix D of the Biodiversity Assessment Report presents a BioBanking credit report from the BioBanking Credit Calculator for this offset, but in the absence of any other data being provided, it is not possible to check this calculation. If the calculation is correct, then the Fallbrook Offset would meet almost all of the biodiversity offset requirements; the exception being 0.2 hectares of Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley. OEH notes that the proponent proposes to meet with OEH later and then finalise its biodiversity offsetting strategy.

The proponent must provide more information on the proposed biodiversity offset strategy in the 'Response to Submissions Report' for OEH to provide comment on it.

Mount Owen is committed to delivering a biodiversity offset strategy that appropriately addresses the unavoidable loss of ecological values as a result of the Proposed Modification. The biodiversity offset strategy presented in the SEE was developed in accordance with the Framework for Biodiversity Assessment (FBA) and the NSW Biodiversity Offsets Policy for Major Projects and included the following options:

- In-perpetuity conservation through the establishment of proponent-managed Stewardship Site, achieved through the retirement of credits,
- Securing required credits through the open credit market, and/or
- Payments to the Biodiversity Conservation Fund (established under the *Biodiversity Conservation Act 2016).*

At a broader level, Glencore has a proven track record for successfully acquiring and managing land-based offsets for its projects in the Hunter Valley. Currently, Glencore manages over 10,500 ha of biodiversity offsets across NSW to meet State and Commonwealth legislative requirements. Glencore maintains a proactive approach to identifying and acquiring biodiversity offsets for its projects. Glencore's approach considers the range of options that are available to secure biodiversity offsets in accordance with current government policy.

Mount Owen will explore all options, listed above, to meet the biodiversity offset requirements for the Proposed Modification, once all relevant information is available in relation to the credit values applicable to the Proposed Modification.

Mount Owen has undertaken preliminary surveys of a Glencore owned land parcel adjacent to the Proposed Modification (known as the Falbrook Site, refer to **Figure 6.4**) which could potentially be utilised as a Stewardship Site, should Mount Owen decide to pursue the retirement of the applicable credits via the establishment of a proponent-managed Stewardship Site. Surveys of the Falbrook site included:

- Detailed floristic and vegetation mapping surveys in December 2017 and April 2018 including 154 systematic plot-based surveys (one located in each vegetation zone identified), 134 rapid vegetation assessment points and collection of biometric data in accordance with BBAM 2014 (OEH 2014c) across the Falbrook Site and surrounds to allow a preliminary BioBanking credit calculator assessment to be completed.

- A total of 13 (2 located directly within the Falbrook Site) baited remote cameras across a wider area targeting the brush-tailed phascogale (*Phascogale tapoatafa*).

- A total of 13 (1 located directly in the Falbrook Site) targeted winter bird surveys in July 2016, including bird surveys and call playback targeting the regent honeyeater and swift parrot.

The Falbrook Site is located proximate to the Mount Owen Complex, conserving vegetation and habitats close to the area of additional disturbance and with other existing Biodiversity Offset Areas and Ravensworth State Forest (refer to **Figure 6.4**). The Falbrook Site contains the following key biodiversity features relevant to the Proposed Modification (refer to **Figure 6.5**):

- 88 ha of PCT1601/HU815 Spotted Gum - Narrow-leaved Ironbark-Red Ironbark shrub - grass open forest of the central and lower Hunter.

- 21.5 ha of PCT1691/HU905 Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter.

- 30.7 ha of habitat for the species-credit species brush-tailed phascogale.

- Proximity to the impacts of the Proposed Modification (i.e. immediately to the north-east of the area of additional disturbance).

The majority of the biodiversity credits required for the Proposed Modification could be secured within the Falbrook Site (refer to **Table 6.8** below for a full balance of biodiversity credits). The small number of remaining ecosystem credits (12 ecosystem credits in total) could be secured by investigating Glencore's other available offsetting properties, purchasing credits on the open market and/or paying into the Biodiversity Conservation Fund. This will be confirmed and detailed as part of finalising the Biodiversity Offset Strategy, in consultation with OEH and DPE and in accordance with the requirements of modified development consent (SSD-5850). Should Mount Owen choose to pursue this option a full Biodiversity Credit Report for the Falbrook Site will be submitted for review prior to a Stewardship Agreement being entered into over the site.

Table 6.8 Offset credit outcome with inclusion of Falbrook Site

Name	Credits Required	Credits Generated by the Falbrook Site	Credit Surplus	Credit Shortfalls
Ecosystem Credits				
HU815 – Spotted Gum - Narrow-leaved Ironbark - Red Ironbark Shrub - Grass Open Forest Slopes of the Central and Lower Hunter	984	987	3	0
HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley	66	292 (under like for like rules offset with HU905)	226	0
HU945 – Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley	12	0	0	12
Total	**1,062**	**1,279**	**229**	**12**
Species Credits				
brush-tailed phascogale (*Phascogale tapoatafa*)	177	218	41	0

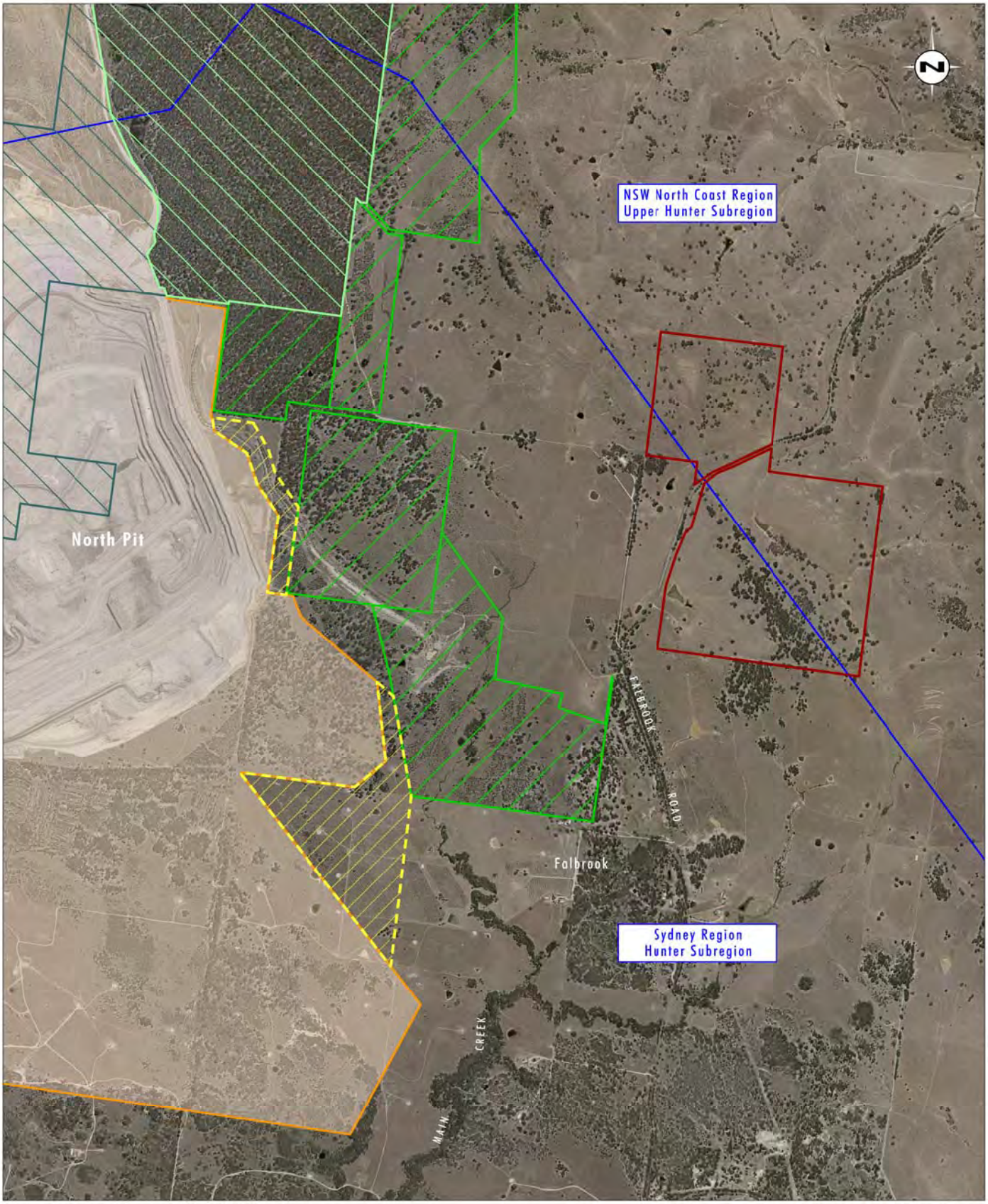


Image Source: Glencore (Feb 2017)
Data Source: Glencore (2017), Australian Government Department of the Environment (2012)

0 0.5 1.0 1.25km
1:25 000

Legend

- Additional Disturbance Area
- Approved Operational Area
- Falbrook Site
- Existing Biodiversity Offset Area
- Ravensworth State Forest
- Ravensworth State Forest within Approved Operational Area
- IBRA V7 Region/Subregion

FIGURE 6.4

Location Map - Falbrook Site

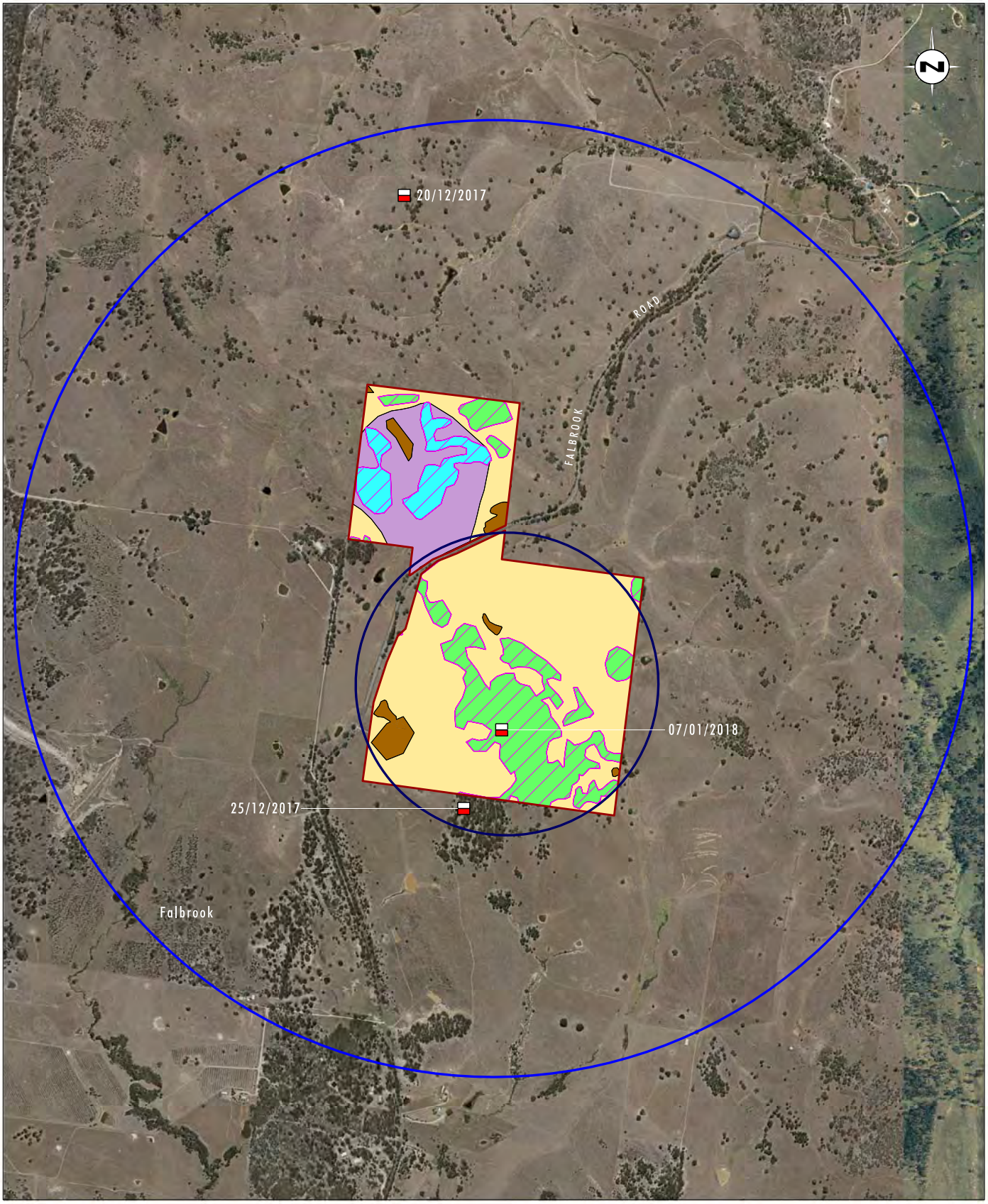


Image Source: Glencore (Feb 2017)
Data Source: Glencore (2017), Department of Finance, Services & Innovation (2017)

0 0.25 0.5 1.0km
1:20 000

Legend

- Falbrook Site
- 100ha Assessment Circle
- 1000ha Assessment Circle
- Cleared/Non-native Vegetation
- Brush-tailed Phascogale Habitat
- Brush-tailed Phascogale Record

Vegetation Communities:

- Zone 1 - PCT1601/HU815 Spotted Gum - Narrow-leaved Ironbark-Red Ironbark Shrub - Grass Open Forest of the Central and Lower Hunter - Moderate to Good
- Zone 2 - PCT1601/HU815 Moderate to Good Derived Native Grassland
- Zone 3 - PCT1691/HU905 Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter - Moderate to Good
- Zone 4 - PCT1691/HU905 Moderate to Good - Derived Native Grassland

FIGURE 6.5

Falbrook Site Biodiversity Features

File Name (A4): R17/3810_247.dgn
20181211 10.49

Some details were missing from the Biodiversity Assessment Report. OEH assessed the BAR prepared for this project against the requirements of the Framework for Biodiversity Assessment. In doing so a few minor matters were not provided.

OEH recommends that the proponent provides the following information in the 'Response to Submissions Report' to complete the Framework for Biodiversity Assessment:

> ***i. a map of the final project footprint, including construction and operation (as per Section 8.8 of the Framework for Biodiversity assessment) and***
>
> ***ii. a map of matters for further consideration that shows the 20-metre wide buffer either side of Betty's Creek Diversion and the 6.8 hectares of potential foraging habitat for the swift parrot in the development footprint.***

Figure 1.3 indicates the area of additional disturbance relevant to the Proposed Modification. As discussed in Section 2.2 of the SEE the Proposed Modification relates to approved mining operations within the North Pit only, with no change to the Approved Operations within Ravensworth East or approved infrastructure including coal processing and transportation infrastructure.

Also, please refer to **Figure 6.6** which illustrates the 20-metre wide buffer either side of the Betty's Creek Diversion and **Figure 6.7** which identifies the 6.8 ha of potential foraging habitat for the swift parrot within the area of additional disturbance.

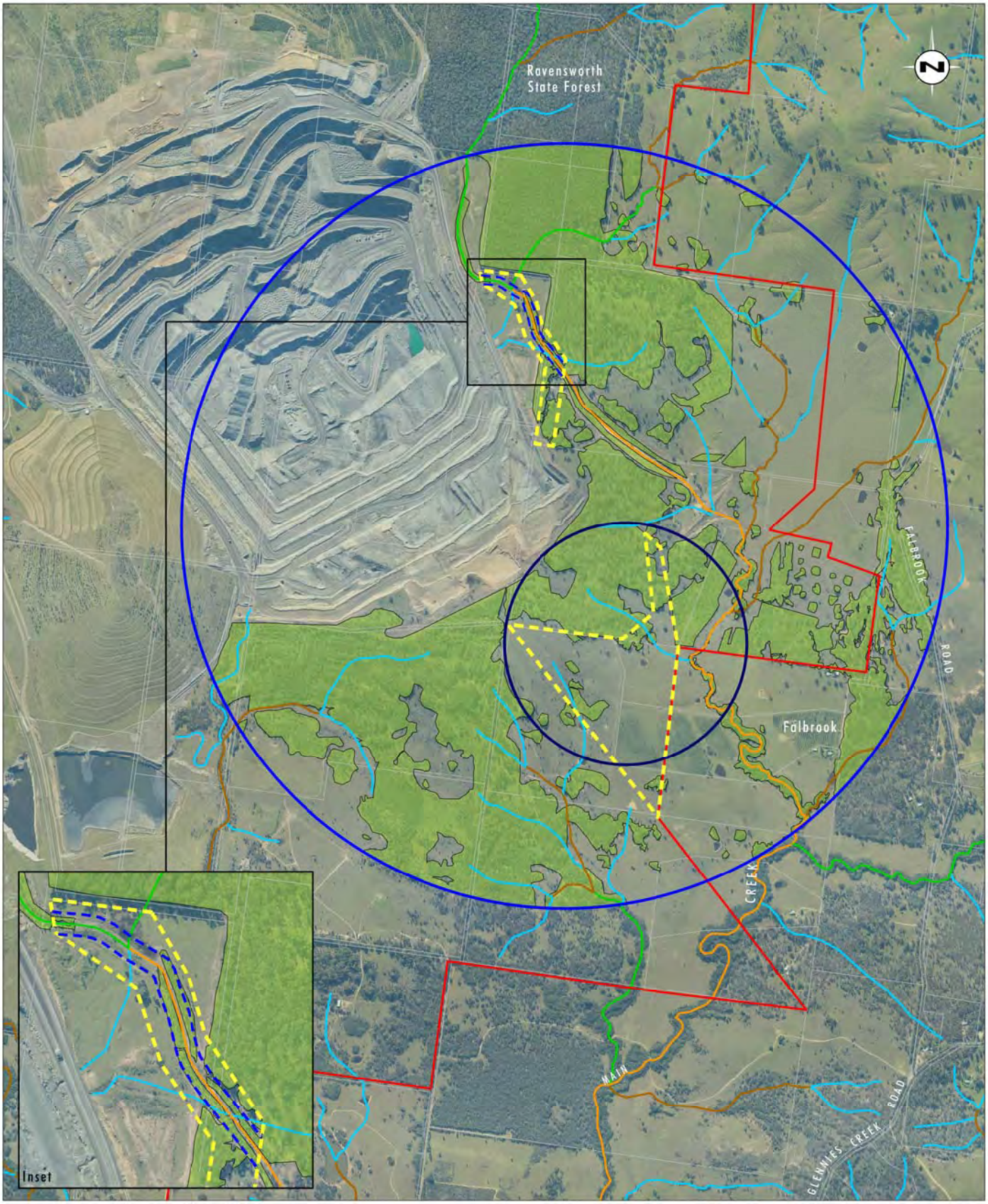


Image Source: Glencore (July 2017)
Data Source: Glencore (2017), OEH (2013), Department of Finance, Services & Innovation (2017),

0 100 200 400m
Inset

0 0.25 0.5 1.0km
1:25 000

Legend

- Proposed SSD-5850 Modification Consent Boundary
- Additional Disturbance Area
- 100ha Assessment Circle
- 1000ha Assessment Circle
- Native Vegetation within Assessment Circles
- 20m Buffer

Stream Order:

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream

FIGURE 6.6

Connectivity Value Analysis
Bettys Creek Diversion Buffer

Image Source: Mount Owen (July 2017)
Data Source: Mount Owen (2017), ATLAS Database (2017)

0 250 500 750m
1:15 000

Legend

- Proposed SSD-5850 Modification Consent Boundary
- Additional Disturbance Area
- Potential Swift Parrot Habitat
- Potential Koala Habitat
- Potential Regent Honeyeater Habitat
- Bettys Creek Diversion
- Drainage Line
- Green and Golden Bell Frog
- Spotted-tailed Quoll
- Swift Parrot
- Large-eared Pied Bat
- Koala
- Grey-headed Flying-fox

FIGURE 6.7

EPBC Act-listed Threatened Species and Habitats Recorded in and around the Area of Additional Disturbance

File Name (A4): R17/3810_249.dgn
20181211 15.07

6.5.2 Interest Group Submissions

6.5.2.1 Environmental Planning and Land Management Consultants

Options for avoiding biodiversity impacts have not been seriously considered. Relevant options need to be identified, and must form part of the environmental impact assessment.

As discussed in Section 6.6.4.1 of the SEE, Mount Owen has sought to avoid and minimise potential impacts on the ecological values of the area of additional disturbance throughout the planning process. This planning included targeted avoidance and minimisation of disturbance of key vegetation communities through maximising the use of existing mining facilities, and the avoidance of all areas of the Central Hunter Valley Eucalypt Forest and Woodland Critically Endangered Ecological Community (CEEC) recorded outside of the Approved Operational Area. The area of additional disturbance comprises disturbed and low quality vegetation in the form of derived native grasslands and a disused olive grove plantation. The derived native grasslands represent lower quality habitat for a range of threatened species. Native forest, woodland and plantation areas comprise less than 20% of the area of additional disturbance and the larger and higher quality remnant patches of native forest and woodland have been avoided.

The area of additional disturbance is set back from Main Creek which provides riparian habitat linking the large areas of remnant woodland and forest to the north as part of the Ravensworth State Forest and existing offset areas to the areas of remnant woodland and forest in the south including riparian habitat along Glennies Creek.

Offset ratios used for calculating offsets are not adequate and should be higher, thereby providing greater biodiversity offset areas. In particular, the offsetting proposed appears significantly less than would have been required under the former Biobanking Assessment Methodology. Furthermore, biodiversity credits should not be given to rehabilitation at the minesite for losses attributable to the mining operation.

As discussed in Section 6.6 of the SEE, the Proposed Modification falls within the transitional arrangements of the Biodiversity Conservation Act 2016 (BC Act) and as a result the biodiversity assessment report (BAR) was undertaken in accordance with the NSW Biodiversity Offsets Policy for Major Projects and the Framework for Biodiversity Assessment (FBA), rather than the Biodiversity Assessment Method (BAM). Mount Owen is committed to delivering a biodiversity offset strategy that appropriately addresses the relevant legislative requirements in accordance with the FBA and the NSW Biodiversity Offsets Policy for Major Projects.

It should be noted that under the NSW Biodiversity Offset Policy for Major Projects and the FBA, offset credits can be generated by mine rehabilitation, however this is not currently included in the proposed biodiversity offset strategy for the Proposed Modification.

The security of offset areas associated with the mine has 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.

As discussed in **Section 6.5.2.1**, additional detail in relation to the proposed biodiversity offset strategy has been provided in response to the submission received from OEH. Mount Owen will explore all options available in relation to the biodiversity offset strategy for the Proposed Modification and undertake the necessary steps to implement the strategy in a manner that meets the relevant requirements.

Ongoing biodiversity monitoring at the site must continue for the full mine life and at least 10 years beyond. The long term monitoring undertaken 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.

As discussed in Section 6.6.4.2 of the SEE, the Mount Owen Complex will continue to be managed in accordance with the existing approved Mount Owen Complex Biodiversity and Offset Management Plan (BOMP)(Mount Owen, 2018) to mitigate impacts on the biodiversity features. The BOMP, which is available on the Mount Owen Complex website, includes a detailed description of the monitoring programme undertaken at the Mount Owen Complex and the biodiversity offset areas. The ongoing monitoring of the site beyond closure will be investigated and determined through the development and approval of the Mine Closure Plan.

The fauna and flora monitoring and management as outlined in the application documents are inadequate. The existing program must at least be maintained and properly documented and appropriate requirements for this need to be included as part of the development consent.

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.

As discussed above, the Mount Owen Complex will continue to be managed in accordance with the existing approved BOMP to mitigate impacts on the biodiversity features. The BOMP, which is available on the Mount Owen Complex website, includes a detailed description of the monitoring programme undertaken at the Mount Owen Complex and the biodiversity offset areas. Flora and fauna monitoring results, details of the effectiveness of management measures and research outcomes are summarised in the Mount Owen Complex Annual Review Report available on the Mount Owen Complex website (www.mtowencomplex.com.au).

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.

In accordance with Schedule 5 condition 11 of SSD-5850, every three years Mount Owen is required to commission and pay the full cost of an independent environmental audit of the development. This includes a review of the adequacy of strategies, plans or programs required under SSD-5850 (including whether the development has met or is trended towards the progressive performance and completion criteria detailed in the strategies, plans or programs).

6.5.3 Community Submissions

Two submissions objected to the increase in disturbance of 46 ha associated with the Proposed Modification, the comments included:

- ***Enough is enough. The loss of a further 46 hectares of Hunter Valley floor habitat to coal extraction is not appropriate. There has been too much loss and too much coal burnt already.***

- ***Since 1993, the Mt Owen Mine Project removed half of Ravensworth State Forest, the largest area of remnant vegetation on the overcleared Hunter Valley floor. This is not in the public interest.***

- ***The Framework for Biodiversity Assessment appears to fail to account appropriately for the context of this modification proposal. It is "only" another 46ha of disturbance. This adds to the already large Mt Owen Complex Disturbance Area of 2534ha. And this mine, together with the Ashton and Rix's Creek Mines is a massive disturbance area. The value of the integrity of the extant vegetation is not recognized. This cannot be offset.***

The area of additional disturbance related to this modification consists of areas that have been previously disturbed for agricultural land uses with all of the vegetation consisting of regrowth over the past 30 years. The majority of the area of additional disturbance comprises disturbed and low quality vegetation in the form of derived native grasslands. The derived native grasslands represent lower quality habitat for a range of threatened species. Native forest, woodland and plantation areas comprise less than 20% of the area of additional disturbance.

The Proposed Modification requires amending the North Pit mine plan only, mining operations (as modified) will continue utilising all existing Mount Owen and Ravensworth East infrastructure with no significant infrastructure construction required. The area of additional disturbance, which represents an increase of approximately 1.8% to the area currently approved is made up of two separate areas (refer to **Figure 1.3**), approximately 37 ha is associated with the extension to the North Pit and approximately 7 ha is associated with earthworks to shape and improve the final landform drainage and to tie into the surrounding topography.

The extent of the area of additional disturbance has been designed to maximise reserve recovery from Glencore mining tenements and provide for:

- sufficient separation from Main Creek and the associated alluvium,
- avoidance of existing Biodiversity Offset Areas and retention of north-south vegetation corridor, and
- utilisation of existing infrastructure with only additional specific water management infrastructure required.

As discussed in Section 6.6 of the SEE, Mount Owen is committed to delivering a biodiversity offset strategy that appropriately addresses the relevant legislative requirements in accordance with the FBA and the NSW Biodiversity Offsets Policy for Major Projects.

6.6 Aboriginal Cultural Heritage

6.6.1 Agency Submissions

6.6.1.1 OEH

OEH has reviewed the Aboriginal Cultural Heritage Management Plan for Mount Owen Open Cut (OzArk 2018) for the Mount Owen Complex (MOC). OEH recommends that the existing ACHMP for the MOC (OzArk 2018) be updated to manage the Aboriginal objects within the proposed SSD 5850 MOD 2 Consent Boundary. The proposed MOD 2 Consent Boundary, as shown on Figure 1-2 of the Aboriginal Cultural Heritage Assessment Report (OzArk 2018), must be updated on all relevant figures in the MOC ACHMP.

OEH recommends that the existing Aboriginal Cultural Heritage Management Plan for the Mount Owen Complex (MOC) (OzArk 2018) be updated on approval of the proposed modification to mitigate Aboriginal sites within the MOD 2 Boundary.

Noted, updates to the approved ACHMP will be undertaken should the Proposed Modification be approved, refer to **Section 7.0**.

Mitigation of AHIMS Site #37-3-1172 is required prior to ground surface disturbance works beginning in that part of the MOD 2 area. Any Aboriginal objects at AHIMS Site #37-2-1172 (MOCO-IF3) will require collecting in accordance with Section 6.2 of the ACHMP for the MOC (2018).

OEH recommends that AHIMS Site #37-3-1172 (MOCO-IF3) is salvaged in accordance with the ACHMP for the MOC (2018).

Noted. Salvage works will be undertaken in accordance with the ACHMP, required updates to the approved ACHMP will be undertaken should the Proposed Modification be approved, refer to **Section 7.0.**

AHIMS Site #37-3-0687 (MC-7) is near to but outside of the MOD 2 Boundary. Mitigation of this site is required to ensure that the Aboriginal objects at the site are not harmed by works in the MOD 2. This site must be protected by a No-Go Zone Barrier Fence prior to MOD 2 works starting.

OEH recommends that AHIMS Site #37-3-0687 (MC-7) is protected by a No-Go Zone Barrier Fence prior to works starting in the MOD 2 area.

As 37-3-0687 (MC-7) is located in close proximity to the area of additional disturbance and may be indirectly impacted in the future by erosion stabilisation works including revegetation and/or drainage works. As detailed in the SEE, Mount Owen propose that the site remain in situ until impacts are planned, at which time, the site will be salvaged as a Group 2 site under the ACHMP.

6.7 Visual Amenity

6.7.1 Agency Submissions

6.7.1.1 DPE

DPE considers that there may be opportunities to further refine and improve the proposed final landform. In particular, the Department draws your attention to the largely flat-topped landforms visible in Figures 6.28 and 6.31 of the SEE. The Department requests that you give detailed consideration to the inclusion of additional topographic variation in the conceptual final landform.

Further refinement of the proposed final landform photomontages presented in the SEE (Figures 6.28 and 6.31) has been undertaken to include proposed micro-relief elements. These revised images are presented in **Figures 6.8** and **6.9**. The most perceptible change in the topography of the North Pit emplacement area when viewed from viewing locations 3 and 5 , is created through the emplacement of overburden on the haul road located in the depression between the WOOP emplacement area and the North Pit emplacement area that was retained in the approved final landform.

Mount Owen considered a range of different options during the development of the mine plans for the Proposed Modification, particularly regarding the emplacement of additional overburden associated with the revised mine plans. Filling the existing lower area within an already disturbed mining footprint is preferred to any increase in height of the emplacement areas or significant changes to the shape of the North Pit emplacement area. The proposed landform design also allows for efficient drainage and also restricts associated haul distances.

Although areas of the final landform presented in the photomontages (refer to **Figure 6.8** and **6.9**) appear to be flat at the distance this view is observed (5-7 km), it is difficult to perceive the actual variation in the landscape and also any variation in the foreground of the viewshed. It is important to note that this view of the landform is only visible from these two specific locations and not from any existing surrounding private residences or community facilities. The long ridge line that would be established as part of the proposed final landform is also consistent with the natural ridgelines surrounding the Mount Owen Complex to the west and south of the North Pit.

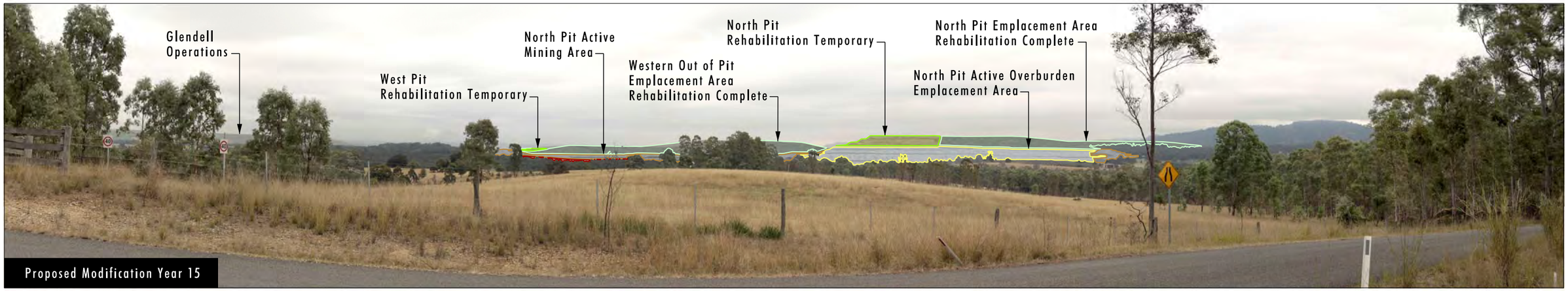
Legend

- Active Overburden Emplacement Area
- Rehabilitation Complete
- Rehabilitation Temporary

FIGURE 6.8

Refined Photomontage from Viewing Location 3, Facing Northwest
Proposed Modification Year 15, Proposed Final Landform and
Approved Final Landform

File Name (A3): R17/3810_253.dgn
20181211 15.11



Legend

- Active Mining Area
- Active Overburden Emplacement Area
- Rehabilitation Complete
- Rehabilitation Temporary
- Topsoil Removal Strip

Note: Proposed vegetation screen will obscure views from this location

File Name (A3): R17/3810_254.dgn
20181211 15.15

FIGURE 6.9

Refined Photomontage from Viewing Location 5, Facing West Proposed Modification Year 15, Proposed Final Landform and Approved Final Landform

6.8 Climate Change and Greenhouse Gas and Energy Assessment

6.8.1 Interest Group Submissions

6.8.1.1 Environmental Planning and Land Management Consultants

The assessment fails to mention of climate change as a risk for successful implementation of biodiversity impact measures, recognising that carbon emissions from the mine operation and production are a significant contributor to climate change.

The Mount Owen Complex BOMP (Mount Owen, 2018) details the ongoing management of biodiversity at the Mount Owen Complex and the Biodiversity Offset Areas (including corridors) for biodiversity conservation and enhancement. The BOMP has been prepared in consideration of the NSW Department of Planning and Environment Best Practice Guidelines (DPI 2014) for the preparation of BOMPs in the Hunter Valley.

The Biodiversity Offset Strategy has been designed in accordance with the Framework for Biodiversity Assessment (FBA) and the NSW Biodiversity Offsets Policy for Major Projects. The policy creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. Underpinning this is the FBA which contains the assessment methodology required to quantify and describe the impact assessment requirements and offset guidance that apply to the Proposed Modification.

The BOMP is subject to review annually and updated if required to account for environmental changes and the results of the on-site monitoring programs.

6.8.1.2 Hunter Communities Network

An increased production of carbon emissions up until 2037 is unacceptable and is not sustainable development.

Consistent with the Approved Operations, the Proposed Modification is considered unlikely to impact national greenhouse gas (GHG) policy objectives due to the relatively small contribution that the Approved Operations and the Proposed Modification will make to national emissions on an annual basis, as discussed in Section 6.9.3 of the SEE.

The design of the mine plan aims to minimise GHG emissions from the mining operations, primarily through energy efficiency and energy use reduction initiatives. This includes limiting the length of haulage routes (where feasible) to minimise transport distances and associated fuel consumption, selection of equipment and vehicles that have high energy efficiency and scheduling activities so that equipment and vehicle operation is optimised. Mount Owen will continue to mitigate GHG emissions through ongoing energy efficiency initiatives, utilising alternative fuel sources and optimising productivity.

The impacts of climate change by 2030 could possibly render mining operations inoperable through lack of water, extremely high wind levels, bushfire and a range of other extreme scenarios that have not been factored into the assessment of the modification.

Glencore's commitment to recognising global climate change science, as laid out by the Intergovernmental Panel on Climate Change is outlined in the Glencore (2017) Climate Change Considerations for our Business document, accessible on the Glencore website.

As a major producer of energy products, Glencore is focused on continuing to help meet the world's energy needs – supporting global development and socio-economic progress. Industrialisation and urbanisation of developing economies, particularly in Asia, will continue to drive significant growth in global energy/ electricity/steel/cement and industrial demand which will continue to largely be met by coal, oil and gas for the foreseeable future.

Importantly, Glencore also acknowledges that the transition to a low-carbon economy will bring both regulatory changes and developments in renewable technology – creating both risks and opportunities for their business. In order to appropriately understand and respond to impacts of climate change, Glencore seeks to:

- Actively engage with policy-makers on regulatory changes arising from global climate change efforts – such as the COP21 commitments agreed in the Paris agreement.
- Support the development of low emission technology and renewable energy sources by supplying copper, cobalt and nickel for use in engines and batteries which will power the electric vehicle revolution.
- Recognise that as energy is one of the highest production costs – to seek ways to improve energy efficiency in the business and reduce GHG emissions.
- Ensure our continued resilience to climate change, develop a framework for identifying, understanding and ultimately, managing climate-related challenges and opportunities facing our portfolio of operations.
- Evaluate each commodity business to assess its attractiveness and resilience against a range of global climate scenarios.

Further, Glencore regularly reviews exposure to actual and potential risks arising from climate change, such as changing weather patterns.

Potential physical impacts from climate change are reviewed as part of the life of mine process. It is also important to note that compliance with the relevant noise, air quality and water resources criteria detailed in SSD-5850 is required in order for the mine to operate.

A transition in the Hunter is needed to encourage a diverse range of new industries to replace mining jobs. The development of a transition plan will be hindered by the continued expansion of the industry.

Section 6.10.3 of the SEE provides an analysis of the potential future land use of the Mount Owen Complex following the completion of mining operations. This analysis confirms there is the potential for a diverse range of post mining land uses providing a transition into a variety of different industries, these include various industrial uses, power generation, agriculture/agribusiness, landscape tourism and research.

6.8.1.3 Hunter Environment Lobby Inc.

The proposed extension of mine life to 2037 to produce an additional 35 million tonnes of coal is unsustainable in many ways, in terms of human health and health of the surrounding areas environment, not to mention Australia's promise to the Paris Agreement?

We see that it is a mandatory request that our state government require a transition plan away from coal mining impacts and that it must be in place in the Hunter Region before 2030.

If this is not the case, Australia has will find itself negatively considered by the global community who are struggling to find a way forward with recalcitrant nations not taking on board mitigating climate change effects.

Consistent with the Approved Operations, the Proposed Modification is considered unlikely to impact national GHG policy objectives due to the relatively small contribution that the Approved Operations and the Proposed Modification will make to national emissions on an annual basis, as discussed in Section 6.9.3 of the SEE.

Australia has a track record of meeting and exceeding international commitments on climate change and this is no different to targets set under the Paris Agreement. Direct Action policies which improve the health of the environment by reducing emissions and increasing productivity are enabling Australia to meet both 2020 and 2030 emission targets. Due to these Direct Action Policies, Australia is on track to reduce emissions by 5 per cent below 2000 levels by 2020.

Australia's climate change mitigation targets are in line with that of other countries such as the United States, Canada, the European Union and Japan. Additionally, Australia recognizes the importance of working together with other countries to reduce emissions (DoEE, 2018).

The Mount Owen Complex could provide strategic opportunities for a variety of potential final land uses, given the extensive infrastructure and accessibility as detailed in Section 6.10.3 of the SEE. The SEE (Section 6.10.3.1) provides a high level analysis of the potential final land use options applicable to the Mount Owen Complex, including a review of the current applicable land use strategies (Hunter Strategic Plan (2016), the Upper Hunter SRLUP (2012) and the Singleton Shire Land Use Strategy (2008)) in relation to land use planning applicable to mine sites. The future final land use options applicable to the site will be considered closer to mine closure and will be dependent on demand at the time.

6.8.2 Community Submissions

A number of submissions from the community included comments in relation to climate change including:

- ***Climate change is a fact and the majority of Australians have concerns related to climate change and want to see governments at every level take measure to address it.***
- ***Australia has been ranked as the worst-performing country in the world on climate action, according to the Sustainable Development Goals (SDGs) Index.***
- ***Australia expanding its coal exports is not economically efficient. As research in the journal Nature shows, for the world to efficiently meet even a weak 2°C target, Australia would have to leave 90% of coal reserves in the ground. This is because winding down coal burning is one the most cost-effective forms of climate action***
- ***Following the economics of supply and demand, increasing coal supply simply reduces the global price of coal.***
- ***An extension of mine life to 2037 to produce an additional 35 million tonnes of coal is unsustainable. The Paris Agreement's long-term goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to limit the increase to 1.5 °C, since this would substantially reduce the risks and effects of climate change. Under the Paris Agreement, each country shall determine, plan, and regularly report on the contribution that it undertakes to make in order to mitigate global warming.***

- ***Proposals made in 2018 to extend mine life ignore the reality of climate change. The mining and burning of coal for the last 200 years has been a major factor in global warming. Australian Federal Government has signed on to the Paris Agreement. State governments should make consistent decisions. The Agreement commits the signatory nations, to keeping global average temperatures increase to below 2 degrees C. Over 90% of Australia's coal reserves need to be left in the ground, unburned, for there to be any chance of keeping the planet habitable for humans.***

- ***The greenhouse effect from increased carbon dioxide in the atmosphere continues to shape government attitude in many countries to energy production and consumption around the world. Australia might soon start to accept the inevitable, we cannot continue with 'business as usual' if we want to limit global warming.***

The Proposed Modification alone is considered unlikely to impact national GHG policy objectives due to the relatively small contribution that the Proposed Modification (and the Approved Operations) will make to national emissions on an annual basis, as discussed in Section 6.9.3 of the SEE.

The Australian Government has made commitments to mitigating the impacts of climate change (DoEE National Energy Productivity Plan (NEPP) 2015 – 2030), and plans to meet its international GHG reduction targets through the following policy streams:

- Adjustments to safeguard mechanism baselines (2020)
- Introduction of new technology
- Energy use efficiency
- Hydrofluorocarbons policy
- Sequestration and waste management.

The Proposed Modification itself is unlikely to prevent the Federal Government achieving its national GHG targets.

There were also a number of comments from the community submissions in relation to the need to transition away from coal to other industries because of the effects of climate change including:

- ***Emerging improved technologies and knowledge of harm has led to the modification or transition from many industries and history shows this can be achieved without harmful side effects.***

- ***There are jobs in mining and coal-power but jobs in renewable power technologies have been shown elsewhere to exceed jobs in coal-associated industry.***

- ***The Hunter is in an enviable position to be a "Renewable Industry Hub" creating jobs and ultimately exports for Australian Companies where the profits and taxes stay in Australia.***

- ***Newcastle University among a number of notable innovations including solar paint, has pioneered revolutionary printed photovoltaics with the potential to slash the cost of solar power and create an export industry with huge potential for jobs.***

- ***Applied Engineering (Renewable Energy Technologies).***

- ***Instead of expanding a harmful and unsustainable coal industry for the profit of Multinationals and Royalties that are such a small part of the NSW Government's revenue The Hunter could lead the world in sustainable technology AND create jobs.***

- ***A transition plan away from coal mining impacts should be in place in the Hunter Region before 2030.***

- ***We should not be mining any more coal as climate impacts are already catastrophic. There is no plan to transition away from coal and this project would significantly impede alternative industries in the area.***

In addition to the discussion above, to hold global warming below 2 degrees (Intergovernmental Panel on Climate Change (IPCC) recent target) all economic sectors will require transformation. Future scenarios which limit global warming to approximately 2 degrees require large-scale changes to land use and global energy systems by 2100. Many of the modelled scenarios that limit global warming require accelerated electrification of energy use, decarbonisation of the majority of electricity generation by 2050 and a phase-out of freely emitting coal generation. Studies indicate a large potential for energy use reductions but also demonstrate that these reductions will not be sufficient by themselves to constrain GHG emissions (IPCC 2016).

In an increasingly 'carbon constrained' world, it is expected that the demand for coal will reduce with time however most energy source projections do not anticipate any significant reduction in overall global demand for coal as an energy source over the timeframe that the Proposed Modification is proposed. It is however expected that there will be a transition from less efficient coal combustion towards cleaner, more efficient combustion.

Glencore supports reducing global carbon emissions and acknowledge the Paris Agreement climate goal of the less than 2° celcius, that global leaders have pledged to achieve. Glencore would like to see a least cost approach to achieving climate goals and note that there is currently a significant gap between the economic and energy reality and climate target scenarios. Industrialisation and urbanisation of developing economies, particularly in Asia, will continue to drive significant growth in global energy/electricity/steel/cement industry and the industrial demand which will continue to largely be met by coal, oil and gas for the foreseeable future.

Under most credible scenarios, while it may no longer be predominant, coal will play a major role as key input to industrial processes as a competitive, safe, secure and reliable baseload source of energy. The aim of climate and energy policy must be to reduce CO_2 emissions in the most cost effective manner whilst ensuring energy security, maintaining economic stability, growth and environmental suatainability.

All climate scenarios recognise the deployment of carbon capture and storage technology (CCS) is essential across all fossil fuel processes to achieve emissions reduction and climate goals. A policy drive towards high efficiency low emission (HELE) technology, which delivers up to 35% less emissions than older technology is also important.

Strategic opportunities for post mining land uses exist at the Mount Owen Complex as detailed in Section 6.10.3 of the SEE. Upon mining cessation, the deeper North Pit void may provide viable options for water storage, pumped hydroelectricity and waste recycling, re-use and emplacement. Through the development of the Mine Closure Plan, further consideration and detailed planning of the final land use will be undertaken.

The mine will destroy more vegetated land, which will increase the impacts of climatic conditions. Increase the area to less productive land and more instability in recovery to massive climatic conditions.

The majority of the area of additional disturbance comprises disturbed and low quality vegetation in the form of derived native grasslands and a disused olive grove plantation. The derived native grasslands represent lower quality habitat for a range of threatened species. Native forest, woodland and plantation areas comprise less than 20% of the area of additional disturbance and the larger and higher quality remnant patches of native forest and woodland have been avoided. Removal of this vegetation will be compensated for through the Biodiversity Offset Strategy which addresses the relevant legislative requirements in accordance with the FBA and the NSW Biodiversity Offsets Policy for Major Projects. Offsetting options are detailed in Section 6.6.6 of the SEE.

As the world's largest coal exporter and 4th largest liquid 'natural' gas exporter, Australia's annual exported CO_2 emissions are 44 tonnes per person, greater than even Saudi Arabia's 35.5 tonnes per person, and much larger than the US' 710kg per person. Despite this, Australia plans to add billions of tons of new fossil fuel production to the mix.

The detailed Green House Gas and Energy Assessment (GHGEA) estimated the greenhouse gas emissions for the operational phase of the Proposed Modification. There would be no changes from the Approved Operations forecast greenhouse gas emissions to the construction and closure phases of mining. As mentioned above, the Proposed Modification is considered unlikely to impact national GHG policy objectives due to the relatively small contribution the Proposed Modification will make to national emissions on an annual basis relative to the Approved Operations.

6.9 Mine Closure and Rehabilitation

6.9.1 Agency Submissions

6.9.1.1 DPE

Mine rehabilitation is a key issue of concern for the community. In particular, the submissions raise objections with respect to the proposed final void. The Department requests a considered response to these concerns.

A response to these submissions is provided in **Section 6.9.3** and **6.9.4**.

Council has raised concerns regarding the intended post-mining land use for the site and has requested that a detailed final land use strategy be prepared. The Department recognises that it may be difficult to provide a detailed strategy at the present time, given the length of mine life remaining. However, you are encouraged to consult directly with Council in this regard.

A response to the Singleton Council submission is provided in **Section 6.9.1.2**.

The transects in Figures 2.6 and 2.7 of the SEE do not have any corresponding reference point on Figure 2.5. Please clarify.

Figure 2.5 from the SEE (reproduced below as **Figure 6.10**) has been updated to include the corresponding transect lines to Figure 2.6 from the SEE (reproduced below as **Figure 6.11**). Figure 2.7 from the SEE (reproduced below as **Figure 6.12**) provides an indicative north-south and east-west conceptual comparison focused on the North Pit final void. The transect does not have a corresponding reference point and has been prepared to illustrate that the key difference between the approved and proposed conceptual landforms is the deeper final void associated with the Proposed Modification.

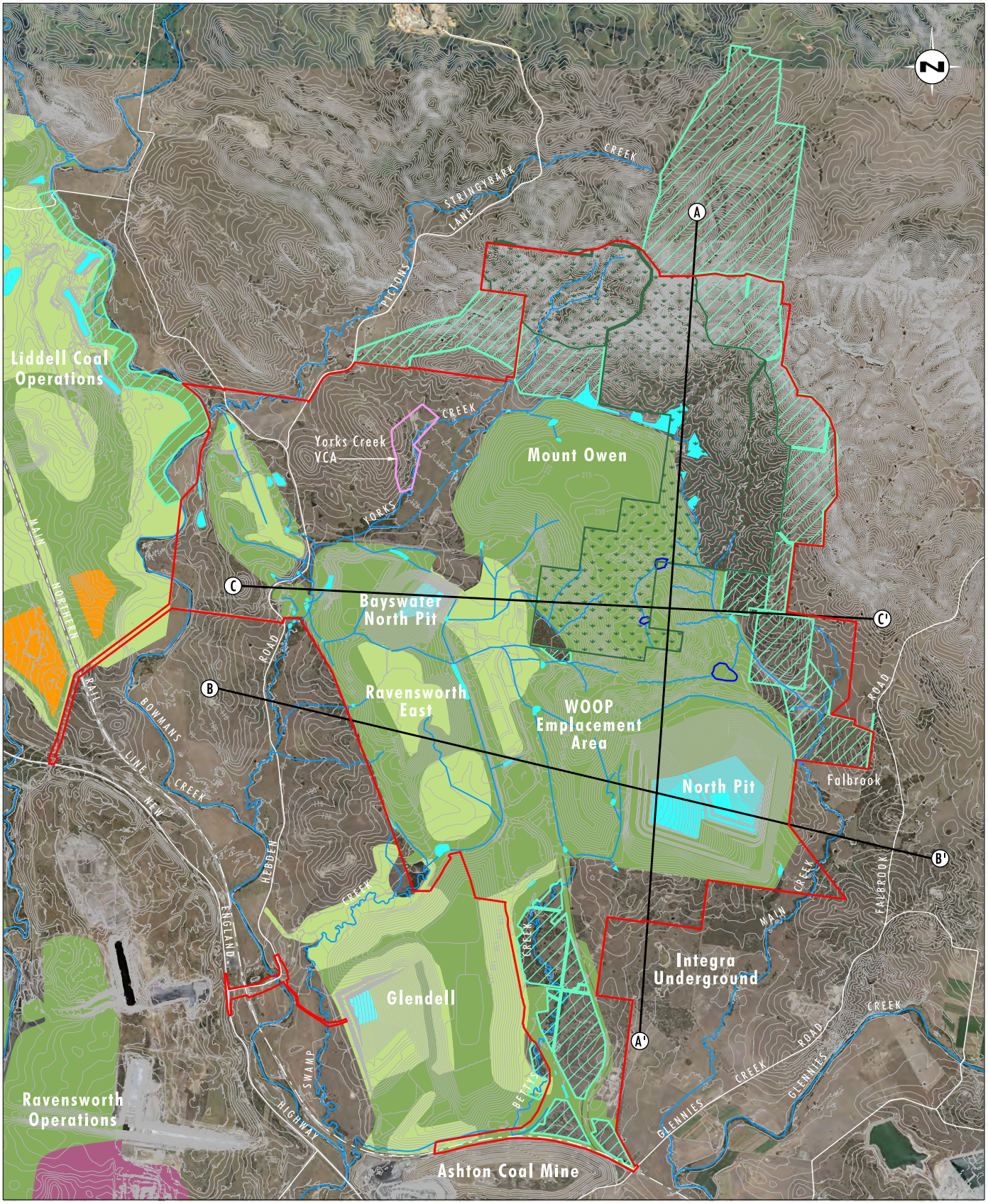


Image Source: Glencore (2017)
Data Source: Glencore (2018), Ravensworth Operation Vegetation: Umwelt (2010), Liddell Coal Operations Vegetation: Umwelt (2016)
Note: Contour Interval 5m(AHD). Equilibrium Water Level shown in North Pit Void.

0 1.0 2.0 3.0km
1:65 000

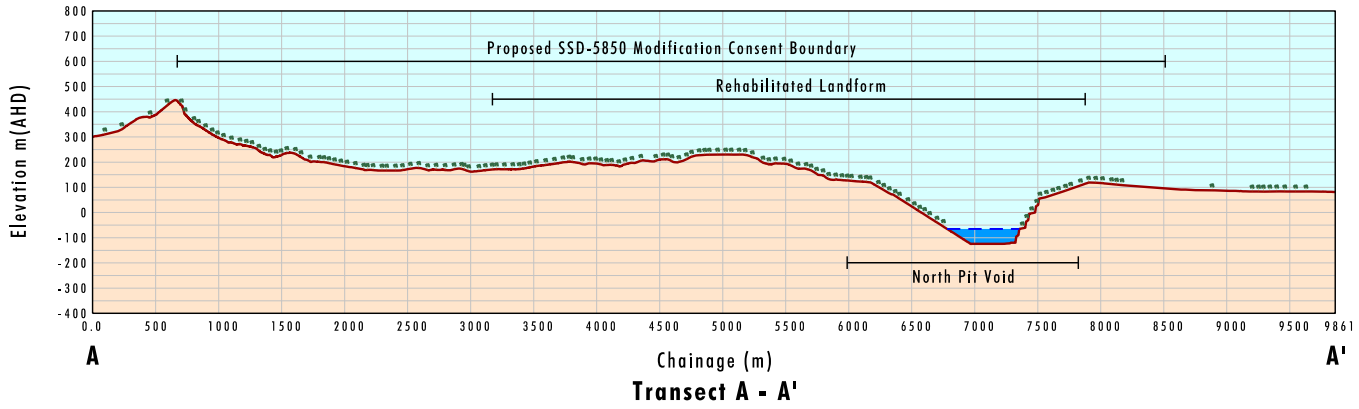
Legend

- Proposed SSD-5850 Consent Boundary
- Yorks Creek VCA
- Dryland Attenuation Basin
- Water Storage
- Native Woodland
- Open Grassland (Potential grazing areas) with pockets of Native Vegetation
- Grassland for Stabilisation (Liddell Coal Operations)
- Grazing (Ravensworth Operations)
- Ravensworth State Forest
- Biodiversity Offset Area
- Drainage Line
- Cross Section Line

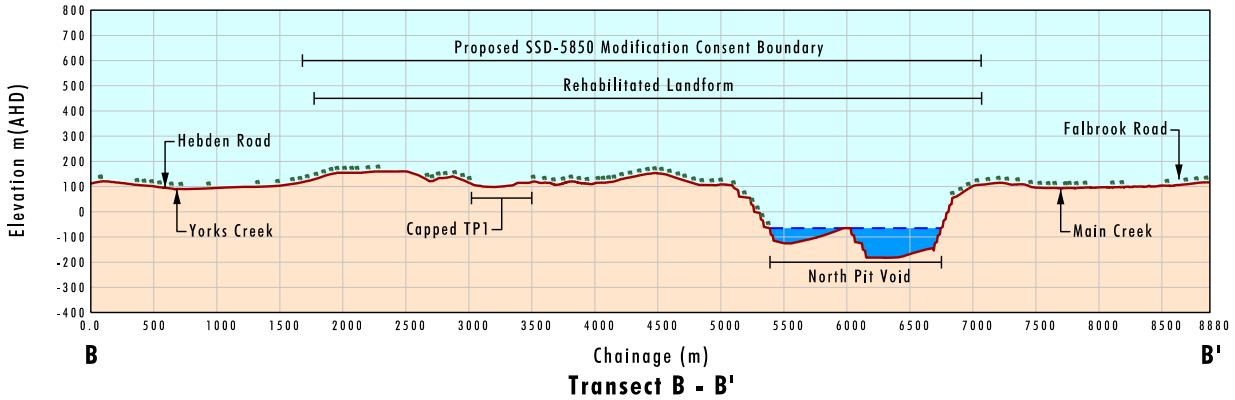
FIGURE 6.10

Proposed Modification Conceptual Final Landform

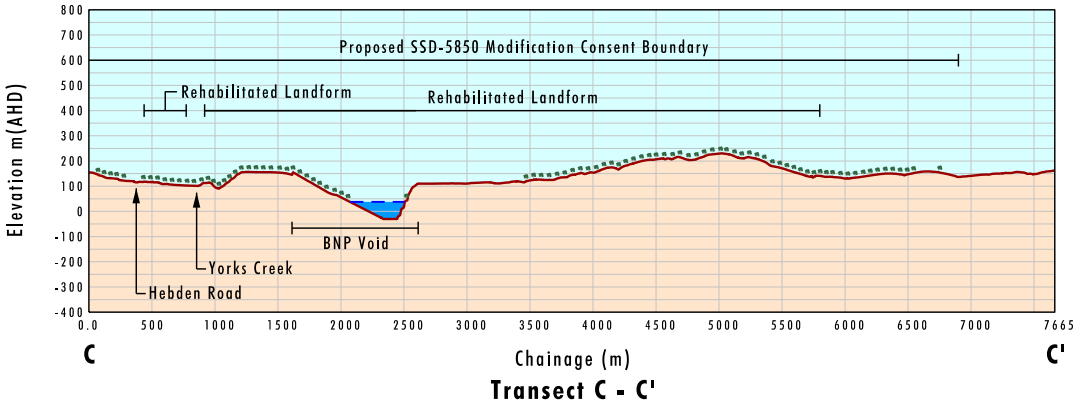
File Name (A4): R17/3810_242.dgn
20181219 14.58



Transect A - A'



Transect B - B'



Transect C - C'

Legend

- Proposed Modification Final Landform Surface
- Modelled Maximum Water Storage Water Level
- Water Storage
- Woodland/Native Vegetation

Note: Vertical Exaggeration 2:1

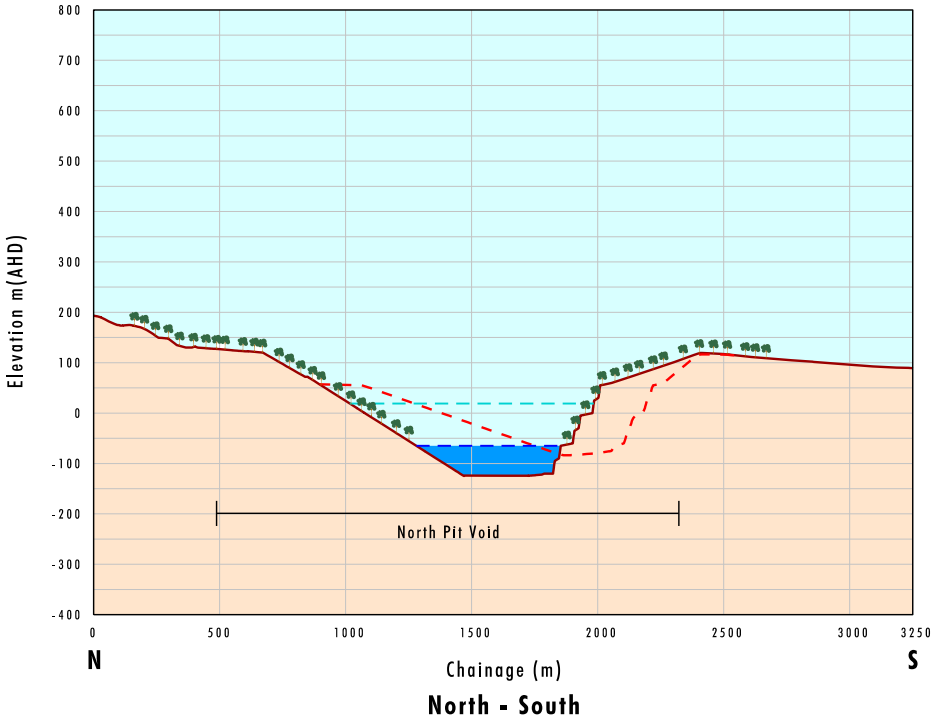
0 1.0 2.0 3.0km
Horizontal Scale 1:60 000

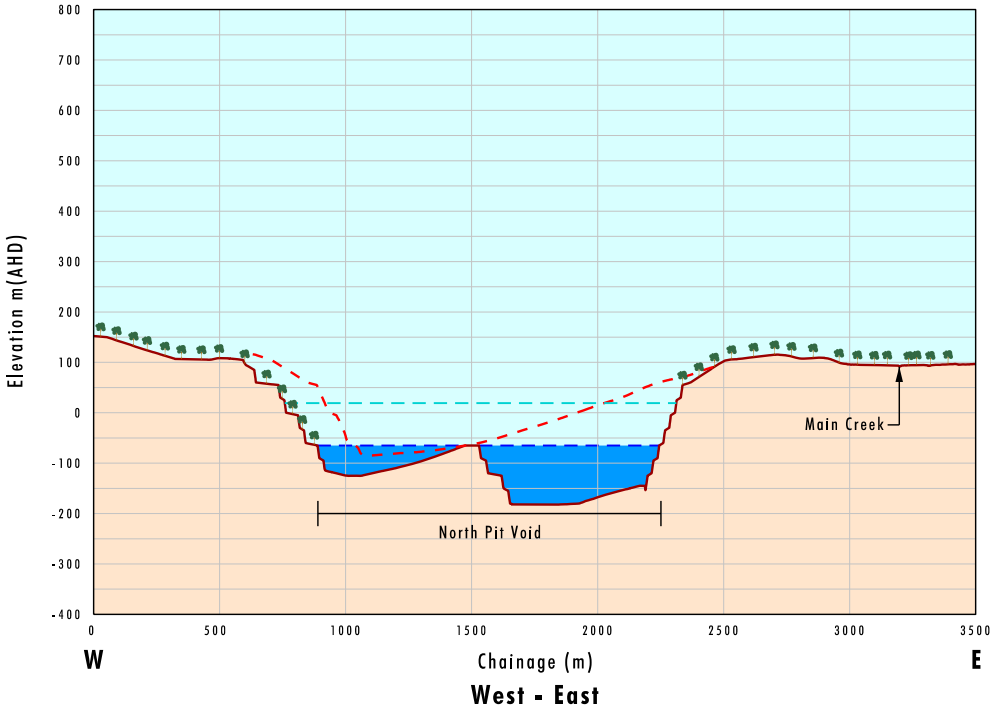
0 0.5 1.0 1.5km
Vertical Scale 1:30 000

FIGURE 6.11

Conceptual Final Landform Transects A-A', B-B' and C-C'

File Name (A4): R17/3810_243.dgn
20181211 15.09





Legend

- Approved Operations (Void)
- Proposed Modification Final Landform Surface
- Modelled Maximum Water Storage Water Level - Approved Operations
- Modelled Maximum Water Storage Water Level - Proposed Modification
- Water Storage
- Woodland/Native Vegetation

0 0.5 1.0 1.5km
Horizontal Scale 1:30 000

0 250 500 1000m
Vertical Scale 1:15 000

Note: Vertical Exaggeration 2:1

File Name (A4): R17/3810_244.dgn
20181211 15.10

FIGURE 6.12

Indicative Comparison of Conceptual North Pit Approved and Proposed Final Void

6.9.1.2 Singleton Council

The evaluation requirements for planning decisions are set out in section 4.15 of the Environmental Planning and Assessment Act 1979. This section requires, amongst other things, the consent authority to consider provisions of any environmental planning instrument (for which Council's Local Environmental Plan, and future Strategic Planning Statement would constitute) and any document required for consultation under the Act, any Development Control Plan, any planning agreement and the public interest. Section 4.40 of the Environmental Planning and Assessment Act 1979 applies section 4.15 to the determination of State Significant Development applications.

Additionally, clause 12 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 requires the consent authority to consider, amongst other things, the existing and approved uses of the land in the vicinity of the development, whether or not the development is likely to have a significant impact on those uses (whether current or future) and any ways that the proposed development could be incompatible with any existing, approved or likely preferred uses.

Given the statutory framework for consideration of long term, off site impacts to land use planning, and the broader public interest requirements, Council considers the current final land use options do not provide for a high level of post mining land use certainty. As a temporary land user, it is incumbent on the applicant to identify a final land use post mining that is consistent with the broader regional and local strategic land use planning objectives and outcomes. The current final land uses proposed do not consider this strategic alignment and do not provide long term certainty to the community of a sustainable post mining land use. Further, the proposed modification should include the cost-benefit to the community of the proposal, and its final land uses, in the context of long term environmental and social impacts, as required by the current conditions of consent.

Council considers the development of a final land use strategy, ahead of proposed mining, is essential in ensuring that the final land use is achievable, consistent with surrounding land uses, does not complete across the LGA for land use outcomes, is planned for and incorporated into the design of the mining operation. Council appreciates that the life of the mine is likely beyond current strategic land use planning timeframes, and, as such, there is a need for flexibility to allow for adequate consideration of all potential final land use options, thereby ensuring consistency with long term local and regional land use planning objectives.

Mount Owen acknowledge the importance of planning for the future use of the Mount Owen Complex following the cessation of mining operations and are committed to the development of a final land use plan which Mount Owen intend to develop as part of the Mine Closure Plan process. A range of final land use options are discussed in Section 6.10.3 of the SEE. The existing infrastructure lends itself to a multitude of different industrial and agricultural land uses, the deeper North Pit void has the potential to provide viable options for water storage, pumped hydroelectricity and waste recycling, re-use and emplacement, and the site also has potential tourism and recreational uses. The final landuse options presented in the SEE are genuine options which subject to further strategic land use planning in the interim, and feasibility analysis closer to mine closure, have the potential of being adopted as future final land use/s.

Glencore is committed to ongoing consultation with Singleton Council as relevant mining operations progress within the Singleton LGA to assist Singleton Council with the development of strategic land use planning that will provide a sustainable future for the community of Singleton post mining.

Consistent with the discussion with Singleton Council on 6 December 2018, Mount Owen proposes the following condition to be included in the development consent should the Proposed Modification be approved (consistent with other recent mining approvals):

Mine Closure

At least 5 years prior to the planned cessation of mining operations, the Applicant must prepare a Mine Closure Plan for the development to the satisfaction of the Planning Secretary. This plan must:

(a) be prepared in consultation with the Resources Regulator and Singleton Council;

(b) integrate final rehabilitation and mine closure requirements with those of adjacent Glencore mines, to the greatest extent practicable;

(c) include a final land use strategy to investigate potential post-mining beneficial land uses for the site (including the final voids), that:

(i) align with local strategic planning instruments;

(ii) provide a sustainable future for the local community;

(iii) utilise existing mining infrastructure, where practicable; and

(iv) do not compromise ecological rehabilitation requirements;

(d) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local employment levels; and

(e) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the development and describe how the performance of these measures would be monitored over time.

6.9.2 Interest Group Submissions

6.9.2.1 Hunter Communities Network

We are concerned that the resubmitted application for the modification outlines four scenarios for the final landform. There should be no approval of final voids left in perpetuity in the Hunter landscape. The rehabilitation bond scheme does not include the costs of long term management of final voids.

The proposed final landform for the Proposed Modification is presented in Section 2.2.3 and Figure 2.5 of the SEE and reproduced in this RTS as **Figure 6.10**. The four alternative design scenarios in relation to the final landform presented in the SEE in Section 5.3 were considered as part of the process of selecting the proposed conceptual final landform.

Consistent with the Approved Operations, the proposed conceptual final landform proposes a natural landform design incorporating micro-relief elements throughout the life of the operation, maximising return of catchment, particularly to Main Creek, and aims to achieve a safe, stable and non-polluting final landform.

Further detail regarding the analysis of the final landform design scenarios is provided in Section 5.3 of the SEE. The analysis indicates that on balance, the prolonged environmental impacts and significant additional costs associated with backfilling the Proposed Modification void are neither feasible nor appropriate. Backfilling of the void would make the Proposed Modification uneconomic.

If the operation cannot fund the backfilling of all voids, as has been required in the USA since 1975, then it is not economically viable and should not be approved.

It is important to note that the approved final landform includes a final North Pit void and no additional voids are proposed as part of the Proposed Modification. In addition to the economic implications of filling the void, the movement of the volume of overburden required to completely backfill the North Pit void to a self-draining landform would take approximately 14 years post mining.

The significant re-handling of material at the end of production will prolong environmental impacts for this period of time e.g. visual, air quality, blasting and noise impacts. Establishment of vegetation from rehabilitation works will also be delayed, which will then delay establishment of habitat connectivity within the final landform. Additionally, there would be an extended duration of the dirty water management system due to re-handle of material which would delay the return of runoff from rehabilitated areas to the receiving waters.

Therefore on balance, the prolonged environmental impacts along with the significant additional costs associated with backfilling the Proposed Modification void are neither feasible nor appropriate.

6.9.2.2 Environmental Planning and Land Management Consultants

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 at Mt Owen Mine is unacceptably slow.

As previously noted the approved final landform includes a final North Pit void and no additional voids are proposed as part of the Proposed Modification. The Proposed Modification will result in changes to the approved final void including increasing the catchment area associated with the void. However, the changes to the proposed final void will result in only a 10 ha increase to the surface area of the pit lake with the remainder of the area to be included within the proposed final void catchment to be rehabilitated to provide woodland/open forest consistent with the approved final landform.

Rehabilitation of post-mining areas is completed as soon as practicable after shaped areas become available for planting. The intention is to maximise opportunities for progressive rehabilitation and reduce the disturbance footprint, however potential delays to rehabilitation can be caused due to:

- Changes or delays in the mining schedule; and
- Postponement of rehabilitation activities to avoid seeding and planting in conditions, which may lead to poor quality rehabilitation or failure.

Where rehabilitation is delayed, overburden areas are shaped to final landform as close as reasonably practicable behind the active mining operation and suitable cover crops applied on exposed areas to minimise dust generation and erosion.

Temporary vegetation will also be undertaken on unshaped overburden dumps and other disturbed areas that are planned to be inactive for 1-2 years. Temporary revegetation of these areas improves both visual amenity and control of dust emissions.

Rehabilitation and revegetation techniques will be continually developed and refined over the life of the mining operations through a continual process of research, trialling, monitoring and improvement.

6.9.2.3 Hunter Environment Lobby Inc.

We believe that no final voids should be left in the landscape, indeed HEL has long maintained that if the current project cannot afford to backfill all pits, it is economically unviable – we do not believe that this is the case, it is obviously a ploy to avoid social responsibility by the proponent.

A response to these issues is provided in **Section 6.9.2.1**.

6.9.3 Community Submissions

The following comments were received from the community in relation to the environmental impact and re-use of the final void:

- ***No final voids should be left in the landscape. Failure to properly regulate the rehabilitation of mine sites is creating a toxic legacy, the New South Wales Government has been warned. The regulatory system in NSW is creating a massive toxic legacy that is going to be very difficult for future generations or future governments to rectify. A recent report predicts the area of land in New South Wales affected by unfilled mining voids will eventually be larger than Sydney Harbour.***
- ***No final voids should be left in the landscape. The company must pay a bond for total rehabilitation of the site.***
- ***The final voids are health concern to environment.***
- ***If the current project cannot afford to backfill all pits, it is economically unviable.***
- ***Australia continues to accept the "inevitability" of final voids and to falsely point to other areas in the world where void regeneration has worked. Such a simplistic view ignores the huge differences between Australian climate and that of those countries which have temperate climates and significant rainfall. Australia has a hot (and getting hotter) climate with little rainfall (and getting less) Such an environment results in "toxic sinks" unsuitable for any use and a permanent blight on the landscape.***
  This simplistic comparison also ignores that the area and depth of these voids in Australia vastly exceeds those being compared elsewhere. It is a fact, as highlighted in statements given by previous mine proponents that were the cost of even simple backfilling included in EIS the project (s) would be financially unsustainable. Thus, the major monies derived from mining leave Australia but Australia and future generations of Australians are left with a toxic legacy and desecrated land that can never be reclaimed.
- ***There is no proven economic value of having a final void in the final landform.***

As previously discussed it is important to note that the Approved Operations final landform includes a final North Pit void and no additional voids are proposed as part of the Proposed Modification. It should be noted that Mount Owen considered a number of different mine plan options when developing the proposed final landform which considered the option of backfilling the void. In addition to the prohibitive economic implications associated with filling the void, the movement of the volume of overburden required to completely backfill the North Pit void to a self-draining landform would take approximately 14 years post mining, significantly prolonging the associated environmental impacts of the Proposed Modification.

Mount Owen reviewed a number of alternative design scenarios in relation to the conceptual final landform design and in an effort to reduce the size of the final North Pit void, increase stability and improve the visual design aspects of the void. The feasibility of improving the design of the conceptual final landform (particularly the final void) and the design alternatives (which included backfilling, as presented in Section 5.3 of the SEE) have been taken into account on the basis of the environmental, social and economic considerations for each design scenario.

As the volume of overburden required to fill the North Pit void to a self-draining landform would necessitate the movement of the entire WOOP emplacement area and a large portion of the North Pit emplacement area, resulting in the removal of significant areas of established rehabilitation and an additional 14 years of operations, completely backfilling the void is considered neither feasible nor appropriate.

Each final landform design scenario considered in selecting the proposed conceptual final landform (as presented in Section 5.3 of the SEE) includes a final void of varying configuration. Given the depth of mining proposed and geotechnical constraints created by the complex geology within the North Pit, the mine plan design is restricted through limited space being available for the emplacement of overburden within the North Pit, requiring emplacement of overburden within the WOOP emplacement area in the early years of the Proposed Modification.

Consistent with the Approved Operations, the proposed conceptual final landform proposes a natural landform design incorporating micro-relief elements throughout the life of the operation, maximising return of catchment, particularly to Main Creek, and aims to achieve a safe, stable and non-polluting final landform/void.

A detailed comparison of the conceptual approved and proposed final landform is provided in Section 6.10.1 of the SEE. The key changes in terms of landform design from the approved to the proposed conceptual final landform relate to the size and depth of final void and a decrease in pit lake recovery levels. These changes, in themselves, do not have any material impact on the closure or rehabilitation strategy for the Approved Operations, additionally the rehabilitation risks associated with the establishment of the final landform including slope stability and erosion apply to the approved conceptual final landform. These risks are manageable through the existing landform and rehabilitation management practices which are currently applied on site.

As discussed in **Section 6.3,** the water balance model developed for the Proposed Modification indicates the evaporation from the proposed final void lake surface will concentrate salts in the lake slowly over time. The gradually increasing salinity will not pose any risk to surface water sources as the final void will remain a permanent sink with a steep hydraulic gradient between the proposed final void and the surrounding Permian strata. The analysis also indicates that the void water will have a salinity level, measured as total dissolved solids (TDS) of approximately 5,200 mg/L at the time of equilibrium. TDS levels ranging from 1,500 mg/L to 7,000 mg/L are considered to be moderately saline.

A TDS concentration greater than 4,500 mg/L is generally considered unsuitable for irrigation however salinity in the range of 5,000 to 10,000 mg/L is considered suitable for some stock watering (mature cows and sheep), recreation, industrial water use and for the maintenance of natural ecosystems. It is considered that the final void has a variety of potential post-mining uses including renewable energy generation, industrial/manufacturing uses, industrial agriculture, specialized training facilities, active recreation, aquaculture, waste management, ecological restoration, research and education. See Table 6.22 in the SEE for additional detail.

6.10 Social Impacts

6.10.1 Interest Group Submissions

6.10.1.1 Hunter Communities Network

The proposal to continue mining at the Mt Owen complex to extract a further 35 million tonnes of coal and keep 660 people in work for an additional 6 years is environmentally and socially unsustainable. The key question is what will happen to the 660 employees after 2037. This problem must be solved before 2030, not prolonged by the approval of this proposal.

As discussed in Section 6.10.3 of the SEE, the Hunter Strategic Plan (2016) identifies potential emerging or strengthened employment opportunities in a post-mining landscape which include:

- Power generation, technology and mining – land needs to be identified for future technology, manufacturing, resources and diversified power generation sites (including renewable energy)
- Growth opportunities in agriculture and agribusiness – 'high technology primary industry'; this requires the protection of natural resources
- Global and regional connectivity, through transport infrastructure for regional products to capital city and international markets
- Landscape tourism, linked to the scenic value and food trail possibilities of the viticulture and equine Critical Industry Clusters (DPE, 2012)
- Knowledge intensive industries, such as research, training and support systems for new technology industries.

The Hunter Strategic Plan also provides strategic guidance on landscape values and strategic actions that will contribute to a successful transition from the current mining, coal fired energy generation and agriculture based economy.

Strategic opportunities for post mining land uses exist at the Mount Owen Complex as detailed in Section 6.10.3 of the SEE. Upon mining cessation, the existing infrastructure lends itself to a multitude of different industrial land uses, the deeper North Pit void may provide viable options for water storage, pumped hydroelectricity and waste recycling, re-use and emplacement. Through the development of the Mine Closure Plan, further consideration and detailed planning for the future economic use of the land will be undertaken.

6.10.2 Community Submissions

It is not in the public interest to continue to dig and burn coal.

As discussed in **Section 6.8**, in an increasingly 'carbon constrained' world, it is expected that the demand for coal will reduce with time however most energy source projections do not anticipate any significant reduction in overall global demand for coal as an energy source over the timeframe that the Proposed Modification is proposed. It is however expected that there will be a transition from less efficient coal combustion towards cleaner, more efficient combustion and the coal industry will continue to provide significant economic benefits to the local economy, NSW and Australia.

The environmental impacts associated with the Proposed Modification are consistent with the Approved Operations. The Economic Impact Assessment concluded that overall, the Proposed Modification is expected to generate net benefits, and is also expected to generate increased economic activity and employment within the NSW community. The Proposed Modification will have a positive economic impact, for the region and NSW.

6.11 Economics

6.11.1 Agency Submissions

6.11.1.1 DPE

The Division of Resources and Geoscience (DRG) has identified discrepancies between the SEE and data provided separately to DRG for the purposes of its Resource & Economic Assessment. The Department considers that this is a significant matter and you are requested to resolve these discrepancies in both the RTS and in discussion with DRG.

Further consultation with DRG has been undertaken, a detailed response is provided in **Section 6.11.1.2**.

6.11.1.2 DRG

The Division notes that this Resource & Economic Assessment has been undertaken in accordance with commercial-in-confidence resource and mine schedule data supplied by the Proponent in relation to the Project during a site visit. During this site visit the proponent indicated that the total Life-Of-Mine (LOM) extension is three years and the increase of total Run-Of-Mine (ROM) coal was 49 million tonnes (Mt). This is different to those presented within the Project's SEE, where the total LOM extension was 6 years and the increase of total ROM coal was 35 Mt. The Division will request to meet with the Department of Planning – Planning Services Division and the Proponent to resolve this difference as part of the Response to Submissions Process. The assessment below was based on the revised data provided during the onsite visit.

The total additional ROM coal associated with the Proposed Modification as presented in the SEE is 35 Mt and will extend the life of the Approved Operations by 6 years. The incremental ROM coal tonnes presented in the SEE was calculated as the difference between the Proposed Modification production schedule (which contains a total ROM coal tonnage of 115 Mt from 2018 to 2036) and Approved Operations production schedule developed for the Mount Owen Continued Operations Project (which contains a total remaining ROM coal tonnage of 80 Mt from 2018 to 2030).

The incremental ROM coal tonnage of 49 Mt calculated by DRG is based on an alternate Approved Operations production schedule that was provided to DRG in July 2018 to enable them to complete their Resource and Economic Assessment, and which had been modified to account for:

- A starting coal face that was more advanced than previously assumed for the Mount Owen Continued Operations Project,
- Revised recovery estimates based on a revised minimum mining thickness following detailed reconciliation of mining recovery relating to thinner seams, and
- Changes to the southern wall of the Approved Operations pit shell based on new drilling data.

These changes subsequently resulted in a decrease in the total ROM coal tonnes contained in the Approved Operations production schedule developed for the Mount Owen Continued Operations Project by approximately 14 Mt.

Additionally, the Proposed Modification production schedule provided to DRG for their economic assessment also included additional ROM coal tonnes in the south-east wall of the proposed pit shell, and which were subsequently removed from the proposed mine plan through the inclusion of additional haul-back benches to manage noise impacts in the latter years of mining. This change to the south-east wall of the proposed mine plan resulted in the loss of approximately 2 Mt of ROM coal.

The reconciliation of the above production schedule refinements to the Approved Operations and Proposed Modification production schedules is shown in **Figure 6.13**.

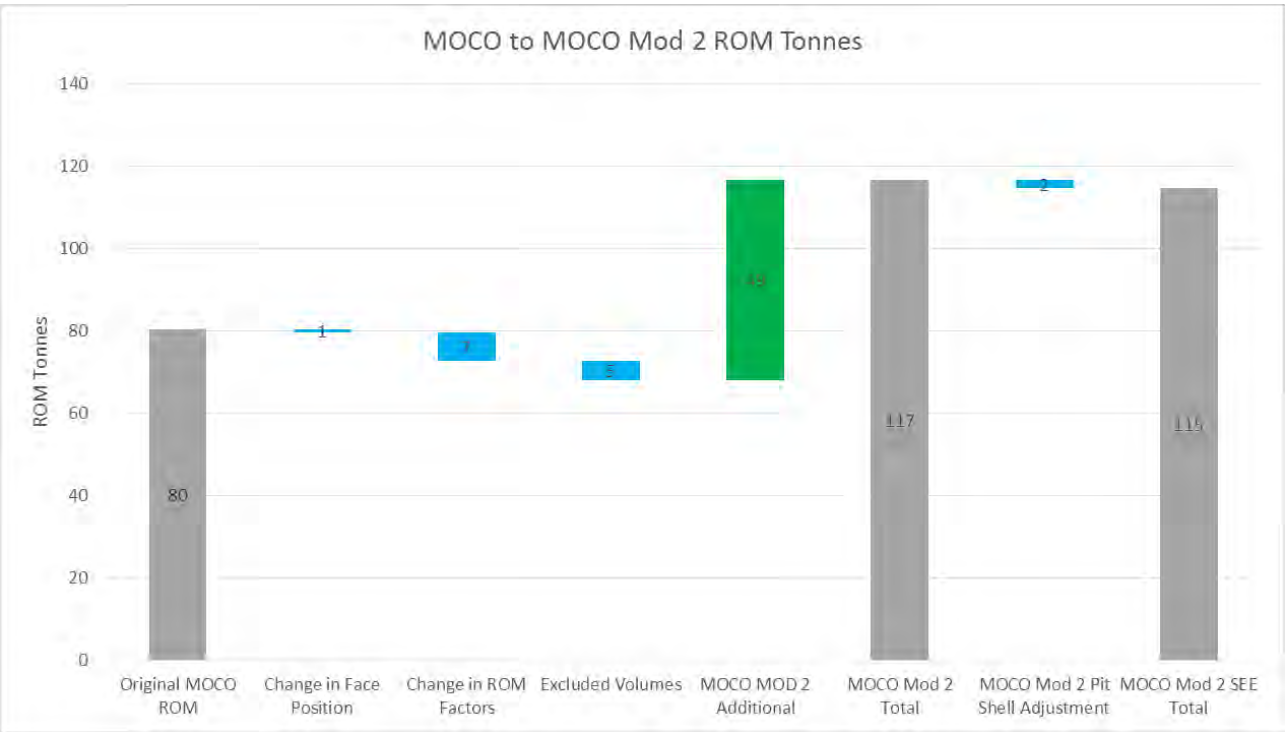


Figure 6.13 MOCO (Approved Operations) to MOCO Modification 2 (Proposed Modification) ROM tonne reconciliation

Mount Owen met with DRG on 27 November 2018 to discuss the production schedule discrepancies associated with the data provided for the Resource and Economic Assessment and the issue has now been resolved.

6.12 Voluntary Planning Agreement

6.12.1 Agency Submissions

6.12.1.1 DPE

Your attention is drawn to Singleton Council's submission, which raises the possibility of a new or revised Voluntary Planning Agreement for the project. You are encouraged to liaise directly with Council regarding this matter, and to report on the progress of these discussions in your RTS.

Mount Owen has met with Singleton Council to discuss the VPA for the Proposed Modification, further detail on this is provided in Section **6.12.1.2**.

6.12.1.2 Singleton Council

The modification application does not consider whether a new or revised Voluntary Planning Agreement (VPA) should be negotiated with Singleton Council. . . With this modification application, the impacts of the proposed modification are greater in scale and duration than those originally approved in SSD 5850. The proposed modification will increase the duration of mining, reduce the availability of land for other land uses and result in a significantly larger void, for which a detailed final land use has not been discussed.

It is important to note that no discussions have been had regarding a VPA for this proposed modification. It is Council's view that the scale and duration of the proposed modification warrants such a discussion.

The existing Mount Owen VPA agreed under SSD-5850 (value $1.024 million) was intended to be distributed to the following:

- Economic Development Initiatives (the Riverfront Beautification)
- Completion of the All Abilities Playground and Rose Point Park
- Sponsorship of Community Groups
- Support for Aboriginal Cultural Events.

Additional consultation was undertaken with Singleton Council in relation to the VPA for the Proposed Modification and the Final Landuse Strategy. Glencore met with Council on 4 October 2018 to discuss an offer to increase the value of the existing VPA for the Mount Owen Continued Operations Project to cover the extended mine life associated with the Proposed Modification.

Glencore then made a formal offer to Singleton Council in writing on 8 October 2018, which proposed to increase the existing VPA, bringing the total value of the Mount Owen Continued Operations Project VPA to $1.250 million.

Council responded via email on 19 November 2018 indicating that the offer had been discussed with the Councillors and accepted. Administrative processes to formalise the VPA are underway with Singleton Council. During the additional meeting with Singleton Council on 6 December 2018 the acceptance of the VPA offer was confirmed.

6.13 Land Use

6.13.1 Agency Submissions

6.13.1.1 DoI Water

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 or Modification approval and Mining Lease approval. The Compensation Agreement may include condition requiring the Mining Lease Holder to purchase any Crown Land or Crown Road impacted by mining activity.

There is no Crown land located within the area of additional disturbance associated with the Proposed Modification or the Mining Lease Application area associated with the Mount Owen Continued Operations Project.

An application for purchase or licence agreement over two Crown parcels of land within the SSD-5850 modification consent boundary (Lot 20A DP 6842 and Lot 356 DP 867083) is currently being assessed. The remaining Crown roads within the Approved Operational Area are retained for access purposes and will be reviewed during mine closure planning.

6.13.2 Community Submissions

It is also important that buffer zones to reduce land use conflict are built into the design of the modification and proponents do not rely on any adjacent rural landholding for their development's buffer zones. The current design does not accommodate this. It relies on our rural land used for agricultural production to absorb the impact.

The Mount Owen Complex is well established, currently operating and predominantly surrounded by other established mining operations and mine owned land. Although there are a number of private properties located to the south and southeast of the North Pit in the Middle Falbrook area, Mount Owen undertook mine plan refinements to ensure the noise, air quality and blast impacts associated with the Proposed Modification were consistent with the impacts predicted for the Approved Operations. These refinements included alterations to the mine plans and progression, along with a range of operational controls and measures to be implemented over the life of the Proposed Modification.

A key objective of the Proposed Modification included maximising the use of previously disturbed areas, existing and approved mining infrastructure and further development of existing environmental mitigation and management strategies to mitigate and manage the predicted impacts associated with the Proposed Modification, thereby limiting potential for conflicts with other land uses, particularly the surrounding private residences in accordance with relevant guidelines and criteria.

A range of noise, air quality and blast control measures are currently implemented for the Approved Operations to minimise the impact of the mining operation to meet the relevant criteria at surrounding private residences. Mount Owen is committed to continuing this approach for the Proposed Modification.

6.14 Waste Management

6.14.1 Agency Submissions

6.14.1.1 DPE

The EPA has requested further information regarding the volume of tailings likely to be generated as a result of the proposal, and whether disposal of this additional volume is permitted under existing approvals. The EPA has also requested an assessment of the capacity of all tailings dams, voids and emplacement areas to contain these tailings, and an assessment of the likely impacts of increased tailings disposal on water resources.

A response to the request from the EPA is provided in **Section 6.14.1.2**.

6.14.1.2 EPA

The proposal will emplace tailings in the Ravensworth East voids including West Pit, within additional in-pit tailings cells in North Pit, the BNP void or transfer under the Greater Ravensworth Area Water and Tailings Scheme ("GRAWTS") to Liddell Operations. The transfer of tailings from the Mount Owen mine under the GRAWTS to Liddell Operations will need to be addressed on Environment Protection Licence 2094 for the Liddell Operations mine to allow receipt of tailings as it is waste received from offsite.

The proponent will need to ensure that they comply with EPA's Coal Washery Rejects Order 2014 and Coal Washery Rejects (Coal Mine Void) Order 2014. This places requirements on the supplier of the reject which will be the Mount Owen mine. The receiver of the waste, being the Liddell Operations mine would need to ensure that they comply with the Coal Washery Rejects Exemption 2014 and Coal Washery Rejects (Coal Mine Void) Exemption 2014.

These exemptions remove Waste Levy liability, but do not apply if the Liddell Operations mine Environment Protection Licence authorises the scheduled activity of Waste Disposal (Application to Land) which would make the tailings Waste Levy liable.

The proponent needs to provide demonstration of how it will comply with the Coal Washery Rejects Order 2014 and The Coal Washery Rejects (Coal Mine Void) Order 2014 and how the Liddell Mine will comply with The Coal Washery Rejects Exemption 2014 and The Coal Washery Rejects (Coal Mine Void) Exemption 2014.

Development Consent SSD-5850 currently allows for the emplacement of tailings in West Pit, with additional in-pit emplacement in tailings cells in North Pit, the Bayswater North Pit (BNP) void, and transfer under the GRAWTS. Tailings are anticipated to be transferred to Liddell Coal Operations (subject to approval), for disposal in existing mine voids at Liddell, in order to allow the West Pit tailings emplacement facility time to consolidate and dry out prior to capping, consistent with the current consent.

The transfer of tailings from Mount Owen to Liddell Coal Operations will require compliance by Mount Owen with relevant legislation including the EPA Coal Washery Reject Orders noted by the EPA in its submission, prior to the transfer of tailings to Liddell Coal Operations. Mount Owen understands this may require submission of analysis results for tailings in accordance with the requirements of the EPA Coal Washery reject orders.

It is noted that the receipt of tailings at the Liddell Coal Operations is not the subject of this Proposed Modification approval process. This will be subject to a separate approval process to ensure that disposal of tailings at Liddell Coal Operations is appropriately approved and licensed.

As discussed in the SEE, the emplacement of tailings from the Mount Owen CHPP in West Pit may still occur during this time to assist with achieving the final landform, and/or for contingency tailings storage, together with in-pit tailings emplacement within tailings cells in the North Pit. If approval is not granted to emplace tailings from Mount Owen CHPP at Liddell Coal Operations (via the GRAWTS) then tailings would be emplaced either in tailings cells in North Pit or in the BNP void at the completion of mining in specific areas, in accordance with SSD-5850.

There is no detail about the additional volume of tailings that will be generated by the modification or details of the volume of tailings that would need to be transported through the GRAWTS to Liddell Operations. There is no detail whether the tailings emplacement areas have sufficient volume available to emplace the additional tailings.

There is no engineering, geotechnical or hydrogeological assessment of the emplacement areas that address if additional tailings can be emplaced in these voids without environmental impacts such as risk of seepage through impermeable layers in the void stratigraphy during emplacement.

Coarse reject is to be co-disposed with overburden emplacement yet there is no explanation of how coarse reject will be emplaced to ensure that there are no long-term saline seepage issues from the final landform.

The proponent needs to provide a full assessment of tailings management and disposal including more detailed information about the volume of tailings that are likely to be generated by the mine expansion and whether existing approvals permit increased tailings disposal (and including details of any transfers to the Liddell Mine under the GRAWTS scheme), an assessment of the capacity of each of the tailings dams, voids and emplacement areas to accept and dispose of the tailings, assessment of any impacts of increased tailings disposal heights on groundwater and surface waters during operation and post rehabilitation and including geotechnical or engineering assessment of the integrity of the storages.

As detailed in the SEE the GRAWTS includes Glencore's Mount Owen Complex, Ravensworth Operations, Integra Underground and Liddell Coal Operations. The GRAWTS is designed to improve the efficiency of use and the emplacement of tailings across the operations. Glencore has undertaken a full assessment of the capacity of the existing and future tailings emplacement areas within the existing operations including the volume of tailings requiring emplacement as part of existing approvals. The capacity of the tailings emplacement areas within the GRAWTS and the predicted tailings generation with and without the Proposed Modification is provided in **Figure 6.14**.

It is important to note that the sharing of tailings within the GRAWTS is not driven by a capacity issue. As discussed above tailings are anticipated to be transferred to Liddell Coal Operations (subject to approval), in order to allow the West Pit tailings emplacement facility time to consolidate and dry out prior to capping. If approval is not granted to emplace tailings from Mount Owen CHPP at Liddell Coal Operations (via the GRAWTS) then tailings would be emplaced either in tailings cells in North Pit or in the BNP void at the completion of mining in specific areas.

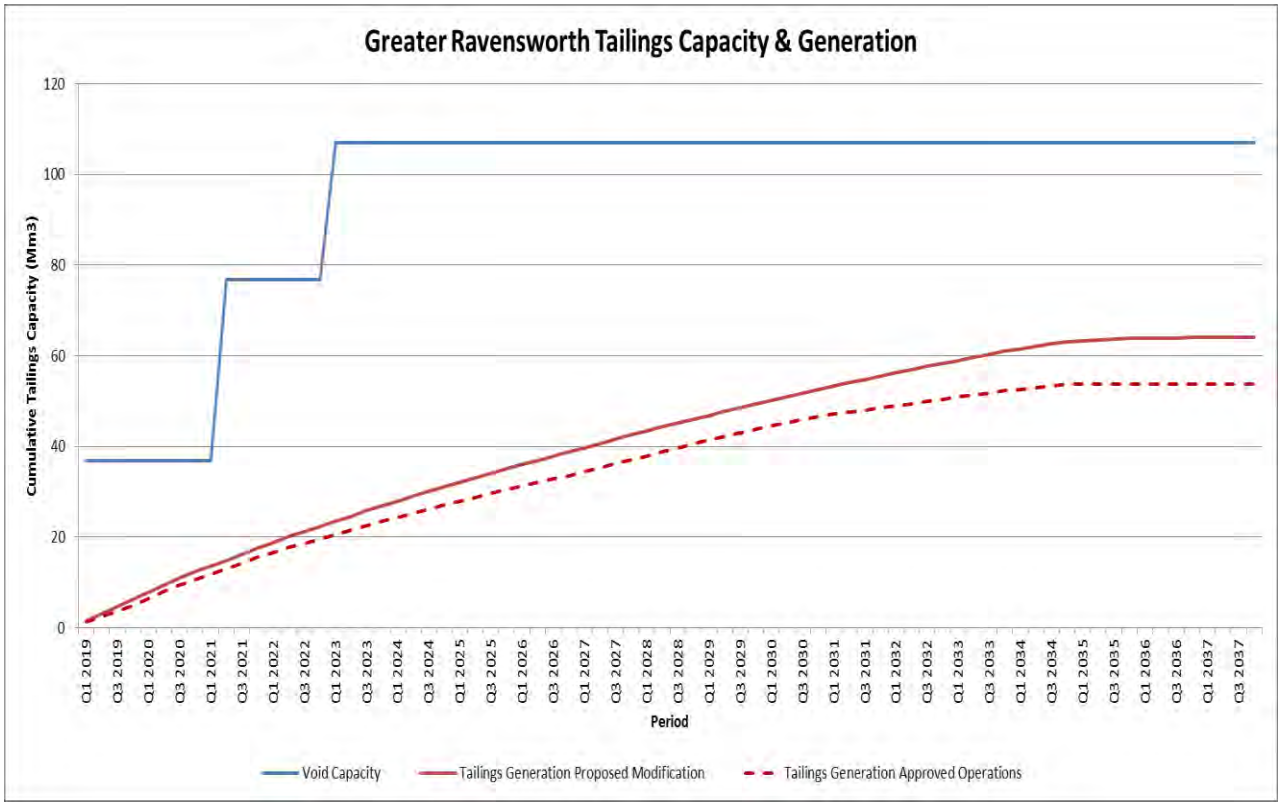


Figure 6.14 Cumulative GRAWTS tailings capacity and tailings generation

The management of coarse reject and other waste material will be consistent with the practices employed for the Approved Operations. Coarse reject will be co-disposed with overburden material and incorporated into the final landform. The coarse reject material will be placed at a suitable depth within the final landform to minimise any potential interference to rehabilitation establishment.

Analysis undertaken by EGI (2018), included the testing of overburden, interburden and coal seams which indicated that salinity does not currently present a risk to the establishment of the final landform. Overburden samples contained electrical conductivity values in the non-saline to slightly saline range. Therefore overburden emplacement does not require any selective handling or any other specific management measures to mitigate salinity risk in rehabilitated emplacement areas.

The results of the geotechnical analysis undertaken by Pells Sullivan Meynink (PSM) is summarised in the Rehabilitation Management Strategy (Appendix 16 of the SEE) which in overview, indicates:

- North Pit has an acceptable Factor-of-Safety (FoS) with all areas ranked very low to low, with one zone ranked low to medium risk (where an area of known structural disturbance to the rock mass intersects the pit wall).

- Specific design parameters have been included in the design of the BNP void including larger catch benches and geotechnical monitoring to improve the stability of the highwalls.

Mining within the West Pit was designed to achieve a stable highwall and low-wall design with the establishment of a surface drainage network to divert the bulk of surface water away from the void. To promote the geotechnical stability of the West Pit void during tailings emplacement, dewatering strategies have been incorporated into the design of the tailings dam. As tailings are emplaced, progressive dewatering is undertaken to promote even consolidation of material throughout the tailings profile. Additionally, tailings within West Pit void are beached along the former highwall, which aids with the sealing of exposed seams and to push decant water away from potential seepage paths.

Regular geotechnical assessments and inspections were undertaken during the mining of the West Pit and establishment of the void as a tailings storage facility and will continue to be undertaken throughout the tailings emplacement process (currently subject to a six-weekly inspection regime). Six-monthly and annual inspections by the tailings engineer review the emplacement strategy and performance. Tailings emplacement performance is measured monthly against the design parameters of emplacement density, settlement and rate of rise.

7.0 Revised Environmental Management and Monitoring Measures

The Approved Operations are undertaken in accordance with the environmental management plans, strategies and monitoring programs currently approved and implemented at the Mount Owen Complex. The current approved environmental management plans, strategies and monitoring programs are available on the Mount Owen Complex website (www.mtowencomplex.com.au), apart from the Rehabilitation Strategy which has been lodged with DPE for approval.

These management plans have been reviewed and revised to incorporate the requirements associated with SSD-5850 and recently, where applicable, to the approved Mount Owen Continued Operations Modification 1. Should the Proposed Modification (Modification 2) be approved, further updates will be undertaken to incorporate the management requirements resulting from the Proposed Modification. This will include general updates to reflect the modified operations as well as specific revisions to reflect updated and revised management commitments required as a result of the Proposed Modification.

The proposed updates to the relevant SSD-5850 conditions of consent and management commitments are described in the SEE. The management commitments identified in Section 2.3 of the SEE are reproduced below as well as additional management measures identified through the RTS process (shown as italicised):

- Revisions to the Noise Management Plan to update the operational noise control protocols and attended and real time noise monitoring locations in accordance with consent condition - Schedule 3, Condition 7 – Noise Management Plan.
- *Revisions to the Noise Management Plan to include a specific protocol for noise compliance monitoring that enables the separation of the noise generated from the Proposed Modification from adjacent mining operations based on the INP and NPfI guidance framework - Schedule 3, Condition 7 – Noise Management Plan.*
- Revisions to the Blast Management Plan to include specific blast impact criteria for Main Creek, in accordance with consent condition - Schedule 3, Conditions 8 (Blasting Criteria) and 15 (Blast Management Plan).
- *Revisions to the Air Quality Management Plan to update the relevant estimates of PM_{10} and $PM_{2.5}$ emssions from Diesel Engines (as detailed in **Section 6.1.1.2**) - Schedule 3, Condition 19 – Air Quality Management Plan.*
- Revisions to the Water Management Plan (Surface Water Management and Monitoring Plan) to update proposed alteration to the flood attenuation commitments for Hebden Road, updates to the monitoring program and other operational updates to the approved water management system, in accordance with consent condition - Schedule 3, Condition 26 (iv) – Surface Water Management Plan.
- *Revisions to the Water Management Plan (Surface Water and Groundwater Response Plan) to include the implementation of an appropriate monitoring program to determine if the Proposed Modification causes a significant impact on the alluvial aquifer water resource of Main Creek. A trigger action response plan (TARP) will be developed to guide the implementation of appropriate responses such as monitoring and mitigation measures (including the installation of a low permeability barrier). Triggers for the implementation of mitigation measures will be included in the updated WMP. Reference to significant impact will be in accordance with the NSW Aquifer Interference Policy (DPI Water 2012), Table 1 – Minimal Impact Considerations for Aquifer Interference Activities - Schedule 3, Condition 26 - Water Management Plan.*

- *Revisions to the Water Management Plan (Surface Water Management and Monitoring Plan) to update the surface water monitoring program to include two additional surface water quality monitoring points on Glennies Creek, one located upstream and one downstream of the junction with Main Creek to provide improved understanding of the influence of Main Creek on the environmental and community values associated with Glennies Creek - Schedule 3, Condition 26 (iv) – Surface Water Management Plan.*

- Revisions to the Biodiversity and Offset Management Plan to include the Biodiversity Offset Strategy for the Proposed Modification once finalised in accordance with consent condition - Schedule 3, Condition 31 – Biodiversity Management Plan.

- Revisions to the Aboriginal Cultural Heritage Management Plan, prepared in accordance with consent condition - Schedule 3, Condition 34 to incorporate two known sites as Category 2 salvage items and amend the artefact storage facility commitment as outlined in Section 2.2.4 of the SEE.

- Implementation of vegetation screen along Glennies Creek Road/Falbrook Road to minimise potential visibility of the North Pit from the intersection of Glennies Creek, Falbrook and Middle Falbrook Roads to satisfy the requirement of consent condition - Schedule 3, Condition 39(e) to undertake reasonable and feasible measures to shield views of mining operations and associated equipment from users of public roads and privately-owned residences.

- Revisions to the Rehabilitation Strategy and Rehabilitation Management Plan to reflect the proposed conceptual final landform and key matters raised by NSW Resources Regulator and DPE in relation to proposed conceptual final landform and in accordance with consent condition - Schedule 3, Condition 43 (Rehabilitation Strategy) and Condition 45 (Rehabilitation Management Plan).

- *Preparation of a Mine Closure Plan for the development to the satisfaction of the Planning Secretary in consultation with the Resources Regulator and Singleton Council. The plan is to consider integration of final rehabilitation and mine closure requirements with those of adjacent Glencore mines, to the greatest extent practicable, and a final land use strategy to investigate potential post-mining beneficial land uses for the site (including the final voids), that:*

    (i) align with local strategic planning instruments;

    (ii) provide a sustainable future for the local community;

    (iii) utilise existing mining infrastructure, where practicable;

    (iv) do not compromise ecological rehabilitation requirements;

    (vi) investigates ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local employment levels; and

    (vii) describe measures that would be implemented to minimise or manage the ongoing environmental effects of the development, including monitored of these effects over time.

8.0 References

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Umwelt (Australia) Pty Limited (2015a). *Mount Owen Continued Operations Project Environmental Impact Statement*

Umwelt (Australia) Pty Limited (2018). *Mount Owen Continued Operations Project Modification 2 Statement of Environmental Effects.*

Umwlet (Australia) Pty Limited (2018a). *Mount Owen Continued Operations Project Modification 2 Noise Impact Assessment*

Umwlet (Australia) Pty Limited (2018b). *Mount Owen Continued Operations Project Modification 2 Biodiversity Assessment Report*

WSP Parsons Brinckerhoff (2017). *Mount Owen Continued Operations Project Hebden Road Upgrade, Yorks Creek – Flood Impact Assessment*

APPENDIX 1

Response to Submissions Relating to Air Quality




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JACOBS

Umwelt (Australia) Pty Limited
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Attention: Penelope Williams

21 December 2018 -

Dear Penelope

Mount Owen Continued Operations Project Modification 2 – Response to Submissions Relating to Air Quality

I have reviewed the submissions from the Department of Planning and Environment (DPE) and Environment Protection Authority (EPA) on the Mount Owen Continued Operations Project Modification 2 Air Quality Impact Assessment (AQIA) (Jacobs 2018). Please see attached for the requested information.

Yours sincerely

Shane Lakmaker
Principal (Air Quality)
(02) 4979 2663 shane.lakmaker@jacobs.com

1. Information for the Department of Planning and Environment

The DPE has requested additional information on three matters. These are listed and addressed below.

- The EPA has requested additional information with respect to the Air Quality Impact Assessment (AQIA). In particular, the EPA has requested that predicted exceedances of the impact assessment criteria be clearly identified in the assessment. The AQIA should distinguish between exceedances of the assessment criteria imposed under SSD 5850, which are applied incrementally in accordance with the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP), and exceedances of the EPA's assessment criteria, which are applied cumulatively in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2016). Clarification has also been requested with respect to $PM_{2.5}$ emissions from diesel plant and equipment.

The requested information is provided in **Section 2**.

- The majority of community submissions raised concerns regarding the cumulative air quality impacts of the proposed modification, particularly in relation to Camberwell. NSW Health also raised concerns regarding the assessment of cumulative impacts in the AQIA and the difficulty of achieving air quality goals in the locality, particularly during drought periods. The Department requests a detailed response to these concerns, including further discussion regarding:
  - the proportional contributions of the various mining operations to particulate matter concentrations in the locality;
  - existing mitigation and/or acquisition rights in Camberwell, following the determination of Ashton Coal Mine South East Open Cut Project (Modification 1) on 27 August 2018; and
  - the draft VLAMP (2017).

  In particular, the AQIA should provide an assessment of cumulative PM_{10} and $PM_{2.5}$ concentrations in the event that the Ashton South East Open Cut Project does not proceed.

  It would also be useful to provide a summary, preferably in table format, of privately-owned residences in Camberwell and to the south-east of the proposed extension area, which hold acquisition and/or mitigation rights, and to identify the relevant development consent or project approval under which those rights are granted.

The proportional contributions of the various mining operations to particulate matter concentrations in the Camberwell area have been examined by extracting results from the models described in the AQIA (Jacobs 2018). Specifically, the predicted annual average PM_{10} concentrations at property 152, located in the centre of Camberwell, have been collated for all years of assessment and for all source contributions including background levels. **Figure 1** 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 introduced (2017) EPA criterion 25 $\mu g/m^3$ in the Camberwell area (refer to Figure 9 of the AQIA).

The contribution from the Mount Owen Continued Operations (as modified), referred to as the Proposed Modification, is predicted to be less than 2 $\mu g/m^3$. This value reflects the distance and direction of Mount Owen Mine relative to Camberwell and is consistent with the predicted contributions associated with the Approved Operations (refer to Table D2 of Appendix D in PEL 2014). It can be seen from **Figure 1** that emissions from the Proposed Modification would not be the main contributor to PM_{10} concentrations at this location. As can be seen from **Figure 1** the cumulative PM_{10} levels are predicted to exceed the 25 $\mu g/m^3$ EPA criterion in Year 2, Year 8 and

Year 15 (should the Ashton SEOC Project proceed) without the contribution from the Approved Operations or the Proposed Modification.

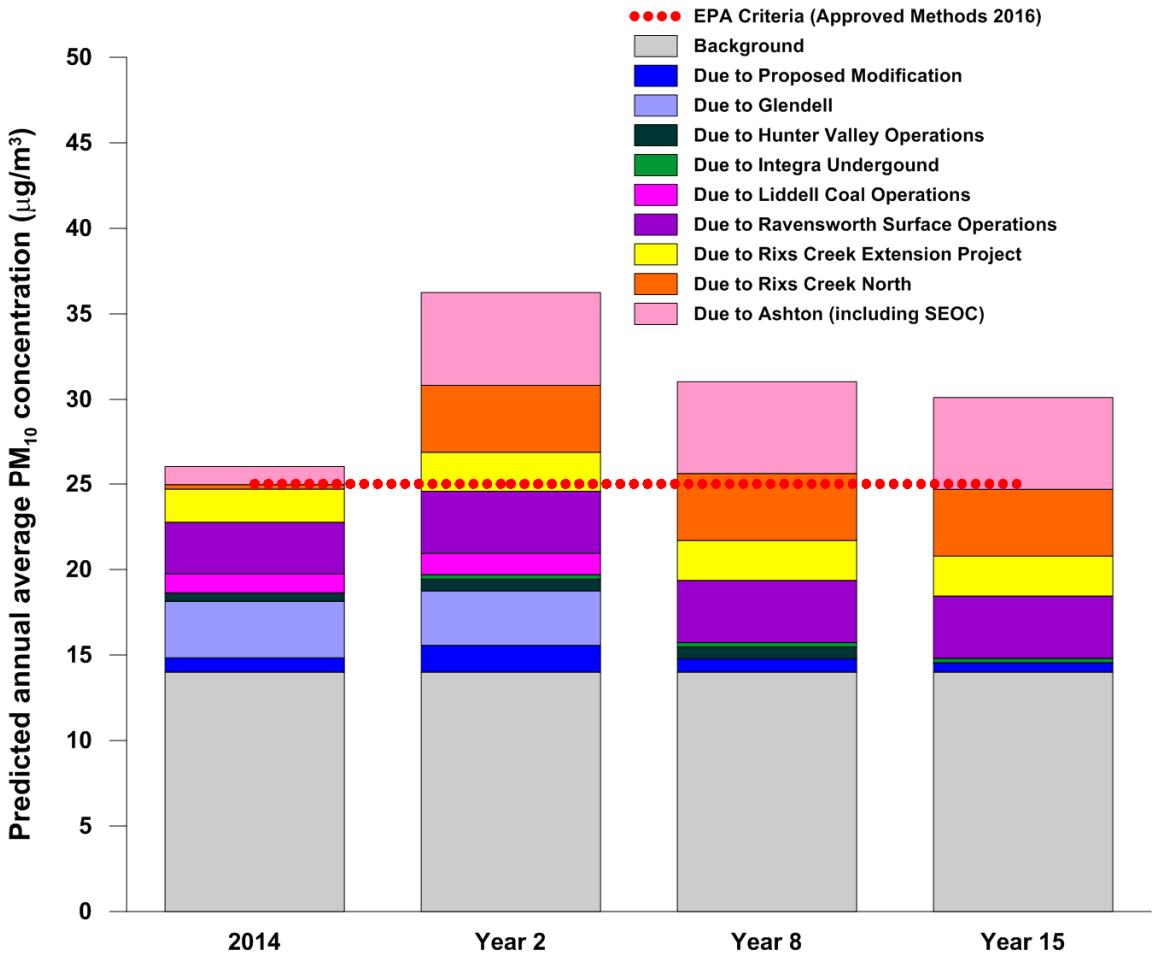

Figure 1 Predicted annual average PM_{10} concentrations in Camberwell (Property 152)

Figure 1 also highlights the relative contributions of background levels and mining operations. In order of significance the contributions for the worst case year (Year 2) are predicted to be ranked as follows:

- Background (39%)
- Ashton including South East Open Cut (SEOC) (15%)
- Rix's Creek North (11%)
- Ravensworth Surface Operations (10%)
- Glendell Mine (9%)
- Rix's Creek including Rix's Creek Extension Project (6%)
- The Proposed Modification (4%)

- Liddell Coal Operations (3%)
- Hunter Valley Operations (2%)
- Integra Underground (1%)

Additional assessment of all private receptors and mine owned properties is provided in **Section 2**, with reference to Appendix A, and including discussion of compliance with the Voluntary Land Acquisition and Mitigation Policy (VLAMP) (NSW Government 2018). It should be noted that although exceedances of the VLAMP 2018 have been identified should it apply to the Proposed Modification, as detailed in the SEE and the following sections, the Proposed Modification is not predicted to result in an increased area of impact in respect to air quality relative to the Approved Operations. No additional private receptors will be impacted, than that identified under the VLAMP 2014 for the Approved Operations. Accordingly, the VLAMP 2018 does not apply to the assessment of the Proposed Modification. **Section 2** and Appendix A also provide results for a scenario which assumes that the Ashton SEOC Project does not proceed.

Table 1 provides a summary of privately-owned residences in Camberwell and to the south-east of the North Pit which hold acquisition and / or mitigation rights. The relevant development consent or project approval which provides the acquisition rights is also indicated.

Table 1 Summary of private residences with mitigation and / or acquisition rights

Residential Property ID	Mount Owen Continued Operations SSD-5850	Glendell DA 80/952	Ashton SEOC MP 08_0182	Ravensworth Surface Operations DA 09_0176	Rixs Creek North 08_0102	Rixs Creek Extension SSD-6300	Integra Underground 08_0101	Ashton Underground DA309-11-2001
Camberwell Residences								
143		M	B, M		M			
144a			A, M	A, M				A
144b, 144c			A, M			A[1]		
145			A, M		A	A[1]		A
147			A, M		A	M[1]		A
150			A, M					
152		M	B		M			
154			A, M					
155		M	A, M		M			
156			A, M					
Other residences (Refer to RTS main document Figure 6.2 for locations)								
4					M			
5					M		A	

Residential Property ID	Mount Owen Continued Operations SSD-5850	Glendell DA 80/952	Ashton SEOC MP 08_0182	Ravensworth Surface Operations DA 09_0176	Rixs Creek North 08_0102	Rixs Creek Extension SSD-6300	Integra Underground 08_0101	Ashton Underground DA309-11-2001
007b					M			
10					M			
12					M			
13	M							
19	M							
21	A, M							
23	A, M							
93	M							
105	A, M				A		A, M	
111		M			A	M[1]		
112					M			
114	A, M							
115	A, M							
122		A, M					A	
127a		A, M	B		A	M[1]		
127b		A, M	B		A	M[1]	M	
127c		*		*	A			*
127d	*	*	*	*	A			*
133[2]	A, M							
Privately owned vacant land								
Lot 3/DP1111313			A		A	A[1]		
Lot 1/DP121623			A			A[1]		
Lot 1/DP1136411			A			A[1]		A
Lot 52/DP252692						A[1]		
Lot 53/DP252692						A[1]		
Lot 54/DP252692						A[1]		
Lot 4/DP1166047			B					
Lot 5/DP1166047			B					
Lot 175/DP1002770			B					

Residential Property ID	Mount Owen Continued Operations SSD-5850	Glendell DA 80/952	Ashton SEOC MP 08_0182	Ravensworth Surface Operations DA 09_0176	Rixs Creek North 08_0102	Rixs Creek Extension SSD-6300	Integra Underground 08_0101	Ashton Underground DA309-11-2001
Lot 106/DP855187			B					

NOTE: A = acquisition on request | B = Ashton SEOC acquisition noise trigger | M – Mitigation rights
[1] - Proposed acquisition (DPE, SSD Assessment Rix's Creek Continuation of Mining Project (2018)
[2] - As per SSD-5850, Mount Owen is only required to acquire Lot 31 DP6842 and Lot 2 DP1175728 within property 133
**Dwelling constructed after project approval granted*

- The Department requests clarification regarding the column heading "Cumulative (no SEOC or RCN)" in Appendix E of the AQIA. Please confirm whether this is intended to refer to the Rix's Creek Continuation Project, rather than Rix's Creek North.

The "RCN" in the column labelled "Cumulative (no SEOC or RCN)" referred to Rix's Creek North. Results for this scenario (that is, without RCN) were included to help understand the relative contribution of Rix's Creek North to the key area of interest to the south east of Mount Owen Mine.

2. Information for the Environment Protection Authority

The EPA has requested additional information on two matters. These are listed and addressed below.

> 1. Explicit estimation of diesel particle emissions
>
> Assessment requires explicit estimation of particle emissions from diesel-powered plant and equipment and commitment to adopting reasonable and feasible emission controls.
>
> Diesel particle emissions have not been estimated and explicitly documented in the SEE or AQIA. It is noted that nitrogen oxide emissions from diesel plant and equipment were estimated and assessed, however diesel particle emissions were not considered in equivalent detail.
>
> - Particle emissions from diesel engines are predominantly $PM_{2.5}$ and diesel engines are a significant source.
> - The consent for current approved operations includes a requirement for the applicant to include an *initial baseline estimate of emissions of $PM_{2.5}$ from all diesel engines used for the development* in their air quality management plan, clause 19(e) of Schedule 3. Clause 19(e) requires that the air quality management plan be approved by the DPE prior to commencement of development under the consent.
> - The required information has not been made available to the EPA to review – to inform recommended conditions of approval or EPL conditions.

An initial baseline estimate of emissions of $PM_{2.5}$ from all diesel engines used for the development is provided in the Mount Owen Complex Air Quality Management Plan (Mount Owen 2018). **Table 2** provides the explicit estimates of PM_{10} and $PM_{2.5}$ emissions due only to diesel plant and equipment exhausts. Emission factors for "Industrial off-road vehicles and equipment" from the EPA's 2008 Air Emissions Inventory (EPA 2012) were used for the calculations below. These factors relate to diesel exhaust and evaporative emissions.

Table 2 Estimate of PM_{10} and $PM_{2.5}$ emissions from diesel engines

Year	Fuel consumption from data provided by Mount Owen (L/y)	Emission factors (kg/kL)		Emissions (kg/y)	
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Year 2	50,999,945	2.84	2.75	144,840	140,495
Year 8	46,767,575	2.84	2.75	132,820	128,835
Year 15	21,512,920	2.84	2.75	61,097	59,264

It should be noted that estimates from **Table 2** are based on generic emission factors for the industry and are not specific to data produced directly from the Original Equipment Manufacturers (OEMs) of equipment used at the Mount Owen Mine. In addition, the National Pollutant Inventory (NPI) provides emissions factors for diesel vehicle exhausts related to heavy good vehicles (>25 t GVM). An emission factor of 1.2 kg/m^3 (1.2 kg/kL) is provided for PM_{10} and 1.1 kg/m^3 (1.1 kg/kL) for $PM_{2.5}$ (NPI 2008). Comparison of the NPI factors with the EPA factors highlight the potential variability of emissions, depending on the referenced emission factors. This further reinforces the position that the generic emission factors for the industry are not specific to data produced directly from the OEMs of equipment used at the Mount Owen Mine.

The emission control measures proposed by Mount Owen, as outlined in the approved Air Quality Management Plan (Mount Owen 2018), include:

- Servicing all machinery in accordance with maintenance contracts and adopting original equipment manufacturer recommendations for maintenance.
- Targeting the maintenance so equipment remains fit for purpose over its whole life cycle.
- Defining failure modes, effects and criticality.

> 2. Additional Exceedances of the EPA's Impact Assessment Criteria
>
> AQIA states (p13) "*the Proposed Modification is not predicted to result in any increase in impacts relative to the Approved Operations*". Additionally, the AQIA concludes (p75) that *"Excluding community or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive locations which are predicted to experience a Proposed Modification contribution of greater than 50 µg/m^3 for maximum 24-hour average PM10 concentrations"*.
>
> However, Figure 19 of AQIA shows there are non-mine owned receptors for which cumulative concentration of 24-hour PM_{10} are predicted to exceed the EPA's impact assessment criterion of 50 µg/m^3. Appendix E tabulates results for the identified receptors. Twenty-seven of these exceed the EPA's cumulative impact assessment criterion for 24-hour PM_{10}, all but one of them appear to be due to the modification proposal.
>
> EPA notes that the AQIA uses the criteria in *Voluntary Land Acquisition and Mitigation Policy* to assess change in predicted impacts. Consistent with the EPA's advice on the original Mt Owen Continuation proposal, the assessment should consider the EPA's impact assessment criteria – which apply on a cumulative basis.
>
> The AQIA should be revised to include additional information (tabulated results and updated conclusions), specifically identifying all receptors (private and mine owned) that are predicted to exceed of the EPA's impact assessment criteria ($PM_{2.5}$, PM_{10}, TSP and dust deposition). The revised assessment should include annotation to indicate any residences predicted to exceed due to the modification

The tabulated results have been revised as per the EPA's request above and Appendix 1 provides the tabulated model results for all receptors and for $PM_{2.5}$, PM_{10}, TSP and dust deposition. These results have been reformatted to include tests and assessments against the VLAMP 2018 and the EPA impact assessment criteria (EPA, 2016). As previously discussed, although exceedances of the VLAMP 2018 have been identified, the VLAMP 2018 does not apply to the Proposed Modification, as the Proposed Modification does not involve increases in the approved dust impacts relative to the Approved Operations. A scenario with and without the Ashton SEOC Project has also been provided.

The conclusions from this revised assessment are as follows:

- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience 24-hour or annual average $PM_{2.5}$, annual average TSP or annual average dust deposition levels above the criteria outlined by the EPA (2016).
- There is a potential for PM_{10} concentrations to exceed the EPA's 24-hour average cumulative impact criterion at 48 private sensitive receptors without acquisition rights, of which 21 were determined to have potential for an exceedance to be influenced by the Proposed Modification. This conclusion is based on modelled instances where the inclusion of the

Proposed Modification led to predicted additional days above 50 µg/m^3 (24-hour average) ranging in the order of 1-3 days per year (that is, relative to modelled cumulative impacts without any contribution from Mount Owen (either the Approved Operations or the Proposed Modification).

- The AQIA undertaken to support the Mount Owen Continued Operations (PAE, 2014) did not follow the same method as the AQIA for the Proposed Modification (Jacobs, 2018) for the assessment of cumulative 24-hour average PM_{10} impacts. For the previous assessment, a Monte Carlo simulation was undertaken to assess the potential cumulative 24-hour average PM_{10} impacts associated with the Approved Operations at selected sensitive receptors only. Accordingly, it is not possible to quantify the extent of change that the Proposed Modification makes to predicted cumulative 24-hour average PM_{10} impacts relative to the Approved Operations. However, a comparison was made between the Approved Operations and the Proposed Modification in the AQIA, in terms of the maximum predicted extent of potential impacts. This comparison showed that the predicted maximum contributions of the Proposed Modification to air quality would be, for the most part, less than the predicted maximum contributions of the Approved Operations. It is noted that the AQIA does not include modelling of reactive management measures that can be undertaken by Mount Owen in the event that elevated dust levels are identified on a day-to-day basis. The potential impacts will continue to be managed in accordance with relevant approval conditions and the existing management processes currently implemented at the Mount Owen Complex as outlined in the approved Air Quality Management Plan.
- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience annual average PM_{10} levels above the criteria outlined by the EPA (2016).
- Excluding community infrastructure or private infrastructure, or properties subject to existing acquisition rights, there are no private sensitive receptors which are predicted to experience 24-hour average $PM_{2.5}$, 24-hour average PM_{10}, annual average TSP or annual average dust deposition levels above the criteria outlined in the VLAMP (2018). Two private sensitive receptors (property 4 and 112) are predicted to experience annual average $PM_{2.5}$ and annual average PM_{10} levels in excess of the VLAMP (2018) criteria on more than 25% of the property. However at these locations the VLAMP (2018) has been determined as not applicable as the VLAMP (2018) only applies to “Modification applications that involve increases in the approved dust or noise impacts of a development”. The currently predicted annual average $PM_{2.5}$ and PM_{10} concentrations at property 4 and 112 due to the Proposed Modification are not higher than those predicted for the Approved Operations.
- The model predictions have been re-assessed as per the EPA’s request above. **Appendix A** provides a copy of the tabulated model results for all receptors and for $PM_{2.5}$, PM_{10}, TSP and dust deposition. These results have been reformatted to include tests and assessments against the current Voluntary Land Acquisition and Mitigation Policy (VLAMP 2018) and the EPA impact assessment criteria (EPA 2016).

3. ACARP Emission Factors – for proponent and consultant to note

The AQIA references the use of particle emission factors derived from ACARP Project C22027 (ACARP factors). EPA advises that the ACARP factors are not routinely adopted in air quality impact assessments in NSW. The EPA understands that peer review of the ACARP factors, commissioned by the Commonwealth (under the NPI program) raised significant issues with the project and uncertainty with the derived factors. Further, the EPA understands that additional work to address some of the shortcomings from the ACARP project was proposed but the project factors have not been finalised and endorsed under the NPI framework. The use of the ACARP factors therefore adds to assessment uncertainty and the EPA does not generally support the use of the ACARP factors in air quality impact assessments at this time.

Notwithstanding the issues associated with the ACARP factors, the EPA is not requesting a complete revision of the AQIA. This is due to the relatively minor scale of the modification – in terms of air emissions – noting that the rate of extraction and mining methods are not proposed to change. On this basis, provided all assessment results are produced using a consistent methodology, results can be interpreted in relative (change in impact) as well as absolute terms.

It is recommended that the proponent and their consultant be advised that the ACARP factors are not generally supported by the EPA for routine use in air quality impact assessments in NSW.

Noted, thank you. The ACARP factors were referenced in the AQIA and compared with the US EPA and NPI factors but were not used in the emission inventories or modelling.

References

Donnelly S-J, Balch A, Wiebe A, Shaw N, Welchman S, Schloss A, Castillo E, Henville K, Vernon A and Planner J (2010) "NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and / or Minimise Emissions of Particulate Matter from Coal Mining". Prepared by Katestone Environmental Pty Ltd for NSW Office of Environment and Heritage, December 2010.

EPA (2012) "Air Emissions Inventory for the Greater Metropolitan Region in New South Wales, 2008 Calendar Year, Off-Road Mobile Emissions". Technical Report No. 6. Prepared by the Environment Protection Authority. EPA 2012/0050. August 2012

EPA (2014) NSW Coal Mining Benchmarking Study: Best practice measures for reducing non-road diesel exhaust emissions".

EPA (2016) "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW". Published by the Environment Protection Authority. January 2017.

Jacobs (2018) "Mount Owen Continued Operations Modification 2 – Air Quality Impact Assessment". Prepared for Mt Owen Pty Limited, dated 18 July 2018. Reference IA129500.

Mount Owen (2018) "Air Quality Management Plan". Document number MGOOC-1779562647-4392. Version 4.0. Effective 12/10/2018.

NSW Government (2018) "Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments". September 2018.

Pacific Environment Limited (2014) "Air Quality Impact Assessment – Mount Owen Continued Operations". Job number 6043C. Report dated 29 October 2014.

TAS (2016) "Review – Air Quality Impact Assessment – Mt Owen Continued Operations Project". Prepared by Todoroski Air Sciences for the NSW Department of Planning & Environment. Dated 29 April 2016. Job Number 15090470.

Appendix A Model results in tabular format

Table 1 Model predictions at receptors

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
Maximum 24-hour average PM_{10} ($\mu g/m^3$)																		
1	Other Mine - Vacant	21	25	16	63	63	63	48	64	63	63	63	63	63	50		Y	0
2	Community Infrastructure	20	19	16	60	59	59	48	61	60	60	60	60	60	50		Y	0
3	Other Mine	22	25	17	57	57	57	48	58	58	57	58	58	57	50		Y	0
4	Private	23	27	19	53	52	52	49	54	53	53	54	53	53	50	N	Y	0
5	Private - Subject to Acq Rights	22	26	17	54	54	54	48	55	55	55	55	55	55	50	N	Y	0
6	Community Infrastructure	24	28	17	53	52	52	48	53	53	53	53	53	53	50		Y	0
10	Private	24	27	19	50	50	50	48	54	52	50	54	52	50	50	N	Y	4
11	Private	26	28	20	50	49	49	48	53	52	50	53	52	50	50	N	Y	3
12	Private	26	28	20	50	49	49	48	54	53	50	54	53	50	50	N	Y	4
13	Private	25	23	11	48	48	48	48	53	50	49	53	50	49	50	N	Y	5
14	Private	22	20	10	48	48	48	48	50	49	48	50	49	48	50	N	N	0
19	Private	29	33	19	49	49	49	48	59	60	50	59	60	50	50	N	Y	11
21	Private - Subject to Acq Rights	29	31	22	50	49	49	48	56	57	50	56	57	50	50	N	Y	8
22	Glencore	28	31	22	50	50	49	48	56	55	50	56	55	50	50		Y	6
23	Private - Subject to Acq Rights	29	33	23	50	50	49	48	57	58	51	57	58	51	50	N	Y	8
24	Glencore	32	35	24	50	49	49	49	59	62	51	59	62	51	50		Y	13
25	Glencore	33	39	25	50	49	49	49	61	65	51	61	65	51	50		Y	16
26	Glencore	33	39	25	49	49	49	49	62	66	50	62	66	50	50		Y	17
27	Glencore	32	38	27	50	50	50	49	60	64	54	60	64	54	50		Y	14
28	Glencore	35	46	30	50	49	49	50	62	67	53	62	67	53	50		Y	18
29	Glencore	34	45	31	50	50	49	50	62	68	56	62	68	56	50		Y	18
30	Glencore	54	90	50	50	50	49	51	73	106	67	73	106	67	50		Y	56
31	Glencore	56	91	50	50	49	49	53	74	107	67	74	107	67	50		Y	58
32	Glencore	45	58	26	49	49	48	60	72	72	52	72	72	52	50		Y	23
33	Glencore	37	45	21	49	48	48	57	63	60	50	63	60	50	50		Y	14
34	Glencore	33	36	19	49	48	48	53	54	54	50	54	54	50	50		Y	6
35	Glencore - Vacant	32	34	19	49	48	48	52	54	54	50	53	54	50	50		Y	6
36	Glencore	38	45	22	49	48	48	57	60	60	51	60	60	51	50		Y	12
37	Glencore - Vacant	51	74	31	49	48	48	62	68	88	53	68	88	53	50		Y	40
38	Glencore	57	90	38	49	49	48	67	85	104	56	85	104	56	50		Y	55
39	Glencore	51	74	32	49	49	48	64	79	89	53	79	88	53	50		Y	40
40	Glencore	25	18	9	48	48	48	49	51	51	49	51	51	49	50		Y	3
41	Private	6	4	2	47	47	47	48	48	48	48	48	48	47	50	N	N	0
42	Private	7	4	2	47	47	47	48	48	48	47	48	48	47	50	N	N	0

Notes:

- [1] VLAMP 2018 assessment includes privately owned receptors only. It should be noted that VLAMP 2018 does not apply to the Proposed Modification due to no predicted increase in air quality impacts relative to the Approved Operations. Assessment of private vacant land provided in Table 2.
- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
43	Private	5	3	1	47	47	47	47	48	48	47	48	48	47	50	N	N	0
45	Private	4	3	1	47	47	47	47	48	48	47	48	48	47	50	N	N	0
46	Private	4	3	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
47	Private	4	3	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
48	Private	5	4	2	47	47	47	48	48	48	48	48	48	47	50	N	N	0
49	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
50	Private	4	3	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
51	Private	5	4	2	47	47	47	48	48	48	47	48	48	47	50	N	N	0
52	Private	4	4	2	47	47	47	48	48	48	47	48	48	47	50	N	N	0
53	Private	3	3	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
54	Private	3	4	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
55	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
57	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
58	Private	7	4	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
59	Private	8	4	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
60	Private	8	4	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
61	Private	8	4	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
62	Private	9	5	2	47	47	47	47	48	48	47	48	48	47	50	N	N	0
73	Private	9	7	5	47	47	47	47	48	48	47	48	48	47	50	N	N	0
74	Private	12	11	6	48	48	48	47	48	48	48	48	48	48	50	N	N	0
83	Private	16	15	8	48	48	48	47	48	48	48	48	48	48	50	N	N	0
85	Private	15	15	9	48	48	48	47	48	48	48	48	48	48	50	N	N	0
86	Private	16	16	11	48	48	48	47	48	48	48	48	48	48	50	N	N	0
87	Private	17	17	10	48	48	48	47	48	48	48	48	48	48	50	N	N	0
88	Private	18	18	12	48	48	48	47	48	48	48	48	48	48	50	N	N	0
89	Private	18	17	13	48	48	48	47	49	49	48	49	49	48	50	N	N	0
90	Other Mine	18	17	13	48	48	48	47	49	49	48	49	49	48	50		N	0
91	Private	20	19	14	49	49	49	48	49	49	49	49	49	49	50	N	N	0
92	Private	20	22	15	49	49	49	48	50	50	50	50	50	49	50	N	N	0
93	Private	22	24	16	49	49	49	48	51	51	49	51	51	49	50	N	Y	2
94	Private	22	22	12	48	48	48	48	51	50	49	51	50	49	50	N	Y	3
95	Private	21	20	11	48	48	48	48	50	49	48	50	49	48	50	N	N	0
96	Private	16	15	10	48	48	48	47	48	48	48	48	48	48	50	N	N	0
97	Private	16	16	10	48	48	48	47	48	48	48	48	48	48	50	N	N	0
98	Private	16	15	12	48	48	48	47	48	48	48	48	48	48	50	N	N	0
99	Private	17	17	12	48	48	48	47	49	49	48	49	49	48	50	N	N	0
100	Private	17	18	12	49	49	48	47	50	49	49	50	49	49	50	N	N	0
101	Private	16	16	11	48	48	48	47	49	48	48	48	48	48	50	N	N	0
104	Other Mine	20	21	11	48	48	48	47	49	49	48	49	49	48	50		N	0
105	Private - Subject to Acq Rights	22	18	13	55	54	54	49	56	55	55	56	55	55	50	N	Y	0

Notes:

- [1] VLAMP 2018 assessment includes privately owned receptors only. It should be noted that VLAMP 2018 does not apply to the Proposed Modification due to no predicted increase in air quality impacts relative to the Approved Operations. Assessment of private vacant land provided in Table 2.
- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
108	Glencore	17	13	8	57	57	56	51	58	57	57	58	57	57	50		Y	0
109	Glencore	18	13	8	56	56	55	52	57	56	56	57	56	56	50		Y	0
110	Other Mine - Vacant	11	8	5	66	66	66	53	67	67	66	67	66	66	50		Y	0
111	Private - Subject to Acq Rights	10	8	5	84	84	84	52	84	84	84	84	84	84	50	N	Y	0
112	Private	30	35	20	51	50	50	48	54	52	51	53	52	51	50	N	Y	2
114	Private - Subject to Acq Rights	28	31	21	53	52	52	49	54	54	53	54	54	53	50	N	Y	0
115	Private - Subject to Acq Rights	33	38	25	53	52	52	49	56	59	54	56	59	54	50	N	Y	0
116	Glencore	27	27	19	53	53	53	49	55	54	54	55	54	54	50		Y	0
117	Glencore	32	32	24	54	53	53	49	57	56	55	56	56	55	50		Y	0
120	Glencore - Vacant	27	25	16	56	55	55	50	57	57	56	57	57	56	50		Y	0
121	Glencore - Vacant	27	21	14	55	55	54	50	58	56	55	57	56	55	50		Y	0
122	Private - Subject to Acq Rights	29	22	15	55	54	54	51	59	56	55	58	56	55	50	N	Y	0
123	Glencore - Vacant	24	21	14	56	55	55	50	58	57	56	57	57	56	50		Y	0
124	Glencore	26	18	12	55	54	54	51	58	56	55	57	55	55	50		Y	0
125	Glencore	27	18	13	55	54	54	52	62	55	55	61	55	54	50		Y	0
126	Glencore	22	16	11	55	55	54	53	58	56	55	57	55	55	50		Y	0
129	Glencore	19	10	8	77	59	59	79	86	60	59	85	59	58	50		Y	0
130	Glencore	19	10	8	81	59	59	83	90	60	59	88	59	58	50		Y	0
131	Glencore - Vacant	29	13	8	53	49	49	58	66	56	53	66	55	52	50		Y	7
132	Glencore - Vacant	27	11	6	54	49	49	58	65	54	52	65	54	52	50		Y	5
133	Private - Subject to Acq Rights	15	10	5	50	48	48	54	57	52	50	57	52	50	50	N	Y	7
143	Private - Subject to Acq Rights	12	6	4	60	59	58	52	61	59	58	59	57	56	50	N	Y	0
145	Private - Subject to Acq Rights	4	3	2	216	208	206	56	220	211	208	55	55	55	50	N	Y	0
146	Other Mine	8	5	3	70	69	61	53	70	69	62	58	57	57	50		Y	0
147	Private - Subject to Acq Rights	7	5	3	101	98	92	55	102	98	93	65	64	64	50	N	Y	0
148	Other Mine	8	5	3	79	79	79	54	79	79	79	78	78	78	50		Y	0
149	Community Infrastructure	10	5	3	63	61	61	53	64	62	61	57	55	54	50		Y	0
150	Private - Subject to Acq Rights	10	5	4	62	60	60	53	62	61	60	57	55	55	50	N	Y	0
151	Other Mine	11	5	4	61	59	59	53	62	60	59	57	55	55	50		Y	0
152	Private - Subject to Acq Rights	11	6	4	61	59	59	53	62	60	59	58	56	55	50	N	Y	0
154	Private - Subject to Acq Rights	12	6	4	60	59	58	53	61	59	59	58	56	56	50	N	Y	0
155	Private - Subject to Acq Rights	12	6	4	60	59	58	52	61	59	59	58	56	56	50	N	Y	0
156	Private - Subject to Acq Rights	13	6	4	60	58	58	56	63	59	58	58	56	55	50	N	Y	0
157	Glencore - Vacant	23	14	10	62	55	55	65	69	56	55	68	55	55	50		Y	0
158	Other Mine - Vacant	6	3	2	437	436	435	56	437	436	435	57	57	57	50		Y	0
159	Other Mine - Vacant	8	4	3	90	90	80	54	91	90	80	58	57	56	50		Y	0
160	Other Mine - Vacant	6	3	2	237	236	233	54	238	236	233	56	55	55	50		Y	0
161	Glencore - Vacant	92	18	11	52	50	49	58	109	57	54	108	57	53	50		Y	7
163	Other Mine	11	5	5	50	48	48	48	53	48	48	52	48	48	50		Y	3
164	Private - Subject to Acq Rights	11	5	4	50	48	48	48	52	48	48	51	48	48	50	N	Y	2

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
165	Other Mine	9	5	3	51	48	48	48	52	48	48	51	48	48	50		Y	0
166	Other Mine - Vacant	14	6	5	80	64	59	82	90	65	60	87	56	55	50		Y	0
178	Private	2	2	1	47	47	47	47	47	47	47	47	47	47	50	N	N	0
210	Private	2	2	1	47	47	47	47	47	47	47	47	47	47	50	N	N	0
211	Private	2	2	1	47	47	47	47	48	47	47	47	47	47	50	N	N	0
212	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
213	Private	3	2	1	47	47	47	47	48	47	47	47	47	47	50	N	N	0
259	Private	8	8	5	48	47	47	47	48	48	48	48	48	48	50	N	N	0
280	Private	15	13	10	50	48	48	47	54	49	48	53	48	48	50	N	Y	4
281	Private	15	14	11	50	48	48	47	54	49	48	53	48	48	50	N	Y	4
282	Private	13	9	8	52	49	48	48	56	50	48	55	49	48	50	N	Y	0
289	Private	11	9	8	48	48	47	47	48	48	48	48	48	48	50	N	N	0
290	Private	12	8	7	48	48	48	47	52	48	48	51	48	48	50	N	Y	4
291	Private	12	7	6	50	48	48	48	53	48	48	52	48	48	50	N	Y	3
293	Private	9	4	3	50	48	48	48	51	48	48	50	48	48	50	N	Y	1
294	Private	9	5	4	48	48	48	47	49	48	48	48	48	48	50	N	N	0
295	Private	8	4	3	50	48	48	47	51	49	48	50	48	48	50	N	Y	1
296	Private	7	4	2	50	48	48	47	51	49	48	50	48	48	50	N	Y	1
299	Private	5	3	2	54	50	48	48	54	50	48	53	48	48	50	N	Y	0
300	Private	4	3	2	55	50	49	48	55	51	49	54	50	48	50	N	Y	1
302	Private	4	3	2	56	51	49	48	56	51	49	55	50	48	50	N	Y	0
303	Private	4	2	1	47	47	47	47	47	47	47	47	47	47	50	N	N	0
305	Private	4	2	1	48	47	47	47	48	47	47	47	47	47	50	N	N	0
306	Private	3	2	1	49	47	47	47	49	48	47	48	48	47	50	N	N	0
307	Private	3	2	1	49	47	47	47	50	48	47	49	48	47	50	N	N	0
308	Private	3	2	1	50	48	47	47	50	48	47	49	48	47	50	N	N	0
309	Private	3	2	1	51	48	47	47	51	48	48	50	48	47	50	N	Y	0
310	Private	3	2	1	51	48	48	47	52	48	48	51	48	48	50	N	Y	0
311	Private	3	2	1	51	48	47	47	51	48	48	50	48	48	50	N	Y	0
312	Private	3	2	1	51	48	48	47	51	48	48	50	48	48	50	N	Y	0
314	Private	3	2	1	50	48	48	47	51	48	48	49	48	48	50	N	Y	1
315	Private	3	2	1	51	48	48	47	52	48	48	51	48	48	50	N	Y	0
316	Private	3	3	1	53	49	48	47	53	49	48	52	48	48	50	N	Y	0
317	Private	3	3	1	53	49	48	47	53	49	48	52	48	48	50	N	Y	0
318	Private	3	3	1	53	49	48	47	53	49	48	52	48	48	50	N	Y	0
319	Private	3	3	1	53	49	48	47	53	49	48	52	48	48	50	N	Y	0
320	Private	3	3	1	53	49	48	47	54	49	48	53	49	48	50	N	Y	0
321	Private	3	3	1	53	50	48	47	54	50	48	53	49	48	50	N	Y	0
322	Private	3	3	1	54	50	49	47	54	50	49	53	49	48	50	N	Y	0
323	Private	3	3	1	55	51	50	48	55	51	50	54	50	48	50	N	Y	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
324	Private	4	3	2	56	52	50	48	56	52	50	55	51	49	50	N	Y	0
325	Private	4	3	2	56	53	51	48	57	53	51	56	51	50	50	N	Y	0
326	Private	3	3	2	56	52	50	48	56	52	50	55	51	49	50	N	Y	0
327	Private	3	3	1	55	51	50	48	55	51	50	54	50	48	50	N	Y	0
328	Private	3	3	1	54	50	49	48	54	50	49	53	49	48	50	N	Y	0
329	Private	3	3	1	54	51	49	48	54	51	49	52	49	48	50	N	Y	0
330	Private	3	2	1	52	49	48	48	52	49	48	51	48	48	50	N	Y	0
337	Private	1	1	1	47	47	47	47	47	47	47	47	47	47	50	N	N	0
342	Private Infrastructure	10	4	3	62	57	56	59	64	58	56	63	56	55	50		Y	0
344	Other Mine	10	5	4	50	48	48	48	52	48	48	51	48	48	50		Y	2
351	Other Mine	12	6	4	61	59	59	53	61	59	59	58	56	55	50		Y	0
352	Other Mine - Vacant	8	5	3	70	69	69	53	73	70	70	71	68	68	50		Y	0
353	Other Mine	7	5	3	89	88	88	55	91	90	89	90	88	87	50		Y	0
356	Glencore - Vacant	17	7	4	66	54	53	66	71	55	54	70	54	53	50		Y	0
357	Glencore - Vacant	42	12	9	63	52	51	70	70	54	53	69	53	52	50		Y	0
358	Glencore - Vacant	32	11	7	59	52	51	59	66	53	52	66	53	51	50		Y	0
359	Glencore - Vacant	9	4	3	62	58	56	59	64	58	57	62	57	55	50		Y	0
360	Glencore - Vacant	29	26	19	55	54	54	50	57	56	56	57	56	55	50		Y	0
361	Glencore - Vacant	33	41	26	52	52	51	49	57	62	53	57	62	53	50		Y	0
363	Glencore	30	28	22	55	54	54	50	56	56	55	56	56	55	50		Y	0
364	Other Mine	8	4	3	86	84	81	53	87	85	82	57	55	55	50		Y	0
365	Other Mine - Vacant	8	4	3	64	63	63	53	65	64	63	56	55	54	50		Y	0
366	Other Mine - Vacant	8	4	3	67	66	64	53	68	66	64	56	55	54	50		Y	0
367	Other Mine	8	4	3	67	67	63	53	68	67	63	56	55	55	50		Y	0
368	Other Mine - Vacant	9	5	3	63	63	62	53	65	63	62	57	55	54	50		Y	0
369	Other Mine - Vacant	9	5	3	69	68	61	53	69	69	61	57	56	55	50		Y	0
370	Other Mine	9	5	3	71	70	62	53	71	70	62	57	56	55	50		Y	0
371	Other Mine	10	5	4	63	62	60	53	65	62	61	57	56	55	50		Y	0
372	Other Mine	10	5	4	62	60	60	53	64	61	60	58	56	55	50		Y	0
373	Other Mine - Vacant	10	5	4	62	61	60	53	63	61	61	57	56	55	50		Y	0
374	Other Mine	11	6	4	61	60	60	53	64	61	60	58	56	56	50		Y	0
375	Other Mine	11	6	4	62	60	60	53	62	61	60	58	56	55	50		Y	0
376	Other Mine	11	5	4	61	60	59	53	62	60	59	57	55	55	50		Y	0
377	Other Mine	11	6	4	61	59	59	53	62	60	59	58	56	55	50		Y	0
378	Other Mine	11	6	4	61	59	59	53	62	60	59	58	55	55	50		Y	0
379	Other Mine	10	5	3	61	60	59	53	62	60	60	57	55	54	50		Y	0
380	Other Mine	11	5	4	61	59	59	53	62	60	59	57	55	55	50		Y	0
381	Other Mine	12	6	4	61	59	59	53	62	60	59	58	56	55	50		Y	0
382	Other Mine	12	6	4	61	59	59	53	62	60	59	58	56	56	50		Y	0
383	Other Mine	12	6	4	61	59	58	53	62	59	59	58	56	55	50		Y	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
384	Other Mine	12	6	4	61	59	58	53	62	59	59	58	56	55	50		Y	0
385	Other Mine	12	6	4	61	59	58	53	62	59	59	58	56	55	50		Y	0
386	Other Mine	12	6	4	61	59	58	53	63	59	59	58	56	55	50		Y	0
387	Other Mine	12	6	4	61	59	59	53	63	60	59	58	55	55	50		Y	0
388	Other Mine	11	5	4	61	59	58	53	63	59	59	57	55	54	50		Y	0
389	Other Mine - Vacant	12	6	4	61	59	58	53	63	59	59	58	55	55	50		Y	0
390	Other Mine	12	6	4	61	59	58	53	63	59	59	58	55	55	50		Y	0
391	Other Mine	13	6	4	60	58	58	54	63	59	58	58	56	55	50		Y	0
392	Other Mine - Vacant	13	6	4	60	59	58	52	61	59	59	58	56	56	50		Y	0
394	Other Mine	10	5	4	65	64	60	53	66	65	60	57	56	55	50		Y	0
395	Other Mine	10	5	4	65	64	60	53	66	64	60	58	56	56	50		Y	0
396	Other Mine	10	5	4	65	64	60	53	67	65	60	58	56	56	50		Y	0
397	Other Mine	10	5	4	65	64	60	53	67	65	60	58	56	56	50		Y	0
398	Other Mine	10	5	4	66	65	59	53	67	65	60	58	56	56	50		Y	0
399	Other Mine	10	5	4	64	63	59	53	66	63	60	58	56	56	50		Y	0
400	Other Mine	10	5	4	63	63	60	53	65	63	60	58	56	56	50		Y	0
401	Other Mine	10	5	4	68	67	59	53	68	67	60	58	56	56	50		Y	0
402	Other Mine	9	5	3	71	71	62	53	72	71	62	58	57	56	50		Y	0
403	Other Mine	10	5	4	67	66	59	53	68	66	59	58	57	56	50		Y	0
404	Other Mine - Vacant	5	2	2	78	77	77	89	78	77	77	78	77	77	50		Y	0
405	Other Mine - Vacant	7	3	2	81	68	66	76	88	68	66	64	64	62	50		Y	0
406	Other Mine - Vacant	7	4	3	115	112	107	54	116	113	107	58	57	57	50		Y	0
407	Other Mine - Vacant	12	6	4	61	59	59	53	62	60	59	58	56	56	50		Y	0
408	Other Mine	11	5	4	61	59	59	53	62	60	59	57	56	55	50		Y	0
409	Glencore - Vacant	9	4	3	62	57	56	59	64	58	57	62	57	55	50		Y	0
410	Glencore - Vacant	20	17	10	50	48	48	58	60	56	52	60	56	52	50		Y	10
411	Glencore - Vacant	22	19	10	50	48	48	59	61	57	53	61	57	53	50		Y	11
412	Community Infrastructure	16	10	5	51	48	48	54	57	53	51	57	53	51	50		Y	5
007a	Private	26	30	17	51	51	51	48	52	52	52	52	52	51	50	N	Y	0
007b	Private	25	30	16	51	51	51	48	52	52	52	52	52	52	50	N	Y	0
007c	Private	24	27	16	51	50	50	48	51	51	51	51	51	51	50	N	Y	1
015a	Private	20	17	8	48	48	48	48	49	49	48	49	49	48	50	N	N	0
015b	Private	21	18	9	48	48	48	48	49	49	48	49	49	48	50	N	N	0
044a	Private	4	3	1	47	47	47	47	48	48	47	48	47	47	50	N	N	0
044b	Private	4	3	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
056a	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
056b	Private	3	2	1	47	47	47	47	48	47	47	48	47	47	50	N	N	0
063a	Community Infrastructure	10	7	3	47	47	47	47	48	48	47	48	48	47	50		N	0
069a	Private	7	6	4	47	47	47	47	48	48	47	48	48	47	50	N	N	0
102a	Private	19	21	11	48	48	48	47	49	48	48	49	48	48	50	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
102b	Private	19	21	11	48	48	48	47	49	48	48	49	48	48	50	N	N	0
127a	Private - Subject to Acq Rights	10	6	4	62	61	60	52	62	61	61	61	60	59	50	N	Y	0
127b	Private - Subject to Acq Rights	14	8	6	63	62	62	55	64	63	62	63	62	62	50	N	Y	0
127c	Private - Subject to Acq Rights	17	9	7	75	59	59	75	81	60	59	79	59	58	50	N	Y	0
127d	Private - Subject to Acq Rights	17	9	7	73	60	60	72	79	61	60	77	60	59	50	N	Y	0
144a	Private - Subject to Acq Rights	4	2	2	104	97	95	64	108	99	96	55	55	55	50	N	Y	0
144b	Private - Subject to Acq Rights	3	2	1	54	54	53	52	54	54	53	51	50	50	50	N	Y	0
144c	Private - Subject to Acq Rights	3	2	1	54	54	53	51	54	54	53	51	50	50	50	N	Y	0
162a	Glencore - Vacant	35	29	11	48	48	48	49	56	52	50	56	52	50	50		Y	8
162b	Private	10	8	4	47	47	47	47	48	48	47	48	48	47	50	N	N	0
17a	Private	14	14	8	48	48	48	48	49	49	48	49	49	48	50	N	N	0
17b	Private	15	15	9	48	48	48	48	49	49	48	49	49	48	50	N	N	0
292a	Private	11	7	6	48	48	48	47	51	48	48	50	48	48	50	N	Y	3
292b	Private	11	7	5	48	48	48	47	50	48	48	50	48	48	50	N	N	0
297a	Private	5	3	2	53	50	48	48	53	51	48	53	48	48	50	N	Y	1
297b	Private	5	3	2	53	50	48	48	54	51	48	53	48	48	50	N	Y	1
297c	Private	5	3	2	53	50	48	48	53	50	48	52	48	48	50	N	Y	0
297d	Private	6	3	2	48	48	48	47	49	48	48	49	48	48	50	N	N	0
349a	Private	4	2	1	48	47	47	47	49	47	47	48	47	47	50	N	N	0
349b	Private	4	2	1	48	47	47	47	49	47	47	48	47	47	50	N	N	0
-																		
Days above PM_{10} criterion (days)																		
1	Other Mine - Vacant	0	0	0	3	2	2	0	6	3	3	5	3	2	0		Y	3
2	Community Infrastructure	0	0	0	1	1	1	0	1	1	1	1	1	1	0		N	0
3	Other Mine	0	0	0	1	1	1	0	1	1	1	1	1	1	0		N	0
4	Private	0	0	0	1	1	1	0	1	1	1	1	1	1	0	N	N	0
5	Private - Subject to Acq Rights	0	0	0	1	1	1	0	1	1	1	1	1	1	0	N	N	0
6	Community Infrastructure	0	0	0	1	1	1	0	1	1	1	1	1	1	0		N	0
10	Private	0	0	0	1	0	0	0	2	2	1	2	2	1	0	N	Y	2
11	Private	0	0	0	0	0	0	0	3	3	0	3	3	0	0	N	Y	3
12	Private	0	0	0	0	0	0	0	3	3	0	3	3	0	0	N	Y	3
13	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
14	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
19	Private	0	0	0	0	0	0	0	3	3	0	3	3	0	0	N	Y	3
21	Private - Subject to Acq Rights	0	0	0	0	0	0	0	3	3	1	3	3	1	0	N	Y	3
22	Glencore	0	0	0	0	0	0	0	3	3	1	3	3	1	0		Y	3
23	Private - Subject to Acq Rights	0	0	0	0	0	0	0	3	3	2	3	3	2	0	N	Y	3
24	Glencore	0	0	0	0	0	0	0	4	5	2	4	5	2	0		Y	5
25	Glencore	0	0	0	0	0	0	0	4	6	2	4	6	2	0		Y	6
26	Glencore	0	0	0	0	0	0	0	4	5	1	4	5	1	0		Y	5

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
27	Glencore	0	0	0	0	0	0	0	6	7	3	6	7	3	0		Y	7
28	Glencore	0	0	0	0	0	0	0	8	11	3	8	11	3	0		Y	11
29	Glencore	0	0	0	0	0	0	1	9	15	3	8	13	3	0		Y	15
30	Glencore	1	60	1	1	0	0	2	57	121	41	56	121	41	0		Y	121
31	Glencore	1	68	0	0	0	0	1	59	128	34	59	127	33	0		Y	128
32	Glencore	0	4	0	0	0	0	1	16	36	2	16	36	2	0		Y	36
33	Glencore	0	0	0	0	0	0	1	7	13	1	7	13	1	0		Y	13
34	Glencore	0	0	0	0	0	0	1	7	6	1	6	6	0	0		Y	7
35	Glencore - Vacant	0	0	0	0	0	0	1	5	6	0	5	6	0	0		Y	6
36	Glencore	0	0	0	0	0	0	1	9	15	1	8	15	1	0		Y	15
37	Glencore - Vacant	2	17	0	0	0	0	2	30	59	3	29	57	3	0		Y	59
38	Glencore	5	48	0	0	0	0	2	59	122	8	59	120	8	0		Y	122
39	Glencore	1	26	0	0	0	0	2	38	83	6	38	82	6	0		Y	83
40	Glencore	0	0	0	0	0	0	0	1	1	0	1	1	0	0		Y	1
41	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
42	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
43	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
45	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
46	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
47	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
48	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
49	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
50	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
51	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
52	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
53	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
54	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
55	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
57	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
58	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
59	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
60	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
61	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
62	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
73	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
74	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
83	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
85	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
86	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
87	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0

Notes:

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- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
88	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
89	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
90	Other Mine	0	0	0	0	0	0	0	0	0	0	0	0	0	0		N	0
91	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
92	Private	0	0	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	1
93	Private	0	0	0	0	0	0	0	1	1	0	1	1	0	0	N	Y	1
94	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
95	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
96	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
97	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
98	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
99	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
100	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
101	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
104	Other Mine	0	0	0	0	0	0	0	0	0	0	0	0	0	0		N	0
105	Private - Subject to Acq Rights	0	0	0	1	1	1	0	1	1	1	1	1	1	0	N	N	0
108	Glencore	0	0	0	5	1	1	4	10	1	1	9	1	1	0		Y	5
109	Glencore	0	0	0	4	1	1	4	11	1	1	8	1	1	0		Y	7
110	Other Mine - Vacant	0	0	0	19	11	11	1	30	12	12	25	12	12	0		Y	11
111	Private - Subject to Acq Rights	0	0	0	99	70	65	1	115	81	72	105	72	66	0	N	Y	16
112	Private	0	0	0	1	1	1	0	2	2	1	2	2	1	0	N	Y	1
114	Private - Subject to Acq Rights	0	0	0	1	1	1	0	3	2	1	3	2	1	0	N	Y	2
115	Private - Subject to Acq Rights	0	0	0	1	1	1	0	5	4	1	5	3	1	0	N	Y	4
116	Glencore	0	0	0	1	1	1	0	3	1	1	3	1	1	0		Y	2
117	Glencore	0	0	0	1	1	1	0	8	4	1	7	4	1	0		Y	7
120	Glencore - Vacant	0	0	0	1	1	1	0	7	1	1	7	1	1	0		Y	6
121	Glencore - Vacant	0	0	0	1	1	1	1	10	1	1	9	1	1	0		Y	9
122	Private - Subject to Acq Rights	0	0	0	1	1	1	1	12	1	1	12	1	1	0	N	Y	11
123	Glencore - Vacant	0	0	0	1	1	1	1	8	1	1	6	1	1	0		Y	7
124	Glencore	0	0	0	1	1	1	1	14	1	1	10	1	1	0		Y	13
125	Glencore	0	0	0	4	1	1	4	24	1	1	21	1	1	0		Y	20
126	Glencore	0	0	0	4	1	1	3	15	1	1	13	1	1	0		Y	11
129	Glencore	0	0	0	69	1	1	59	90	1	1	80	1	1	0		Y	21
130	Glencore	0	0	0	72	1	1	61	93	1	1	80	1	1	0		Y	21
131	Glencore - Vacant	0	0	0	1	0	0	1	2	1	1	2	1	1	0		Y	1
132	Glencore - Vacant	0	0	0	1	0	0	1	2	1	1	2	1	1	0		Y	1
133	Private - Subject to Acq Rights	0	0	0	1	0	0	1	1	1	1	1	1	1	0	N	Y	1
143	Private - Subject to Acq Rights	0	0	0	6	2	2	1	18	2	2	5	1	1	0	N	Y	12
145	Private - Subject to Acq Rights	0	0	0	288	285	282	4	289	285	282	4	4	3	0	N	Y	1
146	Other Mine	0	0	0	14	7	5	1	22	9	5	2	1	1	0		Y	8

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
147	Private - Subject to Acq Rights	0	0	0	68	46	41	2	74	54	44	12	5	5	0	N	Y	8
148	Other Mine	0	0	0	76	54	48	1	84	66	54	57	37	28	0		Y	12
149	Community Infrastructure	0	0	0	17	4	3	1	26	4	3	5	1	1	0		Y	9
150	Private - Subject to Acq Rights	0	0	0	15	5	3	1	24	5	3	4	1	1	0	N	Y	9
151	Other Mine	0	0	0	10	3	2	2	22	4	2	6	1	1	0		Y	12
152	Private - Subject to Acq Rights	0	0	0	16	5	3	1	26	5	3	5	1	1	0	N	Y	10
154	Private - Subject to Acq Rights	0	0	0	13	3	2	2	26	4	2	7	1	1	0	N	Y	13
155	Private - Subject to Acq Rights	0	0	0	12	3	2	3	22	3	2	8	1	1	0	N	Y	10
156	Private - Subject to Acq Rights	0	0	0	15	1	1	6	24	1	1	14	1	1	0	N	Y	9
157	Glencore - Vacant	0	0	0	14	1	1	14	44	1	1	39	1	1	0		Y	30
158	Other Mine - Vacant	0	0	0	359	359	359	3	359	359	359	3	3	3	0		N	0
159	Other Mine - Vacant	0	0	0	69	45	36	2	81	55	38	2	1	1	0		Y	12
160	Other Mine - Vacant	0	0	0	339	339	338	2	339	339	338	3	3	3	0		N	0
161	Glencore - Vacant	48	0	0	1	0	0	1	153	2	1	152	2	1	0		Y	152
163	Other Mine	0	0	0	1	0	0	0	1	0	0	1	0	0	0		N	0
164	Private - Subject to Acq Rights	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
165	Other Mine	0	0	0	1	0	0	0	2	0	0	1	0	0	0		Y	1
166	Other Mine - Vacant	0	0	0	92	7	6	59	107	9	6	66	1	1	0		Y	15
178	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
210	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
211	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
212	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
213	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
259	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
280	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
281	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
282	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
289	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
290	Private	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N	Y	1
291	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
293	Private	0	0	0	1	0	0	0	2	0	0	1	0	0	0	N	Y	1
294	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
295	Private	0	0	0	0	0	0	0	2	0	0	0	0	0	0	N	Y	2
296	Private	0	0	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	1
299	Private	0	0	0	3	1	0	0	3	1	0	1	0	0	0	N	N	0
300	Private	0	0	0	3	1	0	0	3	2	0	2	0	0	0	N	Y	1
302	Private	0	0	0	2	1	0	0	2	1	0	2	1	0	0	N	N	0
303	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
305	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
306	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
307	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
308	Private	0	0	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	1
309	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
310	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
311	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
312	Private	0	0	0	1	0	0	0	1	0	0	0	0	0	0	N	N	0
314	Private	0	0	0	1	0	0	0	1	0	0	0	0	0	0	N	N	0
315	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
316	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
317	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
318	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
319	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
320	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
321	Private	0	0	0	1	0	0	0	1	0	0	1	0	0	0	N	N	0
322	Private	0	0	0	1	1	0	0	1	1	0	1	0	0	0	N	N	0
323	Private	0	0	0	1	1	0	0	1	1	0	1	1	0	0	N	N	0
324	Private	0	0	0	2	1	0	0	2	1	1	1	1	0	0	N	Y	1
325	Private	0	0	0	2	1	1	0	2	1	1	1	1	0	0	N	N	0
326	Private	0	0	0	1	1	1	0	1	1	1	1	1	0	0	N	N	0
327	Private	0	0	0	1	1	0	0	1	1	0	1	0	0	0	N	N	0
328	Private	0	0	0	1	1	0	0	1	1	0	1	0	0	0	N	N	0
329	Private	0	0	0	2	1	0	0	2	1	0	1	0	0	0	N	N	0
330	Private	0	0	0	2	0	0	0	2	0	0	1	0	0	0	N	N	0
337	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
342	Private Infrastructure	0	0	0	9	1	1	5	21	2	1	14	1	1	0		Y	12
344	Other Mine	0	0	0	0	0	0	0	1	0	0	1	0	0	0		Y	1
351	Other Mine	0	0	0	12	3	2	1	24	4	2	7	1	1	0		Y	12
352	Other Mine - Vacant	0	0	0	59	43	38	1	72	50	42	54	30	24	0		Y	13
353	Other Mine	0	0	0	102	90	87	1	109	94	91	84	67	62	0		Y	7
356	Glencore - Vacant	0	0	0	37	1	1	32	59	1	1	43	1	1	0		Y	22
357	Glencore - Vacant	0	0	0	6	1	1	14	29	1	1	23	1	1	0		Y	23
358	Glencore - Vacant	0	0	0	9	1	1	7	26	1	1	24	1	1	0		Y	17
359	Glencore - Vacant	0	0	0	13	2	1	7	19	2	1	14	1	1	0		Y	6
360	Glencore - Vacant	0	0	0	1	1	1	0	7	2	1	7	2	1	0		Y	6
361	Glencore - Vacant	0	0	0	1	1	1	0	5	5	1	5	5	1	0		Y	4
363	Glencore	0	0	0	1	1	1	0	7	2	1	7	2	1	0		Y	6
364	Other Mine	0	0	0	137	111	101	2	150	122	107	3	2	2	0		Y	13
365	Other Mine - Vacant	0	0	0	33	23	15	1	48	24	19	2	1	1	0		Y	15
366	Other Mine - Vacant	0	0	0	50	32	26	1	65	33	27	2	1	1	0		Y	15
367	Other Mine	0	0	0	42	28	22	1	56	29	23	2	1	1	0		Y	14

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
368	Other Mine - Vacant	0	0	0	30	17	9	1	42	18	11	2	1	1	0		Y	12
369	Other Mine - Vacant	0	0	0	32	18	11	1	46	23	12	2	1	1	0		Y	14
370	Other Mine	0	0	0	37	23	13	1	51	26	14	2	1	1	0		Y	14
371	Other Mine	0	0	0	26	11	4	1	37	12	5	4	1	1	0		Y	11
372	Other Mine	0	0	0	25	9	4	1	37	9	5	4	1	1	0		Y	12
373	Other Mine - Vacant	0	0	0	24	8	5	1	35	10	5	4	1	1	0		Y	11
374	Other Mine	0	0	0	21	9	4	1	36	9	4	4	1	1	0		Y	15
375	Other Mine	0	0	0	21	6	3	1	34	8	3	5	1	1	0		Y	13
376	Other Mine	0	0	0	13	4	3	1	24	4	3	5	1	1	0		Y	11
377	Other Mine	0	0	0	14	4	3	1	26	4	3	5	1	1	0		Y	12
378	Other Mine	0	0	0	11	4	2	3	22	5	2	7	1	1	0		Y	11
379	Other Mine	0	0	0	9	3	3	1	22	4	3	5	1	1	0		Y	13
380	Other Mine	0	0	0	11	3	3	1	22	4	3	6	1	1	0		Y	11
381	Other Mine	0	0	0	12	3	2	1	24	4	2	7	1	1	0		Y	12
382	Other Mine	0	0	0	16	4	3	1	26	5	3	6	1	1	0		Y	10
383	Other Mine	0	0	0	12	4	2	5	23	5	2	10	1	1	0		Y	11
384	Other Mine	0	0	0	11	3	2	4	23	4	2	10	1	1	0		Y	12
385	Other Mine	0	0	0	12	3	2	5	23	4	2	11	1	1	0		Y	11
386	Other Mine	0	0	0	13	3	2	5	24	4	2	11	1	1	0		Y	11
387	Other Mine	0	0	0	14	4	2	5	22	5	2	11	1	1	0		Y	8
388	Other Mine	0	0	0	14	4	2	5	21	4	2	10	1	1	0		Y	7
389	Other Mine - Vacant	0	0	0	14	4	2	5	24	5	2	11	1	1	0		Y	10
390	Other Mine	0	0	0	14	4	2	5	24	5	2	11	1	1	0		Y	10
391	Other Mine	0	0	0	14	2	1	5	23	3	1	11	1	1	0		Y	9
392	Other Mine - Vacant	0	0	0	11	3	2	3	23	3	2	8	1	1	0		Y	12
394	Other Mine	0	0	0	26	11	5	1	37	14	6	3	1	1	0		Y	11
395	Other Mine	0	0	0	24	11	5	1	37	13	5	3	1	1	0		Y	13
396	Other Mine	0	0	0	24	11	5	1	35	12	5	3	1	1	0		Y	11
397	Other Mine	0	0	0	23	10	5	1	34	12	5	3	1	1	0		Y	11
398	Other Mine	0	0	0	23	9	5	1	34	12	6	3	1	1	0		Y	11
399	Other Mine	0	0	0	21	9	4	1	34	10	5	4	1	1	0		Y	13
400	Other Mine	0	0	0	21	10	4	1	35	10	5	4	1	1	0		Y	14
401	Other Mine	0	0	0	23	11	6	1	33	14	6	3	1	1	0		Y	10
402	Other Mine	0	0	0	18	9	6	1	34	12	6	2	1	1	0		Y	16
403	Other Mine	0	0	0	16	8	6	1	30	9	6	2	1	1	0		Y	14
404	Other Mine - Vacant	0	0	0	100	69	60	34	112	71	62	70	43	36	0		Y	12
405	Other Mine - Vacant	0	0	0	89	32	27	42	101	39	31	39	9	6	0		Y	12
406	Other Mine - Vacant	0	0	0	118	103	93	2	132	108	97	3	2	2	0		Y	14
407	Other Mine - Vacant	0	0	0	14	4	3	1	25	5	3	6	1	1	0		Y	11
408	Other Mine	0	0	0	14	4	3	1	26	4	3	5	1	1	0		Y	12

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
409	Glencore - Vacant	0	0	0	8	1	1	6	19	1	1	12	1	1	0		Y	11
410	Glencore - Vacant	0	0	0	0	0	0	1	1	1	1	1	1	1	0		Y	1
411	Glencore - Vacant	0	0	0	0	0	0	1	1	1	1	1	1	1	0		Y	1
412	Community Infrastructure	0	0	0	1	0	0	1	1	1	1	1	1	1	0		Y	1
007a	Private	0	0	0	1	1	1	0	1	1	1	1	1	1	0	N	N	0
007b	Private	0	0	0	1	1	1	0	1	1	1	1	1	1	0	N	N	0
007c	Private	0	0	0	1	1	1	0	2	1	1	1	1	1	0	N	Y	1
015a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
015b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
044a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
044b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
056a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
056b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
063a	Community Infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0	0		N	0
069a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
102a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
102b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
127a	Private - Subject to Acq Rights	0	0	0	9	4	3	1	22	5	3	4	2	2	0	N	Y	13
127b	Private - Subject to Acq Rights	0	0	0	17	2	2	8	30	2	2	22	2	1	0	N	Y	13
127c	Private - Subject to Acq Rights	0	0	0	55	1	1	37	74	2	1	55	1	1	0	N	Y	19
127d	Private - Subject to Acq Rights	0	0	0	48	1	1	36	66	1	1	54	1	1	0	N	Y	18
144a	Private - Subject to Acq Rights	0	0	0	142	130	115	6	143	132	119	10	8	6	0	N	Y	4
144b	Private - Subject to Acq Rights	0	0	0	5	2	1	1	6	2	1	1	1	0	0	N	Y	1
144c	Private - Subject to Acq Rights	0	0	0	3	3	1	1	6	3	1	2	2	0	0	N	Y	3
162a	Glencore - Vacant	0	0	0	0	0	0	0	2	1	0	2	1	0	0		Y	2
162b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
17a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
17b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
292a	Private	0	0	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	1
292b	Private	0	0	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	1
297a	Private	0	0	0	2	1	0	0	2	1	0	1	0	0	0	N	N	0
297b	Private	0	0	0	2	1	0	0	2	1	0	1	0	0	0	N	N	0
297c	Private	0	0	0	2	1	0	0	2	1	0	1	0	0	0	N	N	0
297d	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
349a	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
349b	Private	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N	N	0
-																		
-																		
Annual average PM_{10} ($\mu g/m^3$)																		
1	Other Mine - Vacant	3.9	3.2	2.3	28	26	26	18	32	30	29	31	29	28	25		Y	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
2	Community Infrastructure	4.2	3.4	2.5	24	23	23	19	29	26	25	28	26	25	25		Y	5
3	Other Mine	4.2	3.6	2.6	23	22	22	19	27	25	24	27	25	24	25		Y	4
4	Private	5.4	5	3.6	20	18	18	19	25	23	22	25	23	21	25	Y (>25% land)	N	0
5	Private - Subject to Acq Rights	4.4	3.8	2.7	21	20	19	19	25	23	22	25	23	22	25	N	N	0
6	Community Infrastructure	4.4	3.9	2.7	20	19	18	18	24	22	21	24	22	21	25		N	0
10	Private	5.3	5.3	3.2	17	16	16	18	23	22	19	22	21	19	25	N	N	0
11	Private	5.3	5.3	3.1	17	16	16	18	22	21	19	22	21	19	25	N	N	0
12	Private	5.5	5.6	3.2	17	16	16	18	22	21	19	22	21	19	25	N	N	0
13	Private	4.2	4.1	2.1	16	15	15	17	20	19	17	20	19	17	25	N	N	0
14	Private	3.5	3.3	1.7	16	15	15	17	19	18	17	19	18	16	25	N	N	0
19	Private	6.1	6.5	3.5	16	15	15	19	22	22	19	22	22	19	25	N	N	0
21	Private - Subject to Acq Rights	6.4	6.8	3.8	17	16	16	19	23	23	20	23	23	19	25	N	N	0
22	Glencore	6.2	6.5	3.7	17	16	16	19	23	22	20	23	22	19	25		N	0
23	Private - Subject to Acq Rights	6.9	7.5	4.3	17	16	16	19	24	24	20	24	23	20	25	N	N	0
24	Glencore	7.7	8.6	4.8	17	16	16	20	25	24	20	24	24	20	25		N	0
25	Glencore	8.2	9.5	5.1	17	16	16	20	25	25	21	25	25	21	25		N	0
26	Glencore	8.1	9.4	5	17	16	15	20	25	25	20	25	25	20	25		N	0
27	Glencore	8.5	10	5.7	17	16	16	20	26	26	22	26	26	22	25		Y	10
28	Glencore	9.4	11.4	6.2	17	16	16	20	26	27	22	26	27	22	25		Y	11
29	Glencore	9.9	12.2	7	17	16	16	21	27	28	23	27	28	23	25		Y	12
30	Glencore	15.3	25.1	15.4	17	16	16	22	33	41	31	32	41	31	25		Y	25
31	Glencore	15.8	26.2	14.8	17	16	16	23	33	42	30	33	42	30	25		Y	26
32	Glencore	11.5	15.1	7	16	15	15	21	27	30	22	27	30	22	25		Y	15
33	Glencore	8.9	10.6	5	16	15	15	20	25	26	20	25	26	20	25		Y	11
34	Glencore	7.7	8.7	4.1	16	15	15	19	23	24	19	23	24	19	25		N	0
35	Glencore - Vacant	7.4	8.2	3.9	16	15	15	19	23	23	19	23	23	19	25		N	0
36	Glencore	9.3	11.1	5.1	16	15	15	20	25	26	20	25	26	20	25		Y	11
37	Glencore - Vacant	13.6	18.6	8.1	16	15	15	22	29	34	23	29	33	23	25		Y	19
38	Glencore	16.6	25.9	11.2	16	15	15	23	33	41	26	32	41	26	25		Y	26
39	Glencore	14.3	20.8	9.3	16	15	15	22	30	36	24	30	36	24	25		Y	21
40	Glencore	3.8	3.6	1.6	15	14	14	17	19	18	16	19	18	16	25		N	0
41	Private	0.9	0.6	0.3	14	14	14	15	15	15	14	15	15	14	25	N	N	0
42	Private	0.8	0.6	0.3	14	14	14	15	15	15	14	15	15	14	25	N	N	0
43	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
45	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
46	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
47	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
48	Private	0.8	0.6	0.3	14	14	14	15	15	15	14	15	15	14	25	N	N	0
49	Private	0.5	0.3	0.2	14	14	14	14	14	14	14	14	14	14	25	N	N	0
50	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
51	Private	0.7	0.5	0.3	14	14	14	14	15	14	14	15	14	14	25	N	N	0
52	Private	0.6	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
53	Private	0.5	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
54	Private	0.5	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
55	Private	0.5	0.3	0.2	14	14	14	14	14	14	14	14	14	14	25	N	N	0
57	Private	0.4	0.3	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
58	Private	0.7	0.5	0.3	14	14	14	14	15	14	14	15	14	14	25	N	N	0
59	Private	0.8	0.6	0.3	14	14	14	15	15	15	14	15	14	14	25	N	N	0
60	Private	0.7	0.5	0.3	14	14	14	14	15	14	14	15	14	14	25	N	N	0
61	Private	0.7	0.5	0.3	14	14	14	14	15	14	14	15	14	14	25	N	N	0
62	Private	0.8	0.6	0.3	14	14	14	15	15	14	14	15	14	14	25	N	N	0
73	Private	1.2	1	0.5	14	14	14	15	16	15	15	16	15	15	25	N	N	0
74	Private	2.1	1.8	0.9	15	14	14	16	17	16	15	17	16	15	25	N	N	0
83	Private	2.1	1.9	1	15	15	15	16	17	17	16	17	16	15	25	N	N	0
85	Private	1.9	1.7	1	15	15	15	16	17	16	16	17	16	15	25	N	N	0
86	Private	2.2	1.9	1.1	15	15	15	16	18	17	16	17	17	16	25	N	N	0
87	Private	2.2	2	1.1	15	15	15	16	18	17	16	17	17	16	25	N	N	0
88	Private	2.6	2.3	1.3	16	15	15	16	18	17	16	18	17	16	25	N	N	0
89	Private	2.8	2.5	1.5	16	15	15	17	19	18	17	19	18	17	25	N	N	0
90	Other Mine	2.9	2.6	1.5	16	15	15	17	19	18	17	19	18	17	25		N	0
91	Private	3.2	2.9	1.8	17	16	16	17	20	19	17	20	19	17	25	N	N	0
92	Private	3.8	3.5	2.1	17	16	16	17	21	20	18	21	19	18	25	N	N	0
93	Private	4.2	4.1	2.3	16	16	15	18	21	20	18	20	19	18	25	N	N	0
94	Private	3.4	3.3	1.8	16	15	15	17	19	18	17	19	18	17	25	N	N	0
95	Private	3.1	2.9	1.6	16	15	15	17	19	18	16	19	18	16	25	N	N	0
96	Private	2.2	1.9	1.2	16	15	15	16	18	17	17	18	17	16	25	N	N	0
97	Private	2.3	2	1.3	16	15	15	16	18	17	16	18	17	16	25	N	N	0
98	Private	2.5	2.2	1.3	16	15	15	16	18	17	16	18	17	16	25	N	N	0
99	Private	2.8	2.4	1.5	17	16	16	17	20	18	17	19	18	17	25	N	N	0
100	Private	2.8	2.4	1.5	18	17	17	17	20	19	18	20	19	18	25	N	N	0
101	Private	2.4	2.1	1.3	17	16	16	17	20	18	18	20	18	17	25	N	N	0
104	Other Mine	2.4	1.9	1.3	19	18	18	17	21	20	19	21	20	19	25		N	0
105	Private - Subject to Acq Rights	5	3.8	2.9	21	20	19	19	26	23	22	26	23	22	25	Y (>25% land)	Y	5
108	Glencore	3.3	1.9	1.3	29	25	24	24	32	26	26	32	26	25	25		Y	2
109	Glencore	3.4	1.8	1.3	28	24	23	24	32	26	25	31	25	24	25		Y	2
110	Other Mine - Vacant	1.9	1.1	0.8	36	31	31	24	37	32	32	37	32	31	25		Y	0
111	Private - Subject to Acq Rights	1.7	1.1	0.7	44	39	39	24	45	40	40	45	39	39	25	Y (>25% land)	Y	0
112	Private	6.1	6.1	4	18	17	17	19	24	23	21	24	23	21	25	Y (>25% land)	N	0
114	Private - Subject to Acq Rights	6.7	6.6	4.8	20	18	18	20	26	25	23	26	25	23	25	Y (>25% land)	Y	6
115	Private - Subject to Acq Rights	7.6	8	5.8	20	18	18	20	28	26	24	27	26	24	25	Y (>25% land)	Y	8

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
116	Glencore	6.4	5.9	4.4	20	19	18	20	27	25	23	26	24	23	25		Y	7
117	Glencore	7.3	6.9	5.2	21	19	19	20	28	26	24	28	26	24	25		Y	7
120	Glencore - Vacant	6.4	4.5	3.6	23	21	21	21	30	26	24	30	25	24	25		Y	7
121	Glencore - Vacant	5.8	3.1	2.5	25	22	21	23	31	25	24	30	24	23	25		Y	6
122	Private - Subject to Acq Rights	6.3	3.4	2.7	25	21	21	24	31	25	24	30	24	23	25	Y (>25% land)	Y	6
123	Glencore - Vacant	5.9	3.4	2.7	25	22	22	22	31	25	24	30	25	24	25		Y	6
124	Glencore	5.2	2.7	2	26	22	22	24	31	24	24	30	24	23	25		Y	0
125	Glencore	5.3	2.6	2	27	22	22	25	32	25	24	31	24	23	25		Y	0
126	Glencore	4.3	2.3	1.7	27	23	22	25	31	25	24	31	24	23	25		Y	0
129	Glencore	2.8	1.4	1	39	26	26	33	41	28	27	40	26	25	25		Y	0
130	Glencore	2.7	1.3	1	39	27	26	33	42	28	27	40	26	25	25		Y	0
131	Glencore - Vacant	7.1	2.5	1.5	19	15	15	21	26	18	16	26	17	16	25		Y	7
132	Glencore - Vacant	6.3	2.2	1.3	19	15	15	21	25	17	16	25	17	16	25		N	0
133	Private - Subject to Acq Rights	2.7	1.3	0.7	16	15	14	17	19	16	15	19	16	15	25	N	N	0
143	Private - Subject to Acq Rights	1.7	0.8	0.6	32	27	27	25	34	28	27	31	25	24	25	Y (>25% land)	Y	0
145	Private - Subject to Acq Rights	0.6	0.3	0.2	84	83	82	24	85	83	82	27	26	24	25	Y (>25% land)	Y	0
146	Other Mine	1.1	0.6	0.4	33	31	30	23	34	31	31	30	27	26	25		Y	0
147	Private - Subject to Acq Rights	1	0.6	0.4	40	38	38	26	41	39	38	35	33	32	25	Y (>25% land)	Y	0
148	Other Mine	1.1	0.7	0.4	41	39	38	25	42	39	38	39	36	35	25		Y	0
149	Community Infrastructure	1.3	0.7	0.4	35	31	30	25	36	32	31	29	24	23	25		Y	0
150	Private - Subject to Acq Rights	1.4	0.7	0.5	34	31	30	25	36	31	30	29	25	24	25	Y (>25% land)	Y	0
151	Other Mine	1.5	0.7	0.5	34	29	29	26	35	30	29	29	24	23	25		Y	0
152	Private - Subject to Acq Rights	1.6	0.8	0.5	34	30	29	26	36	31	30	30	25	24	25	Y (>25% land)	Y	0
154	Private - Subject to Acq Rights	1.7	0.8	0.6	34	29	28	26	35	29	28	31	25	24	25	Y (>25% land)	Y	0
155	Private - Subject to Acq Rights	1.7	0.8	0.6	33	28	27	26	35	29	28	31	24	24	25	Y (>25% land)	Y	0
156	Private - Subject to Acq Rights	1.8	0.9	0.6	33	27	26	27	35	27	27	31	24	23	25	Y (>25% land)	Y	0
157	Glencore - Vacant	3.9	1.9	1.4	31	24	24	28	35	26	25	34	25	24	25		Y	2
158	Other Mine - Vacant	0.8	0.4	0.3	195	193	192	24	196	194	193	28	26	25	25		Y	0
159	Other Mine - Vacant	1.1	0.6	0.4	39	37	36	24	41	38	37	30	28	27	25		Y	0
160	Other Mine - Vacant	0.9	0.5	0.3	106	104	103	24	107	105	103	28	26	25	25		Y	0
161	Glencore - Vacant	26.7	4.3	2.5	19	15	15	25	46	20	18	46	20	18	25		Y	27
163	Other Mine	1.4	0.7	0.6	21	19	19	17	22	20	20	22	20	20	25		N	0
164	Private - Subject to Acq Rights	1.3	0.6	0.5	21	19	19	17	22	20	20	22	20	19	25	N	N	0
165	Other Mine	1.1	0.6	0.4	21	20	19	18	22	20	20	22	20	20	25		N	0
166	Other Mine - Vacant	2	0.9	0.7	41	31	30	34	43	32	31	37	25	24	25		Y	0
178	Private	0.3	0.2	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
210	Private	0.3	0.2	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
211	Private	0.4	0.2	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
212	Private	0.4	0.3	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
213	Private	0.4	0.3	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
259	Private	1.6	1.4	0.7	15	14	14	15	16	16	15	16	16	15	25	N	N	0
280	Private	1.8	1.2	0.9	20	19	18	17	22	20	19	21	20	19	25	N	N	0
281	Private	1.9	1.3	1	20	19	19	17	22	20	20	22	20	19	25	N	N	0
282	Private	1.7	1	0.8	21	20	19	17	23	20	20	22	20	20	25	N	N	0
289	Private	1.3	0.8	0.6	18	17	17	16	20	18	18	19	18	18	25	N	N	0
290	Private	1.4	0.8	0.7	20	18	18	17	21	19	19	21	19	19	25	N	N	0
291	Private	1.5	0.8	0.6	20	19	19	17	22	20	19	22	20	19	25	N	N	0
293	Private	1.1	0.5	0.4	21	19	19	18	22	20	20	22	20	19	25	N	N	0
294	Private	1	0.5	0.4	19	18	18	17	20	19	18	20	19	18	25	N	N	0
295	Private	0.9	0.4	0.3	21	19	19	17	21	20	19	21	19	19	25	N	N	0
296	Private	0.8	0.4	0.3	20	19	19	17	21	20	19	21	19	19	25	N	N	0
299	Private	0.6	0.3	0.2	21	20	20	18	22	20	20	22	20	20	25	N	N	0
300	Private	0.5	0.3	0.2	22	20	20	18	22	20	20	22	20	20	25	N	N	0
302	Private	0.5	0.3	0.2	22	20	20	18	22	21	20	22	20	20	25	N	N	0
303	Private	0.4	0.2	0.2	18	17	17	16	18	17	17	18	17	17	25	N	N	0
305	Private	0.4	0.2	0.2	19	18	18	17	19	18	18	19	18	18	25	N	N	0
306	Private	0.4	0.2	0.1	20	19	18	17	20	19	19	20	18	18	25	N	N	0
307	Private	0.4	0.2	0.1	20	19	19	17	20	19	19	20	19	18	25	N	N	0
308	Private	0.4	0.2	0.1	20	19	19	17	20	19	19	20	19	18	25	N	N	0
309	Private	0.4	0.2	0.1	20	19	19	17	20	19	19	20	19	19	25	N	N	0
310	Private	0.4	0.2	0.1	20	19	19	17	21	19	19	20	19	19	25	N	N	0
311	Private	0.4	0.2	0.1	20	19	19	17	21	19	19	20	19	19	25	N	N	0
312	Private	0.4	0.2	0.1	20	19	19	17	21	19	19	20	19	19	25	N	N	0
314	Private	0.4	0.2	0.1	20	19	19	18	21	20	19	20	19	19	25	N	N	0
315	Private	0.4	0.2	0.1	21	20	20	18	21	20	20	21	20	19	25	N	N	0
316	Private	0.4	0.2	0.1	21	20	20	18	21	20	20	21	20	19	25	N	N	0
317	Private	0.4	0.2	0.1	21	20	20	18	21	20	20	21	20	19	25	N	N	0
318	Private	0.4	0.2	0.1	21	20	20	18	21	20	20	21	20	19	25	N	N	0
319	Private	0.4	0.2	0.1	21	20	19	18	21	20	20	21	19	19	25	N	N	0
320	Private	0.4	0.2	0.2	21	20	19	18	21	20	20	21	19	19	25	N	N	0
321	Private	0.4	0.2	0.1	21	20	20	18	21	20	20	21	20	19	25	N	N	0
322	Private	0.4	0.2	0.1	21	20	20	18	22	20	20	21	20	20	25	N	N	0
323	Private	0.4	0.2	0.1	22	20	20	18	22	21	20	22	20	20	25	N	N	0
324	Private	0.4	0.2	0.2	22	21	20	18	22	21	20	22	20	20	25	N	N	0
325	Private	0.4	0.2	0.2	22	21	21	19	23	21	21	22	21	20	25	N	N	0
326	Private	0.4	0.2	0.1	22	21	21	18	22	21	21	22	21	20	25	N	N	0
327	Private	0.4	0.2	0.1	22	21	20	18	22	21	21	22	20	20	25	N	N	0
328	Private	0.4	0.2	0.1	22	21	20	18	22	21	20	22	20	20	25	N	N	0
329	Private	0.4	0.2	0.1	22	21	21	19	22	21	21	22	21	20	25	N	N	0
330	Private	0.3	0.2	0.1	22	21	20	18	22	21	20	21	20	20	25	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
337	Private	0.2	0.1	0.1	14	14	14	14	14	14	14	14	14	14	25	N	N	0
342	Private Infrastructure	1.9	0.7	0.5	34	24	23	31	36	25	24	34	23	22	25		Y	0
344	Other Mine	1.2	0.6	0.5	21	20	19	18	22	20	20	22	20	20	25		N	0
351	Other Mine	1.6	0.8	0.6	34	29	28	26	35	30	29	30	25	24	25		Y	0
352	Other Mine - Vacant	1.1	0.6	0.4	39	37	37	23	41	38	37	38	35	34	25		Y	0
353	Other Mine	1	0.6	0.4	43	41	41	25	44	42	41	41	39	38	25		Y	0
356	Glencore - Vacant	4	1.2	0.8	37	20	19	37	41	21	20	40	20	19	25		Y	0
357	Glencore - Vacant	7.2	1.7	1.2	30	18	18	34	37	20	19	36	19	18	25		Y	0
358	Glencore - Vacant	5.1	1.3	0.9	32	17	17	33	37	19	18	37	18	18	25		Y	0
359	Glencore - Vacant	1.8	0.7	0.5	35	25	24	31	36	26	25	34	23	22	25		Y	1
360	Glencore - Vacant	6.6	5.2	4.1	22	20	20	21	29	25	24	29	25	24	25		Y	7
361	Glencore - Vacant	7.9	8.8	6.2	19	18	18	20	27	26	24	27	26	24	25		Y	8
363	Glencore	6.9	5.9	4.6	22	20	20	20	29	26	24	29	25	24	25		Y	7
364	Other Mine	1	0.6	0.4	45	43	42	24	47	44	43	29	26	25	25		Y	0
365	Other Mine - Vacant	1.2	0.6	0.4	37	34	34	24	38	35	34	28	25	24	25		Y	0
366	Other Mine - Vacant	1.1	0.6	0.4	38	36	35	24	39	36	35	28	25	24	25		Y	0
367	Other Mine	1.2	0.6	0.4	38	35	34	24	39	36	35	29	25	24	25		Y	0
368	Other Mine - Vacant	1.2	0.6	0.4	37	34	33	24	38	34	33	29	25	24	25		Y	0
369	Other Mine - Vacant	1.2	0.6	0.4	37	34	33	24	38	35	34	29	26	25	25		Y	0
370	Other Mine	1.2	0.6	0.4	37	35	34	24	39	35	34	29	26	25	25		Y	0
371	Other Mine	1.4	0.7	0.5	36	33	32	25	38	34	33	30	26	25	25		Y	0
372	Other Mine	1.4	0.7	0.5	36	32	32	25	37	33	32	31	26	25	25		Y	0
373	Other Mine - Vacant	1.4	0.7	0.5	36	32	32	25	37	33	32	30	26	25	25		Y	0
374	Other Mine	1.5	0.8	0.5	36	32	31	26	37	33	32	31	27	26	25		Y	0
375	Other Mine	1.5	0.8	0.5	35	31	31	26	37	32	31	31	26	25	25		Y	0
376	Other Mine	1.5	0.7	0.5	34	30	29	25	35	30	30	30	25	24	25		Y	0
377	Other Mine	1.5	0.8	0.5	34	30	29	25	35	30	29	30	25	24	25		Y	0
378	Other Mine	1.6	0.8	0.5	34	29	28	26	35	30	29	30	24	23	25		Y	0
379	Other Mine	1.4	0.7	0.5	34	30	29	25	35	30	29	29	24	23	25		Y	0
380	Other Mine	1.5	0.8	0.5	34	29	29	25	35	30	29	29	24	23	25		Y	0
381	Other Mine	1.6	0.8	0.5	34	29	28	26	35	30	29	30	24	24	25		Y	0
382	Other Mine	1.6	0.8	0.6	34	30	29	26	36	30	30	31	25	24	25		Y	0
383	Other Mine	1.6	0.8	0.5	33	28	28	26	35	29	28	30	24	23	25		Y	0
384	Other Mine	1.6	0.8	0.5	33	28	28	26	35	29	28	30	24	23	25		Y	0
385	Other Mine	1.6	0.8	0.5	33	28	27	26	35	29	28	30	24	23	25		Y	0
386	Other Mine	1.7	0.8	0.6	33	28	27	26	35	29	28	30	24	23	25		Y	0
387	Other Mine	1.6	0.8	0.5	34	29	28	26	35	29	29	30	24	23	25		Y	0
388	Other Mine	1.6	0.8	0.5	34	28	28	26	35	29	28	29	24	23	25		Y	0
389	Other Mine - Vacant	1.6	0.8	0.5	33	28	27	26	35	29	28	30	24	23	25		Y	0
390	Other Mine	1.6	0.8	0.5	34	28	28	26	35	29	28	30	24	23	25		Y	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
391	Other Mine	1.7	0.8	0.6	33	27	26	26	35	28	27	31	24	23	25		Y	0
392	Other Mine - Vacant	1.7	0.9	0.6	33	28	27	26	35	29	28	31	25	24	25		Y	0
394	Other Mine	1.3	0.7	0.5	36	33	32	25	38	34	33	30	27	26	25		Y	0
395	Other Mine	1.4	0.7	0.5	36	33	32	25	37	34	33	31	27	26	25		Y	0
396	Other Mine	1.4	0.7	0.5	36	33	32	25	37	33	32	31	27	26	25		Y	0
397	Other Mine	1.4	0.7	0.5	36	33	32	25	37	33	32	31	27	26	25		Y	0
398	Other Mine	1.4	0.7	0.5	36	33	32	25	37	33	32	31	27	26	25		Y	0
399	Other Mine	1.4	0.7	0.5	36	32	32	25	37	33	32	31	27	26	25		Y	0
400	Other Mine	1.4	0.7	0.5	36	32	32	25	37	33	32	31	27	26	25		Y	0
401	Other Mine	1.3	0.7	0.5	36	33	32	25	37	33	32	31	27	26	25		Y	0
402	Other Mine	1.2	0.7	0.5	35	32	32	24	36	33	32	30	27	26	25		Y	0
403	Other Mine	1.3	0.7	0.5	35	32	31	25	36	33	32	31	27	26	25		Y	0
404	Other Mine - Vacant	0.8	0.4	0.3	42	40	38	32	43	40	38	35	32	31	25		Y	0
405	Other Mine - Vacant	1.1	0.5	0.3	42	37	36	32	43	38	36	33	27	26	25		Y	0
406	Other Mine - Vacant	1	0.5	0.4	45	43	42	24	46	43	42	30	28	27	25		Y	0
407	Other Mine - Vacant	1.6	0.8	0.6	34	29	29	26	36	30	29	31	25	24	25		Y	0
408	Other Mine	1.5	0.8	0.5	34	30	29	25	35	30	30	30	25	24	25		Y	0
409	Glencore - Vacant	1.8	0.7	0.5	34	25	24	31	36	26	25	34	23	22	25		Y	1
410	Glencore - Vacant	4.8	2.6	1.4	16	15	14	19	21	17	16	21	17	16	25		N	0
411	Glencore - Vacant	5.6	3	1.6	16	15	14	19	22	18	16	21	17	16	25		N	0
412	Community Infrastructure	2.9	1.4	0.8	16	15	14	18	19	16	15	19	16	15	25		N	0
007a	Private	4.7	4.3	2.9	19	18	17	18	23	22	20	23	22	20	25	N	N	0
007b	Private	4.5	4.1	2.8	19	18	18	18	23	22	20	23	22	20	25	N	N	0
007c	Private	4.4	4	2.6	18	17	17	18	22	21	19	22	21	19	25	N	N	0
015a	Private	3.2	3	1.6	15	15	15	17	19	18	16	19	18	16	25	N	N	0
015b	Private	3.2	3	1.6	15	15	15	17	19	18	16	19	18	16	25	N	N	0
044a	Private	0.5	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
044b	Private	0.5	0.4	0.2	14	14	14	14	15	14	14	15	14	14	25	N	N	0
056a	Private	0.5	0.3	0.2	14	14	14	14	14	14	14	14	14	14	25	N	N	0
056b	Private	0.4	0.3	0.2	14	14	14	14	14	14	14	14	14	14	25	N	N	0
063a	Community Infrastructure	0.8	0.6	0.3	14	14	14	14	15	14	14	15	14	14	25		N	0
069a	Private	1	0.8	0.4	14	14	14	15	15	15	14	15	15	14	25	N	N	0
102a	Private	2.4	1.9	1.3	18	17	17	17	21	19	19	21	19	18	25	N	N	0
102b	Private	2.3	1.9	1.2	19	18	18	17	21	20	19	21	19	19	25	N	N	0
127a	Private - Subject to Acq Rights	1.4	0.8	0.5	35	31	31	24	36	32	31	33	29	28	25	Y (>25% land)	Y	0
127b	Private - Subject to Acq Rights	2	1.1	0.8	36	29	29	26	38	30	29	36	29	28	25	Y (>25% land)	Y	0
127c	Private - Subject to Acq Rights	2.4	1.2	0.9	38	27	27	31	40	28	28	38	26	25	25	Y (>25% land)	Y	0
127d	Private - Subject to Acq Rights	2.4	1.3	0.9	38	28	27	30	40	29	28	38	27	26	25	Y (>25% land)	Y	0
144a	Private - Subject to Acq Rights	0.6	0.3	0.2	46	45	43	25	46	45	43	29	28	26	25	Y (>25% land)	Y	0
144b	Private - Subject to Acq Rights	0.4	0.2	0.1	27	27	25	22	28	27	25	24	24	21	25	Y (>25% land)	Y	0

Notes:

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- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
144c	Private - Subject to Acq Rights	0.4	0.2	0.1	27	27	24	22	28	27	25	24	23	21	25	Y (>25% land)	Y	0
162a	Glencore - Vacant	5	4.9	2.2	15	14	14	18	20	19	17	20	19	17	25		N	0
162b	Private	0.9	0.7	0.3	14	14	14	15	15	15	14	15	15	14	25	N	N	0
17a	Private	2.9	2.6	1.3	15	15	15	16	18	17	16	18	17	16	25	N	N	0
17b	Private	3.1	2.8	1.5	15	15	15	17	18	17	16	18	17	16	25	N	N	0
292a	Private	1.3	0.7	0.6	20	18	18	17	21	19	19	21	19	19	25	N	N	0
292b	Private	1.3	0.7	0.5	20	18	18	17	21	19	19	21	19	19	25	N	N	0
297a	Private	0.6	0.3	0.2	21	20	20	18	22	20	20	22	20	20	25	N	N	0
297b	Private	0.6	0.3	0.2	21	20	20	18	22	20	20	22	20	20	25	N	N	0
297c	Private	0.6	0.3	0.2	21	20	20	18	22	20	20	22	20	20	25	N	N	0
297d	Private	0.7	0.3	0.2	20	18	18	17	20	19	18	20	18	18	25	N	N	0
349a	Private	0.4	0.2	0.1	19	18	18	17	20	18	18	19	18	18	25	N	N	0
349b	Private	0.4	0.2	0.2	19	18	18	17	20	19	18	19	18	18	25	N	N	0
-																		
Maximum 24-hour average $PM_{2.5}$ ($\mu g/m^3$)																		
1	Other Mine - Vacant	3	4	3	24	24	24	19	25	24	24	24	24	24	25		N	0
2	Community Infrastructure	3	3	2	23	22	22	19	23	23	22	23	23	22	25		N	0
3	Other Mine	3	4	3	22	22	22	19	22	22	22	22	22	22	25		N	0
4	Private	4	4	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
5	Private - Subject to Acq Rights	3	4	3	21	21	21	19	21	21	21	21	21	21	25	N	N	0
6	Community Infrastructure	4	4	3	21	20	20	19	21	21	21	21	21	20	25		N	0
10	Private	4	5	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
11	Private	4	5	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
12	Private	4	5	4	20	20	20	19	20	20	20	20	20	20	25	N	N	0
13	Private	4	4	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
14	Private	4	4	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
19	Private	5	6	3	20	19	19	19	20	20	20	20	20	20	25	N	N	0
21	Private - Subject to Acq Rights	5	5	4	20	20	20	19	20	20	20	20	20	20	25	N	N	0
22	Glencore	5	5	4	20	20	20	19	20	20	20	20	20	20	25		N	0
23	Private - Subject to Acq Rights	5	6	4	20	20	20	19	20	20	20	20	20	20	25	N	N	0
24	Glencore	5	6	4	20	20	19	19	20	20	20	20	20	20	25		N	0
25	Glencore	5	6	4	20	19	19	19	20	20	20	20	20	20	25		N	0
26	Glencore	6	6	4	20	19	19	19	20	20	20	20	20	20	25		N	0
27	Glencore	5	6	5	20	20	20	19	20	20	20	20	20	20	25		N	0
28	Glencore	6	7	5	20	19	19	19	20	20	20	20	20	20	25		N	0
29	Glencore	6	7	5	20	20	19	19	20	20	20	20	20	20	25		N	0
30	Glencore	8	12	8	20	19	19	19	20	21	20	20	21	20	25		N	0
31	Glencore	8	12	8	20	19	19	19	20	21	20	20	21	20	25		N	0
32	Glencore	7	9	5	19	19	19	19	20	20	20	20	20	20	25		N	0
33	Glencore	6	7	4	19	19	19	19	20	20	20	20	20	20	25		N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
34	Glencore	6	6	3	19	19	19	19	20	20	20	20	20	20	25		N	0
35	Glencore - Vacant	5	6	3	19	19	19	19	20	20	20	20	20	20	25		N	0
36	Glencore	6	7	4	19	19	19	19	20	20	20	20	20	20	25		N	0
37	Glencore - Vacant	8	11	6	19	19	19	19	20	21	20	20	21	20	25		N	0
38	Glencore	9	13	7	19	19	19	19	20	21	20	20	21	20	25		N	0
39	Glencore	8	11	6	19	19	19	19	20	21	20	20	21	20	25		N	0
40	Glencore	5	3	2	19	19	19	19	20	20	19	20	20	19	25		N	0
41	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
42	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
43	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
45	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
46	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
47	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
48	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
49	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
50	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
51	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
52	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
53	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
54	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
55	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
57	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
58	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
59	Private	2	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
60	Private	2	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
61	Private	2	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
62	Private	2	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
73	Private	1	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
74	Private	2	2	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
83	Private	3	3	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
85	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
86	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
87	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
88	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
89	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
90	Other Mine	3	3	3	19	19	19	19	19	19	19	19	19	19	25		N	0
91	Private	3	3	3	19	19	19	19	20	20	19	20	20	19	25	N	N	0
92	Private	4	4	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
93	Private	4	4	3	19	19	19	19	20	20	19	20	20	19	25	N	N	0
94	Private	4	4	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
95	Private	4	4	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
96	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
97	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
98	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
99	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
100	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
101	Private	2	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
104	Other Mine	3	3	2	19	19	19	19	19	19	19	19	19	19	25		N	0
105	Private - Subject to Acq Rights	4	3	2	21	21	21	19	21	21	21	21	21	21	25	N	N	0
108	Glencore	3	2	2	21	21	21	20	21	21	21	21	21	21	25		N	0
109	Glencore	3	2	2	21	21	21	20	21	21	21	21	21	21	25		N	0
110	Other Mine - Vacant	2	2	1	23	23	23	20	23	23	23	23	23	23	25		N	0
111	Private - Subject to Acq Rights	2	2	1	25	25	25	20	25	25	25	25	25	25	25	N	N	0
112	Private	4	5	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
114	Private - Subject to Acq Rights	4	5	3	20	20	20	19	21	20	20	21	20	20	25	N	N	0
115	Private - Subject to Acq Rights	5	6	4	20	20	20	19	21	21	20	21	21	20	25	N	N	0
116	Glencore	4	4	3	20	20	20	19	21	21	20	21	21	20	25		N	0
117	Glencore	5	5	4	21	20	20	19	21	21	21	21	21	21	25		N	0
120	Glencore - Vacant	5	4	3	21	21	21	19	21	21	21	21	21	21	25		N	0
121	Glencore - Vacant	5	4	3	21	21	20	20	21	21	21	21	21	21	25		N	0
122	Private - Subject to Acq Rights	5	4	3	21	20	20	20	21	21	21	21	21	21	25	N	N	0
123	Glencore - Vacant	4	4	2	21	21	21	20	21	21	21	21	21	21	25		N	0
124	Glencore	5	3	2	21	20	20	20	21	21	21	21	21	20	25		N	0
125	Glencore	5	3	2	21	20	20	20	21	21	20	21	21	20	25		N	0
126	Glencore	4	3	2	21	20	20	20	21	21	21	21	21	20	25		N	0
129	Glencore	4	2	2	22	21	21	21	23	22	22	22	21	21	25		N	0
130	Glencore	4	2	2	22	22	21	21	23	22	22	22	21	21	25		N	0
131	Glencore - Vacant	6	2	1	20	19	19	21	23	20	20	23	20	20	25		N	0
132	Glencore - Vacant	5	2	1	21	19	19	21	23	20	20	23	20	20	25		N	0
133	Private - Subject to Acq Rights	3	2	1	20	19	19	20	21	20	19	21	20	19	25	N	N	0
143	Private - Subject to Acq Rights	3	1	1	22	22	21	20	22	22	21	22	21	21	25	N	N	0
145	Private - Subject to Acq Rights	1	1	0	55	52	52	20	56	53	52	21	21	20	25	N	Y	0
146	Other Mine	2	1	1	22	22	22	20	22	22	22	22	21	21	25		N	0
147	Private - Subject to Acq Rights	2	1	1	34	33	30	21	34	33	30	23	22	22	25	N	Y	0
148	Other Mine	2	1	1	27	26	23	21	27	26	23	23	23	23	25		Y	0
149	Community Infrastructure	2	1	1	23	22	22	20	23	23	22	21	21	20	25		N	0
150	Private - Subject to Acq Rights	2	1	1	23	22	22	20	23	22	22	21	21	21	25	N	N	0
151	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
152	Private - Subject to Acq Rights	3	1	1	22	22	22	20	23	22	22	21	21	21	25	N	N	0
154	Private - Subject to Acq Rights	3	1	1	22	22	22	20	22	22	22	21	21	21	25	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
155	Private - Subject to Acq Rights	3	1	1	22	22	21	20	22	22	22	21	21	21	25	N	N	0
156	Private - Subject to Acq Rights	3	1	1	22	21	21	20	22	22	21	21	21	21	25	N	N	0
157	Glencore - Vacant	4	3	2	21	21	20	20	21	21	21	21	21	20	25		N	0
158	Other Mine - Vacant	1	1	1	110	109	108	20	110	109	108	21	21	21	25		Y	0
159	Other Mine - Vacant	2	1	1	27	27	24	20	27	27	24	22	21	21	25		Y	0
160	Other Mine - Vacant	2	1	1	80	79	78	20	80	79	78	21	21	21	25		Y	0
161	Glencore - Vacant	21	3	2	20	19	19	21	27	21	20	27	21	20	25		Y	7
163	Other Mine	2	1	1	19	19	19	19	19	19	19	19	19	19	25		N	0
164	Private - Subject to Acq Rights	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
165	Other Mine	2	1	0	19	19	19	19	19	19	19	19	19	19	25		N	0
166	Other Mine - Vacant	3	1	1	23	22	22	22	23	22	22	22	21	21	25		N	0
178	Private	0	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
210	Private	0	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
211	Private	0	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
212	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
213	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
259	Private	1	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
280	Private	2	2	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
281	Private	2	2	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
282	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
289	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
290	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
291	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
293	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
294	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
295	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
296	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
299	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
300	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
302	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
303	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
305	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
306	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
307	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
308	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
309	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
310	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
311	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
312	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
314	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
315	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
316	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
317	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
318	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
319	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
320	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
321	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
322	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
323	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
324	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
325	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
326	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
327	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
328	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
329	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
330	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
337	Private	0	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
342	Private Infrastructure	2	1	1	22	21	21	22	23	21	21	23	21	21	25		N	0
344	Other Mine	2	1	1	19	19	19	19	19	19	19	19	19	19	25		N	0
351	Other Mine	3	1	1	22	22	22	20	22	22	22	21	21	21	25		N	0
352	Other Mine - Vacant	2	1	1	23	23	23	20	23	23	23	23	23	23	25		N	0
353	Other Mine	2	1	1	28	27	25	21	28	27	25	24	24	24	25		Y	0
356	Glencore - Vacant	3	1	1	24	20	20	24	25	21	20	25	21	20	25		N	0
357	Glencore - Vacant	6	2	2	22	20	20	23	23	20	20	23	20	20	25		N	0
358	Glencore - Vacant	6	2	1	22	20	20	22	23	20	20	23	20	20	25		N	0
359	Glencore - Vacant	2	1	1	22	21	21	22	23	21	21	23	21	21	25		N	0
360	Glencore - Vacant	5	4	3	21	21	21	19	21	21	21	21	21	21	25		N	0
361	Glencore - Vacant	5	6	4	20	20	20	19	21	20	20	20	20	20	25		N	0
363	Glencore	5	5	3	21	21	20	19	21	21	21	21	21	21	25		N	0
364	Other Mine	2	1	1	28	27	25	20	28	27	26	21	21	21	25		Y	1
365	Other Mine - Vacant	2	1	1	24	23	23	20	24	23	23	21	21	21	25		N	0
366	Other Mine - Vacant	2	1	1	24	24	23	20	24	24	23	21	21	21	25		N	0
367	Other Mine	2	1	1	24	23	23	20	24	23	23	21	21	21	25		N	0
368	Other Mine - Vacant	2	1	1	23	23	23	20	23	23	23	21	21	21	25		N	0
369	Other Mine - Vacant	2	1	1	23	23	22	20	23	23	23	21	21	21	25		N	0
370	Other Mine	2	1	1	23	23	23	20	23	23	23	21	21	21	25		N	0
371	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
372	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
373	Other Mine - Vacant	2	1	1	23	22	22	20	23	23	22	21	21	21	25		N	0
374	Other Mine	2	1	1	23	22	22	20	23	22	22	22	21	21	25		N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
375	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
376	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
377	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
378	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
379	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
380	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
381	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
382	Other Mine	3	1	1	22	22	22	20	23	22	22	22	21	21	25		N	0
383	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
384	Other Mine	3	1	1	22	22	22	20	22	22	22	21	21	21	25		N	0
385	Other Mine	3	1	1	22	22	22	20	22	22	22	21	21	21	25		N	0
386	Other Mine	3	1	1	22	22	22	20	22	22	22	21	21	21	25		N	0
387	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
388	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	20	25		N	0
389	Other Mine - Vacant	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
390	Other Mine	3	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
391	Other Mine	3	1	1	22	22	21	20	22	22	21	21	21	21	25		N	0
392	Other Mine - Vacant	3	1	1	22	22	21	20	22	22	22	22	21	21	25		N	0
394	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
395	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
396	Other Mine	2	1	1	23	22	22	20	23	22	22	21	21	21	25		N	0
397	Other Mine	2	1	1	23	22	22	20	23	22	22	22	21	21	25		N	0
398	Other Mine	2	1	1	22	22	22	20	23	22	22	22	21	21	25		N	0
399	Other Mine	2	1	1	22	22	22	20	23	22	22	22	21	21	25		N	0
400	Other Mine	2	1	1	23	22	22	20	23	22	22	22	21	21	25		N	0
401	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
402	Other Mine	2	1	1	22	22	22	20	22	22	22	21	21	21	25		N	0
403	Other Mine	2	1	1	22	22	22	20	22	22	22	22	21	21	25		N	0
404	Other Mine - Vacant	1	1	0	23	22	22	22	23	23	22	21	21	20	25		N	0
405	Other Mine - Vacant	2	1	1	23	22	22	21	23	22	22	22	21	20	25		N	0
406	Other Mine - Vacant	2	1	1	37	36	33	20	37	36	33	22	21	21	25		Y	0
407	Other Mine - Vacant	3	1	1	22	22	22	20	22	22	22	22	21	21	25		N	0
408	Other Mine	2	1	1	22	22	22	20	23	22	22	21	21	21	25		N	0
409	Glencore - Vacant	2	1	1	22	21	21	22	23	21	21	23	21	21	25		N	0
410	Glencore - Vacant	3	3	1	20	19	19	21	21	20	20	21	20	20	25		N	0
411	Glencore - Vacant	3	3	2	20	19	19	21	22	21	20	22	21	20	25		N	0
412	Community Infrastructure	3	2	1	20	19	19	20	21	20	19	21	20	19	25		N	0
007a	Private	4	5	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
007b	Private	4	5	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0
007c	Private	4	4	3	20	20	20	19	20	20	20	20	20	20	25	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
015a	Private	4	3	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
015b	Private	4	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
044a	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
044b	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
056a	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
056b	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
063a	Community Infrastructure	2	1	1	19	19	19	19	19	19	19	19	19	19	25		N	0
069a	Private	1	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
102a	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
102b	Private	3	3	2	19	19	19	19	19	19	19	19	19	19	25	N	N	0
127a	Private - Subject to Acq Rights	2	1	1	22	22	22	20	22	22	22	22	22	22	25	N	N	0
127b	Private - Subject to Acq Rights	3	2	1	22	22	22	20	23	22	22	22	22	22	25	N	N	0
127c	Private - Subject to Acq Rights	4	2	1	22	22	22	20	22	22	22	22	21	21	25	N	N	0
127d	Private - Subject to Acq Rights	4	2	1	22	22	22	20	22	22	22	22	22	21	25	N	N	0
144a	Private - Subject to Acq Rights	1	1	0	29	27	26	20	30	28	27	21	20	20	25	N	Y	0
144b	Private - Subject to Acq Rights	1	0	0	21	21	20	19	21	21	20	20	20	20	25	N	N	0
144c	Private - Subject to Acq Rights	1	0	0	21	21	20	19	21	21	20	20	20	20	25	N	N	0
162a	Glencore - Vacant	6	5	2	19	19	19	19	20	20	19	20	20	19	25		N	0
162b	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
17a	Private	2	2	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
17b	Private	2	2	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
292a	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
292b	Private	2	1	1	19	19	19	19	19	19	19	19	19	19	25	N	N	0
297a	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
297b	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
297c	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
297d	Private	1	1	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
349a	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
349b	Private	1	0	0	19	19	19	19	19	19	19	19	19	19	25	N	N	0
-																		
Annual average $PM_{2.5}$ ($\mu g/m^3$)																		
1	Other Mine - Vacant	0.7	0.5	0.4	10	10	10	7	11	10	10	11	10	10	8		Y	0
2	Community Infrastructure	0.7	0.6	0.4	9	8	8	7	9	9	9	9	9	9	8		Y	1
3	Other Mine	0.7	0.6	0.5	8	8	8	7	9	9	8	9	9	8	8		Y	1
4	Private	0.9	0.8	0.6	7	7	7	7	8	8	7	8	7	7	8	Y (>25% land)	N	0
5	Private - Subject to Acq Rights	0.8	0.6	0.5	8	7	7	7	8	8	8	8	8	8	8	Y (>25% land)	N	0
6	Community Infrastructure	0.8	0.6	0.5	7	7	7	7	8	8	7	8	8	7	8		N	0
10	Private	0.9	0.9	0.6	7	6	6	7	7	7	7	7	7	7	8	N	N	0
11	Private	0.9	0.9	0.5	6	6	6	7	7	7	7	7	7	7	8	N	N	0
12	Private	0.9	0.9	0.6	6	6	6	7	7	7	7	7	7	7	8	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
13	Private	0.7	0.7	0.4	6	6	6	6	7	7	6	7	7	6	8	N	N	0
14	Private	0.6	0.6	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
19	Private	1	1.1	0.6	6	6	6	7	7	7	7	7	7	7	8	N	N	0
21	Private - Subject to Acq Rights	1.1	1.1	0.7	6	6	6	7	8	7	7	7	7	7	8	N	N	0
22	Glencore	1	1.1	0.7	6	6	6	7	8	7	7	7	7	7	8		N	0
23	Private - Subject to Acq Rights	1.2	1.2	0.8	6	6	6	7	8	7	7	8	7	7	8	N	N	0
24	Glencore	1.3	1.4	0.9	6	6	6	7	8	8	7	8	7	7	8		N	0
25	Glencore	1.4	1.5	0.9	6	6	6	7	8	8	7	8	8	7	8		N	0
26	Glencore	1.3	1.5	0.9	6	6	6	7	8	8	7	8	8	7	8		N	0
27	Glencore	1.4	1.6	1	7	6	6	7	8	8	7	8	8	7	8		N	0
28	Glencore	1.5	1.8	1.1	6	6	6	7	8	8	7	8	8	7	8		N	0
29	Glencore	1.6	1.9	1.2	7	6	6	7	8	8	7	8	8	7	8		N	0
30	Glencore	2.4	3.7	2.5	7	6	6	7	9	10	9	9	10	9	8		Y	4
31	Glencore	2.4	3.9	2.4	6	6	6	7	9	10	8	9	10	8	8		Y	4
32	Glencore	1.8	2.4	1.3	6	6	6	7	8	8	7	8	8	7	8		N	0
33	Glencore	1.5	1.7	0.9	6	6	6	7	8	8	7	8	8	7	8		N	0
34	Glencore	1.3	1.4	0.8	6	6	6	7	7	7	7	7	7	7	8		N	0
35	Glencore - Vacant	1.2	1.4	0.7	6	6	6	7	7	7	7	7	7	6	8		N	0
36	Glencore	1.5	1.8	1	6	6	6	7	8	8	7	8	8	7	8		N	0
37	Glencore - Vacant	2.2	2.9	1.5	6	6	6	7	8	9	7	8	9	7	8		Y	3
38	Glencore	2.5	3.9	2	6	6	6	7	9	10	8	9	10	8	8		Y	4
39	Glencore	2.2	3.2	1.7	6	6	6	7	8	9	8	8	9	7	8		Y	3
40	Glencore	0.7	0.7	0.3	6	6	6	6	7	6	6	7	6	6	8		N	0
41	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
42	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
43	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
45	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
46	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
47	Private	0.1	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
48	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
49	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
50	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
51	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
52	Private	0.1	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
53	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
54	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
55	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
57	Private	0.1	0.1	0	6	6	5	6	6	6	6	6	6	6	8	N	N	0
58	Private	0.1	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
59	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
60	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
61	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
62	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
73	Private	0.2	0.2	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
74	Private	0.4	0.3	0.2	6	6	6	6	6	6	6	6	6	6	8	N	N	0
83	Private	0.4	0.3	0.2	6	6	6	6	6	6	6	6	6	6	8	N	N	0
85	Private	0.3	0.3	0.2	6	6	6	6	6	6	6	6	6	6	8	N	N	0
86	Private	0.4	0.3	0.2	6	6	6	6	6	6	6	6	6	6	8	N	N	0
87	Private	0.4	0.3	0.2	6	6	6	6	6	6	6	6	6	6	8	N	N	0
88	Private	0.5	0.4	0.2	6	6	6	6	7	6	6	6	6	6	8	N	N	0
89	Private	0.5	0.4	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
90	Other Mine	0.5	0.4	0.3	6	6	6	6	7	6	6	7	6	6	8		N	0
91	Private	0.6	0.5	0.3	6	6	6	6	7	7	6	7	7	6	8	N	N	0
92	Private	0.7	0.6	0.4	7	6	6	6	7	7	7	7	7	7	8	N	N	0
93	Private	0.7	0.7	0.4	6	6	6	6	7	7	6	7	7	6	8	N	N	0
94	Private	0.6	0.6	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
95	Private	0.5	0.5	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
96	Private	0.4	0.3	0.2	6	6	6	6	7	6	6	7	6	6	8	N	N	0
97	Private	0.4	0.3	0.2	6	6	6	6	7	6	6	7	6	6	8	N	N	0
98	Private	0.4	0.4	0.2	6	6	6	6	7	6	6	7	6	6	8	N	N	0
99	Private	0.5	0.4	0.3	6	6	6	6	7	7	6	7	7	6	8	N	N	0
100	Private	0.5	0.4	0.3	7	6	6	6	7	7	7	7	7	7	8	N	N	0
101	Private	0.4	0.4	0.2	7	6	6	6	7	7	7	7	7	6	8	N	N	0
104	Other Mine	0.4	0.3	0.2	7	7	7	6	7	7	7	7	7	7	8		N	0
105	Private - Subject to Acq Rights	0.9	0.6	0.5	8	7	7	7	8	8	7	8	8	7	8	Y (>25% land)	N	0
108	Glencore	0.6	0.4	0.3	9	8	8	8	10	8	8	9	8	8	8		Y	0
109	Glencore	0.6	0.4	0.3	9	8	8	8	9	8	8	9	8	8	8		Y	0
110	Other Mine - Vacant	0.4	0.2	0.2	10	9	9	8	11	10	9	11	9	9	8		Y	0
111	Private - Subject to Acq Rights	0.4	0.2	0.2	12	11	11	8	12	11	11	12	11	11	8	Y (>25% land)	Y	0
112	Private	1	1	0.7	7	6	6	7	8	7	7	8	7	7	8	Y (>25% land)	N	0
114	Private - Subject to Acq Rights	1.1	1.1	0.8	7	7	7	7	8	8	7	8	8	7	8	Y (>25% land)	N	0
115	Private - Subject to Acq Rights	1.3	1.3	1	7	7	7	7	9	8	8	8	8	8	8	Y (>25% land)	Y	2
116	Glencore	1.1	1	0.8	7	7	7	7	8	8	7	8	8	7	8		N	0
117	Glencore	1.3	1.1	0.9	8	7	7	7	9	8	8	9	8	8	8		Y	1
120	Glencore - Vacant	1.1	0.8	0.6	8	7	7	7	9	8	8	9	8	8	8		Y	1
121	Glencore - Vacant	1	0.6	0.5	8	7	7	8	9	8	8	9	8	7	8		Y	1
122	Private - Subject to Acq Rights	1.1	0.6	0.5	8	7	7	8	9	8	8	9	8	7	8	Y (>25% land)	Y	1
123	Glencore - Vacant	1	0.6	0.5	8	7	7	7	9	8	8	9	8	8	8		Y	1
124	Glencore	0.9	0.5	0.4	8	7	7	8	9	8	8	9	8	7	8		Y	1
125	Glencore	1	0.5	0.4	9	7	7	8	10	8	8	9	8	7	8		Y	0

Notes:

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- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
126	Glencore	0.8	0.4	0.3	9	7	7	8	9	8	8	9	8	7	8		Y	0
129	Glencore	0.6	0.3	0.2	11	8	8	10	12	9	8	11	8	8	8		Y	1
130	Glencore	0.5	0.3	0.2	11	9	8	10	12	9	9	11	8	8	8		Y	1
131	Glencore - Vacant	1.4	0.4	0.2	7	6	6	7	8	6	6	8	6	6	8		N	0
132	Glencore - Vacant	1.2	0.4	0.2	7	6	6	7	8	6	6	8	6	6	8		N	0
133	Private - Subject to Acq Rights	0.5	0.2	0.1	6	6	6	6	7	6	6	7	6	6	8	N	N	0
143	Private - Subject to Acq Rights	0.3	0.2	0.1	10	9	8	8	10	9	9	9	8	8	8	Y (>25% land)	Y	1
145	Private - Subject to Acq Rights	0.1	0.1	0.1	20	20	20	8	21	20	20	9	8	8	8	Y (>25% land)	Y	0
146	Other Mine	0.2	0.1	0.1	10	10	10	8	11	10	10	9	9	8	8		Y	0
147	Private - Subject to Acq Rights	0.2	0.1	0.1	12	12	12	9	13	12	12	11	10	10	8	Y (>25% land)	Y	0
148	Other Mine	0.2	0.1	0.1	12	11	11	8	12	12	11	11	11	10	8		Y	0
149	Community Infrastructure	0.3	0.1	0.1	11	10	9	8	11	10	10	9	8	8	8		Y	0
150	Private - Subject to Acq Rights	0.3	0.2	0.1	11	10	9	8	11	10	9	9	8	8	8	Y (>25% land)	Y	0
151	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
152	Private - Subject to Acq Rights	0.3	0.2	0.1	11	9	9	8	11	10	9	9	8	8	8	Y (>25% land)	Y	0
154	Private - Subject to Acq Rights	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8	Y (>25% land)	Y	0
155	Private - Subject to Acq Rights	0.4	0.2	0.1	10	9	9	8	10	9	9	9	8	8	8	Y (>25% land)	Y	0
156	Private - Subject to Acq Rights	0.4	0.2	0.1	10	9	8	8	10	9	8	9	8	8	8	Y (>25% land)	Y	0
157	Glencore - Vacant	0.7	0.4	0.3	9	8	8	9	10	8	8	10	8	8	8		Y	0
158	Other Mine - Vacant	0.2	0.1	0.1	56	56	55	8	56	56	56	9	8	8	8		Y	0
159	Other Mine - Vacant	0.2	0.1	0.1	12	12	11	8	13	12	12	10	9	9	8		Y	0
160	Other Mine - Vacant	0.2	0.1	0.1	33	33	32	8	33	33	32	9	8	8	8		Y	0
161	Glencore - Vacant	6	0.7	0.4	7	6	6	8	13	7	6	13	7	6	8		Y	6
163	Other Mine	0.3	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8		N	0
164	Private - Subject to Acq Rights	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
165	Other Mine	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8		N	0
166	Other Mine - Vacant	0.4	0.2	0.1	12	9	9	10	12	9	9	11	8	8	8		Y	0
178	Private	0.1	0.1	0	6	5	5	6	6	6	6	6	6	6	8	N	N	0
210	Private	0.1	0	0	6	5	5	6	6	6	6	6	6	5	8	N	N	0
211	Private	0.1	0.1	0	6	6	5	6	6	6	6	6	6	6	8	N	N	0
212	Private	0.1	0.1	0	6	6	5	6	6	6	6	6	6	6	8	N	N	0
213	Private	0.1	0.1	0	6	6	5	6	6	6	6	6	6	6	8	N	N	0
259	Private	0.3	0.2	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
280	Private	0.3	0.2	0.2	7	7	7	6	7	7	7	7	7	7	8	N	N	0
281	Private	0.3	0.2	0.2	7	7	7	6	7	7	7	7	7	7	8	N	N	0
282	Private	0.3	0.2	0.1	7	7	7	6	8	7	7	8	7	7	8	N	N	0
289	Private	0.2	0.1	0.1	7	6	6	6	7	7	6	7	6	6	8	N	N	0
290	Private	0.3	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
291	Private	0.3	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
293	Private	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
294	Private	0.2	0.1	0.1	7	7	6	6	7	7	7	7	7	6	8	N	N	0
295	Private	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
296	Private	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
299	Private	0.1	0.1	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
300	Private	0.1	0.1	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
302	Private	0.1	0.1	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
303	Private	0.1	0	0	6	6	6	6	7	6	6	6	6	6	8	N	N	0
305	Private	0.1	0	0	7	6	6	6	7	7	6	7	6	6	8	N	N	0
306	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	6	8	N	N	0
307	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
308	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
309	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
310	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
311	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
312	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
314	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
315	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
316	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
317	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
318	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
319	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
320	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
321	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
322	Private	0.1	0	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
323	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
324	Private	0.1	0.1	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
325	Private	0.1	0.1	0	7	7	7	7	8	7	7	7	7	7	8	N	N	0
326	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
327	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
328	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
329	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
330	Private	0.1	0	0	7	7	7	7	7	7	7	7	7	7	8	N	N	0
337	Private	0	0	0	6	5	5	6	6	6	5	6	5	5	8	N	N	0
342	Private Infrastructure	0.4	0.2	0.1	10	8	8	10	11	8	8	10	8	7	8		Y	0
344	Other Mine	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8		N	0
351	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
352	Other Mine - Vacant	0.2	0.1	0.1	11	11	11	8	12	11	11	11	10	10	8		Y	0
353	Other Mine	0.2	0.1	0.1	13	12	12	8	13	12	12	12	11	11	8		Y	0
356	Glencore - Vacant	0.8	0.3	0.2	11	7	7	11	12	7	7	12	7	7	8		Y	0
357	Glencore - Vacant	1.3	0.3	0.2	10	7	6	11	11	7	7	11	7	6	8		Y	0

Notes:

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- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
358	Glencore - Vacant	1.1	0.2	0.2	10	6	6	10	11	7	6	11	7	6	8		Y	0
359	Glencore - Vacant	0.4	0.2	0.1	10	8	8	10	11	8	8	10	8	7	8		Y	0
360	Glencore - Vacant	1.2	0.9	0.7	8	7	7	7	9	8	8	9	8	8	8		Y	1
361	Glencore - Vacant	1.3	1.4	1	7	7	7	7	8	8	8	8	8	8	8		N	0
363	Glencore	1.2	1	0.8	8	7	7	7	9	8	8	9	8	8	8		Y	1
364	Other Mine	0.2	0.1	0.1	14	13	13	8	14	14	13	9	8	8	8		Y	0
365	Other Mine - Vacant	0.3	0.1	0.1	12	11	11	8	12	11	11	9	8	8	8		Y	0
366	Other Mine - Vacant	0.2	0.1	0.1	12	11	11	8	12	11	11	9	8	8	8		Y	0
367	Other Mine	0.3	0.1	0.1	12	11	11	8	12	11	11	9	8	8	8		Y	0
368	Other Mine - Vacant	0.3	0.1	0.1	11	11	10	8	12	11	10	9	8	8	8		Y	0
369	Other Mine - Vacant	0.3	0.1	0.1	12	11	10	8	12	11	11	9	8	8	8		Y	0
370	Other Mine	0.3	0.1	0.1	12	11	11	8	12	11	11	9	8	8	8		Y	0
371	Other Mine	0.3	0.2	0.1	11	10	10	8	12	10	10	10	8	8	8		Y	0
372	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	8	8	8		Y	0
373	Other Mine - Vacant	0.3	0.2	0.1	11	10	10	8	11	10	10	9	8	8	8		Y	0
374	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
375	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	8	8	8		Y	0
376	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
377	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
378	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
379	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
380	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
381	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
382	Other Mine	0.3	0.2	0.1	11	9	9	8	11	9	9	10	8	8	8		Y	0
383	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
384	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
385	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
386	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
387	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
388	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	7	8		Y	0
389	Other Mine - Vacant	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
390	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
391	Other Mine	0.4	0.2	0.1	10	9	8	8	10	9	9	9	8	8	8		Y	1
392	Other Mine - Vacant	0.4	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
394	Other Mine	0.3	0.2	0.1	11	10	10	8	12	10	10	10	9	8	8		Y	0
395	Other Mine	0.3	0.2	0.1	11	10	10	8	12	10	10	10	9	8	8		Y	0
396	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
397	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
398	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
399	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
400	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
401	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
402	Other Mine	0.3	0.1	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
403	Other Mine	0.3	0.2	0.1	11	10	10	8	11	10	10	10	9	8	8		Y	0
404	Other Mine - Vacant	0.2	0.1	0.1	12	11	11	9	12	11	11	10	9	9	8		Y	0
405	Other Mine - Vacant	0.2	0.1	0.1	12	10	10	9	12	10	10	10	8	8	8		Y	0
406	Other Mine - Vacant	0.2	0.1	0.1	14	13	13	8	14	14	13	9	9	8	8		Y	0
407	Other Mine - Vacant	0.3	0.2	0.1	10	9	9	8	11	9	9	10	8	8	8		Y	0
408	Other Mine	0.3	0.2	0.1	10	9	9	8	11	9	9	9	8	8	8		Y	0
409	Glencore - Vacant	0.4	0.2	0.1	10	8	8	10	11	8	8	10	8	7	8		Y	0
410	Glencore - Vacant	0.9	0.5	0.2	6	6	6	7	7	6	6	7	6	6	8		N	0
411	Glencore - Vacant	1.1	0.5	0.3	6	6	6	7	7	6	6	7	6	6	8		N	0
412	Community Infrastructure	0.6	0.2	0.1	6	6	6	6	7	6	6	7	6	6	8		N	0
007a	Private	0.8	0.7	0.5	7	7	7	7	8	7	7	8	7	7	8	N	N	0
007b	Private	0.8	0.7	0.5	7	7	7	7	8	7	7	8	7	7	8	N	N	0
007c	Private	0.8	0.7	0.5	7	7	6	6	8	7	7	8	7	7	8	N	N	0
015a	Private	0.6	0.5	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
015b	Private	0.6	0.5	0.3	6	6	6	6	7	6	6	7	6	6	8	N	N	0
044a	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
044b	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
056a	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
056b	Private	0.1	0.1	0	6	6	6	6	6	6	6	6	6	6	8	N	N	0
063a	Community Infrastructure	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8		N	0
069a	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
102a	Private	0.4	0.3	0.2	7	7	7	6	7	7	7	7	7	7	8	N	N	0
102b	Private	0.4	0.3	0.2	7	7	7	6	7	7	7	7	7	7	8	N	N	0
127a	Private - Subject to Acq Rights	0.3	0.2	0.1	10	10	9	8	11	10	10	10	9	9	8	Y (>25% land)	Y	0
127b	Private - Subject to Acq Rights	0.4	0.2	0.2	11	9	9	8	11	9	9	11	9	9	8	Y (>25% land)	Y	0
127c	Private - Subject to Acq Rights	0.5	0.2	0.2	11	9	8	9	11	9	9	11	8	8	8	Y (>25% land)	Y	1
127d	Private - Subject to Acq Rights	0.5	0.3	0.2	11	9	9	9	12	9	9	11	9	8	8	Y (>25% land)	Y	0
144a	Private - Subject to Acq Rights	0.1	0.1	0	13	13	12	8	14	13	13	9	9	8	8	Y (>25% land)	Y	0
144b	Private - Subject to Acq Rights	0.1	0.1	0	9	9	8	7	9	9	8	8	8	7	8	Y (>25% land)	Y	0
144c	Private - Subject to Acq Rights	0.1	0.1	0	9	9	8	7	9	9	8	8	8	7	8	Y (>25% land)	Y	0
162a	Glencore - Vacant	0.9	0.9	0.5	6	6	6	6	7	7	6	7	7	6	8		N	0
162b	Private	0.2	0.1	0.1	6	6	6	6	6	6	6	6	6	6	8	N	N	0
17a	Private	0.5	0.5	0.3	6	6	6	6	6	6	6	6	6	6	8	N	N	0
17b	Private	0.5	0.5	0.3	6	6	6	6	6	6	6	6	6	6	8	N	N	0
292a	Private	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
292b	Private	0.2	0.1	0.1	7	7	7	6	7	7	7	7	7	7	8	N	N	0
297a	Private	0.1	0.1	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
297b	Private	0.1	0.1	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
297c	Private	0.1	0.1	0	7	7	7	6	7	7	7	7	7	7	8	N	N	0
297d	Private	0.1	0.1	0	7	7	7	6	7	7	7	7	7	6	8	N	N	0
349a	Private	0.1	0	0	7	7	6	6	7	7	7	7	6	6	8	N	N	0
349b	Private	0.1	0	0	7	7	6	6	7	7	7	7	7	6	8	N	N	0
-																		
Annual average TSP (µg/m^3)																		
1	Other Mine - Vacant	3	2.2	1.7	80	80	80	70	83	82	81	83	82	81	90		N	0
2	Community Infrastructure	3.1	2	1.7	75	75	75	71	79	77	76	78	77	76	90		N	0
3	Other Mine	3.2	2.5	2	74	74	74	71	78	76	75	77	76	75	90		N	0
4	Private	4.1	3.3	2.7	71	71	70	71	75	74	73	75	74	73	90	N	N	0
5	Private - Subject to Acq Rights	3.4	2.7	2.1	72	72	72	71	76	74	74	76	74	74	90	N	N	0
6	Community Infrastructure	3.5	2.9	2.2	71	71	71	71	75	74	73	75	74	73	90		N	0
10	Private	4.6	4.6	3	69	69	69	71	74	74	72	74	74	72	90	N	N	0
11	Private	4.6	4.7	3	69	69	69	71	74	74	72	74	73	72	90	N	N	0
12	Private	4.8	4.9	3.2	69	69	69	71	74	74	72	74	74	72	90	N	N	0
13	Private	3.8	3.6	2.1	69	68	68	71	72	72	70	72	72	70	90	N	N	0
14	Private	3.1	2.9	1.7	69	68	68	70	72	71	70	72	71	70	90	N	N	0
19	Private	5.4	5.7	3.5	69	69	69	71	74	74	72	74	74	72	90	N	N	0
21	Private - Subject to Acq Rights	5.5	5.8	3.7	69	69	69	71	75	75	72	75	75	72	90	N	N	0
22	Glencore	5.3	5.6	3.6	69	69	69	71	75	74	72	75	74	72	90		N	0
23	Private - Subject to Acq Rights	5.8	6.3	4.1	69	69	69	72	75	75	73	75	75	73	90	N	N	0
24	Glencore	6.4	7.1	4.5	69	69	69	72	76	76	73	76	76	73	90		N	0
25	Glencore	6.8	7.8	4.9	69	69	69	72	76	76	74	76	76	74	90		N	0
26	Glencore	6.8	7.7	4.8	69	69	69	72	76	76	73	76	76	73	90		N	0
27	Glencore	6.9	7.9	5.3	69	69	69	72	76	77	74	76	77	74	90		N	0
28	Glencore	7.6	9	5.8	69	69	69	72	77	78	75	77	78	75	90		N	0
29	Glencore	7.7	9.2	6.4	69	69	69	72	77	78	75	77	78	75	90		N	0
30	Glencore	11.1	16.5	13.4	69	69	69	74	81	85	82	81	85	82	90		N	0
31	Glencore	12.2	18.4	13.9	69	69	69	74	81	87	83	81	87	83	90		N	0
32	Glencore	9	10.5	6.5	69	68	68	73	78	79	75	78	79	75	90		N	0
33	Glencore	7.1	7.5	4.5	69	68	68	73	76	76	73	76	76	73	90		N	0
34	Glencore	6.1	6	3.4	69	68	68	72	75	74	72	75	74	72	90		N	0
35	Glencore - Vacant	5.8	5.5	3.2	69	68	68	72	75	74	72	74	74	72	90		N	0
36	Glencore	7.2	7.5	4.4	69	68	68	73	76	76	73	76	76	73	90		N	0
37	Glencore - Vacant	9.8	11.1	7.3	69	68	68	74	79	79	76	79	79	76	90		N	0
38	Glencore	13.6	18.4	12	69	69	68	75	83	87	80	83	87	80	90		N	0
39	Glencore	11.7	14.9	9.4	69	69	68	74	81	83	78	81	83	78	90		N	0
40	Glencore	2.2	1.6	0.8	68	68	68	70	71	70	69	71	70	69	90		N	0
41	Private	0.5	0.3	0.2	68	68	68	68	69	68	68	69	68	68	90	N	N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
42	Private	0.5	0.3	0.2	68	68	68	68	69	68	68	69	68	68	90	N	N	0
43	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
45	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
46	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
47	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
48	Private	0.4	0.3	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
49	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
50	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
51	Private	0.4	0.2	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
52	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
53	Private	0.2	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
54	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
55	Private	0.2	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
57	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
58	Private	0.4	0.2	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
59	Private	0.5	0.3	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
60	Private	0.4	0.3	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
61	Private	0.4	0.3	0.1	68	68	68	68	69	68	68	69	68	68	90	N	N	0
62	Private	0.5	0.3	0.2	68	68	68	68	69	68	68	69	68	68	90	N	N	0
73	Private	0.9	0.7	0.4	68	68	68	69	69	69	68	69	69	68	90	N	N	0
74	Private	1.8	1.4	0.8	68	68	68	69	70	70	69	70	70	69	90	N	N	0
83	Private	1.9	1.7	1	69	68	68	69	70	70	69	70	70	69	90	N	N	0
85	Private	1.7	1.5	0.9	69	68	68	69	70	70	69	70	70	69	90	N	N	0
86	Private	1.9	1.7	1.1	69	68	68	70	71	70	69	71	70	69	90	N	N	0
87	Private	2	1.8	1.1	69	68	68	70	71	70	69	71	70	69	90	N	N	0
88	Private	2.3	2.1	1.3	69	68	68	70	71	70	70	71	70	70	90	N	N	0
89	Private	2.5	2.2	1.4	69	69	68	70	71	71	70	71	71	70	90	N	N	0
90	Other Mine	2.6	2.4	1.5	69	69	68	70	72	71	70	71	71	70	90		N	0
91	Private	2.9	2.6	1.7	69	69	69	70	72	71	70	72	71	70	90	N	N	0
92	Private	3.4	3.1	2.1	69	69	69	70	73	72	71	73	72	71	90	N	N	0
93	Private	3.8	3.7	2.3	69	69	69	71	73	72	71	73	72	71	90	N	N	0
94	Private	3.1	3	1.8	69	68	68	70	72	71	70	72	71	70	90	N	N	0
95	Private	2.8	2.6	1.5	69	68	68	70	72	71	70	71	71	70	90	N	N	0
96	Private	2	1.7	1.1	69	69	69	70	71	70	70	71	70	70	90	N	N	0
97	Private	2.1	1.8	1.2	69	69	69	70	71	70	70	71	70	70	90	N	N	0
98	Private	2.2	2	1.3	69	68	68	70	71	70	70	71	70	70	90	N	N	0
99	Private	2.4	2.1	1.4	69	69	69	70	72	71	70	72	71	70	90	N	N	0
100	Private	2.4	2	1.4	70	69	69	70	72	71	71	72	71	70	90	N	N	0
101	Private	2.1	1.8	1.2	70	69	69	70	72	71	70	72	71	70	90	N	N	0
104	Other Mine	2	1.5	1.1	71	70	70	70	73	72	71	73	72	71	90		N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
105	Private - Subject to Acq Rights	3.4	1.8	1.7	73	72	72	71	76	74	73	76	74	73	90	N	N	0
108	Glencore	1.1	0.3	0.2	76	74	74	74	77	74	74	77	74	74	90		N	0
109	Glencore	1.1	0.3	0.2	76	73	73	73	77	74	73	77	73	73	90		N	0
110	Other Mine - Vacant	0.5	0.2	0.1	80	77	77	73	81	78	77	80	77	77	90		N	0
111	Private - Subject to Acq Rights	0.4	0.1	0.1	85	82	82	73	85	83	82	85	82	82	90	Y (>25% land)	N	0
112	Private	5	4.9	3.6	70	69	69	71	75	74	73	75	74	73	90	N	N	0
114	Private - Subject to Acq Rights	4.7	4	3.4	71	70	70	71	76	74	74	76	74	74	90	N	N	0
115	Private - Subject to Acq Rights	5.1	4.3	3.8	71	70	70	71	76	75	74	76	75	74	90	N	N	0
116	Glencore	4.4	3.1	2.8	72	71	71	71	76	74	74	76	74	73	90		N	0
117	Glencore	4.6	2.8	2.8	72	71	71	71	76	74	74	76	74	74	90		N	0
120	Glencore - Vacant	3.9	1.2	1.3	73	72	72	71	77	73	74	77	73	73	90		N	0
121	Glencore - Vacant	3	0.6	0.5	74	72	72	73	77	73	73	77	73	73	90		N	0
122	Private - Subject to Acq Rights	3.2	0.6	0.6	74	72	72	73	77	73	73	77	73	72	90	N	N	0
123	Glencore - Vacant	3.3	0.7	0.7	74	73	73	72	77	73	73	77	73	73	90		N	0
124	Glencore	2.3	0.5	0.4	74	72	72	73	77	73	73	77	73	73	90		N	0
125	Glencore	2	0.4	0.3	75	73	72	73	77	73	73	77	73	73	90		N	0
126	Glencore	1.6	0.4	0.3	75	73	73	73	77	73	73	77	73	73	90		N	0
129	Glencore	0.4	0.2	0.1	81	74	73	78	82	74	74	81	73	73	90		N	0
130	Glencore	0.4	0.2	0.1	82	74	74	78	82	74	74	81	73	73	90		N	0
131	Glencore - Vacant	6.7	2.8	1.7	70	68	68	73	77	71	70	77	71	70	90		N	0
132	Glencore - Vacant	6	2.3	1.4	70	68	68	73	76	71	70	76	71	70	90		N	0
133	Private - Subject to Acq Rights	2.5	1.3	0.8	69	68	68	70	71	70	69	71	70	69	90	N	N	0
143	Private - Subject to Acq Rights	0.2	0.1	0.1	77	75	75	73	78	75	75	76	74	73	90	N	N	0
145	Private - Subject to Acq Rights	0.1	0	0	120	119	119	73	120	119	119	75	75	74	90	Y (>25% land)	Y	0
146	Other Mine	0.1	0.1	0	77	76	76	72	77	76	76	75	74	74	90		N	0
147	Private - Subject to Acq Rights	0.1	0.1	0	80	79	79	73	80	80	79	76	76	75	90	N	N	0
148	Other Mine	0.1	0.1	0	80	79	79	73	80	79	79	78	78	77	90		N	0
149	Community Infrastructure	0.2	0.1	0	79	78	78	73	79	78	78	74	73	73	90		N	0
150	Private - Subject to Acq Rights	0.2	0.1	0.1	78	77	77	73	78	77	77	74	73	73	90	N	N	0
151	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	74	73	73	90		N	0
152	Private - Subject to Acq Rights	0.2	0.1	0.1	78	76	76	73	78	77	76	75	73	73	90	N	N	0
154	Private - Subject to Acq Rights	0.2	0.1	0.1	77	76	76	73	78	76	76	75	73	73	90	N	N	0
155	Private - Subject to Acq Rights	0.2	0.1	0.1	77	75	75	73	78	75	75	75	73	73	90	N	N	0
156	Private - Subject to Acq Rights	0.3	0.1	0.1	78	75	75	74	78	75	75	76	73	73	90	N	N	0
157	Glencore - Vacant	1	0.3	0.2	77	73	73	75	78	74	73	78	73	73	90		N	0
158	Other Mine - Vacant	0.1	0	0	485	485	485	73	485	485	485	75	75	74	90		Y	0
159	Other Mine - Vacant	0.1	0.1	0	81	80	80	72	81	81	80	75	74	74	90		N	0
160	Other Mine - Vacant	0.1	0	0	218	218	218	73	218	218	218	75	74	74	90		Y	0
161	Glencore - Vacant	24.8	4.6	2.8	70	69	68	76	95	73	71	95	73	71	90		Y	25
163	Other Mine	0.9	0.3	0.3	72	71	71	70	73	71	71	73	71	71	90		N	0

Notes:

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
164	Private - Subject to Acq Rights	0.8	0.3	0.2	72	71	71	70	73	71	71	72	71	71	90	N	N	0
165	Other Mine	0.7	0.2	0.2	72	71	71	70	73	71	71	72	71	71	90		N	0
166	Other Mine - Vacant	0.3	0.1	0.1	81	78	78	76	81	78	78	76	73	73	90		N	0
178	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
210	Private	0.1	0.1	0	68	68	68	68	68	68	68	68	68	68	90	N	N	0
211	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
212	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
213	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
259	Private	1.4	1.1	0.6	68	68	68	69	70	69	69	70	69	69	90	N	N	0
280	Private	1.3	0.8	0.6	72	71	71	70	73	72	71	73	72	71	90	N	N	0
281	Private	1.4	0.9	0.7	72	71	71	70	73	72	72	73	72	72	90	N	N	0
282	Private	1.2	0.5	0.5	72	71	71	70	73	72	72	73	72	72	90	N	N	0
289	Private	0.9	0.5	0.4	71	70	70	69	71	71	70	71	70	70	90	N	N	0
290	Private	1	0.5	0.4	71	71	70	70	72	71	71	72	71	71	90	N	N	0
291	Private	1	0.4	0.4	72	71	71	70	73	71	71	73	71	71	90	N	N	0
293	Private	0.6	0.2	0.2	72	71	71	70	72	71	71	72	71	71	90	N	N	0
294	Private	0.7	0.2	0.2	71	70	70	70	72	71	71	72	71	70	90	N	N	0
295	Private	0.5	0.2	0.1	72	71	71	70	72	71	71	72	71	71	90	N	N	0
296	Private	0.4	0.1	0.1	72	71	71	70	72	71	71	72	71	71	90	N	N	0
299	Private	0.2	0.1	0.1	72	71	71	70	72	72	71	72	71	71	90	N	N	0
300	Private	0.2	0.1	0.1	72	72	71	70	72	72	71	72	71	71	90	N	N	0
302	Private	0.2	0.1	0	72	72	71	70	72	72	71	72	71	71	90	N	N	0
303	Private	0.2	0.1	0.1	70	70	70	69	71	70	70	70	70	70	90	N	N	0
305	Private	0.2	0.1	0	71	70	70	69	71	71	70	71	70	70	90	N	N	0
306	Private	0.1	0	0	71	71	71	70	71	71	71	71	71	70	90	N	N	0
307	Private	0.1	0	0	71	71	71	70	71	71	71	71	71	70	90	N	N	0
308	Private	0.1	0	0	71	71	71	70	72	71	71	71	71	71	90	N	N	0
309	Private	0.2	0.1	0	72	71	71	70	72	71	71	71	71	71	90	N	N	0
310	Private	0.1	0.1	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
311	Private	0.1	0	0	72	71	71	70	72	71	71	71	71	71	90	N	N	0
312	Private	0.1	0	0	72	71	71	70	72	71	71	71	71	71	90	N	N	0
314	Private	0.1	0	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
315	Private	0.1	0	0	72	72	71	70	72	72	71	72	71	71	90	N	N	0
316	Private	0.1	0	0	72	72	71	70	72	72	71	72	71	71	90	N	N	0
317	Private	0.1	0	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
318	Private	0.1	0	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
319	Private	0.1	0	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
320	Private	0.2	0.1	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
321	Private	0.1	0	0	72	71	71	70	72	71	71	72	71	71	90	N	N	0
322	Private	0.1	0	0	72	72	71	70	72	72	71	72	71	71	90	N	N	0

Notes:

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
323	Private	0.1	0	0	72	72	72	70	72	72	72	72	71	71	90	N	N	0
324	Private	0.1	0	0	72	72	72	70	73	72	72	72	71	71	90	N	N	0
325	Private	0.1	0	0	73	72	72	70	73	72	72	72	72	71	90	N	N	0
326	Private	0.1	0	0	73	72	72	70	73	72	72	72	72	72	90	N	N	0
327	Private	0.1	0	0	73	72	72	70	73	72	72	72	72	72	90	N	N	0
328	Private	0.1	0	0	72	72	72	70	73	72	72	72	72	71	90	N	N	0
329	Private	0.1	0	0	73	72	72	71	73	72	72	73	72	72	90	N	N	0
330	Private	0.1	0	0	73	72	72	71	73	72	72	72	72	72	90	N	N	0
337	Private	0.1	0	0	68	68	68	68	68	68	68	68	68	68	90	N	N	0
342	Private Infrastructure	0.4	0.1	0.1	77	72	72	75	78	73	72	76	71	71	90		N	0
344	Other Mine	0.7	0.2	0.2	72	71	71	70	73	71	71	73	71	71	90		N	0
351	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
352	Other Mine - Vacant	0.1	0.1	0	81	80	80	72	81	80	80	79	78	78	90		N	0
353	Other Mine	0.1	0.1	0	81	80	80	73	81	80	80	79	79	78	90		N	0
356	Glencore - Vacant	1.1	0.3	0.2	81	70	70	80	82	71	70	81	70	70	90		N	0
357	Glencore - Vacant	3.6	0.7	0.5	76	69	69	78	80	70	70	79	70	70	90		N	0
358	Glencore - Vacant	3	0.8	0.6	79	69	69	80	82	70	70	82	70	70	90		N	0
359	Glencore - Vacant	0.3	0.1	0.1	77	73	73	75	77	73	73	76	72	71	90		N	0
360	Glencore - Vacant	4.1	1.7	1.8	73	72	72	71	77	73	74	77	73	73	90		N	0
361	Glencore - Vacant	5.5	5.3	4.5	71	70	70	71	76	75	74	76	75	74	90		N	0
363	Glencore	4.2	2.1	2.2	72	71	71	71	77	74	74	77	74	74	90		N	0
364	Other Mine	0.1	0.1	0	88	88	88	72	88	88	88	74	74	74	90		N	0
365	Other Mine - Vacant	0.1	0.1	0	80	80	79	72	80	80	79	74	74	73	90		N	0
366	Other Mine - Vacant	0.1	0.1	0	81	81	80	72	81	81	80	74	74	73	90		N	0
367	Other Mine	0.1	0.1	0	80	80	80	72	80	80	80	74	74	73	90		N	0
368	Other Mine - Vacant	0.2	0.1	0	79	79	79	72	80	79	79	74	74	73	90		N	0
369	Other Mine - Vacant	0.2	0.1	0	79	78	78	72	79	78	78	74	74	74	90		N	0
370	Other Mine	0.1	0.1	0	79	79	78	72	79	79	78	74	74	74	90		N	0
371	Other Mine	0.2	0.1	0.1	78	78	77	73	78	78	77	75	74	74	90		N	0
372	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	75	74	74	90		N	0
373	Other Mine - Vacant	0.2	0.1	0.1	78	78	77	73	79	78	77	75	74	73	90		N	0
374	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	75	74	74	90		N	0
375	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	75	74	73	90		N	0
376	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	74	73	73	90		N	0
377	Other Mine	0.2	0.1	0.1	78	77	76	73	78	77	76	75	73	73	90		N	0
378	Other Mine	0.2	0.1	0.1	78	76	76	73	78	77	76	75	73	73	90		N	0
379	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	74	73	73	90		N	0
380	Other Mine	0.2	0.1	0.1	78	77	76	73	78	77	77	74	73	73	90		N	0
381	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
382	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	74	73	90		N	0

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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
383	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
384	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
385	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
386	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
387	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
388	Other Mine	0.2	0.1	0.1	78	77	76	73	78	77	77	74	73	73	90		N	0
389	Other Mine - Vacant	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
390	Other Mine	0.2	0.1	0.1	78	76	76	73	78	76	76	75	73	73	90		N	0
391	Other Mine	0.2	0.1	0.1	78	75	75	74	78	75	75	76	73	73	90		N	0
392	Other Mine - Vacant	0.2	0.1	0.1	77	75	75	73	78	75	75	76	73	73	90		N	0
394	Other Mine	0.2	0.1	0.1	78	77	77	72	78	78	77	75	74	74	90		N	0
395	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
396	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
397	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
398	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
399	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
400	Other Mine	0.2	0.1	0.1	78	77	77	73	78	77	77	75	74	74	90		N	0
401	Other Mine	0.2	0.1	0.1	78	77	77	72	78	77	77	75	74	74	90		N	0
402	Other Mine	0.2	0.1	0	77	77	77	72	78	77	77	75	74	74	90		N	0
403	Other Mine	0.2	0.1	0.1	77	77	77	72	78	77	77	75	74	74	90		N	0
404	Other Mine - Vacant	0.1	0	0	85	85	85	76	86	85	85	79	78	78	90		N	0
405	Other Mine - Vacant	0.1	0.1	0	83	82	82	75	83	82	82	76	75	74	90		N	0
406	Other Mine - Vacant	0.1	0.1	0	88	88	88	73	88	88	88	75	74	74	90		N	0
407	Other Mine - Vacant	0.2	0.1	0.1	78	76	76	73	78	76	76	75	74	73	90		N	0
408	Other Mine	0.2	0.1	0.1	78	77	76	73	78	77	77	75	73	73	90		N	0
409	Glencore - Vacant	0.4	0.1	0.1	77	73	73	75	77	73	73	76	72	71	90		N	0
410	Glencore - Vacant	4.6	2.8	1.6	69	68	68	72	73	71	70	73	71	70	90		N	0
411	Glencore - Vacant	5.4	3.3	1.8	69	68	68	72	74	72	70	74	72	70	90		N	0
412	Community Infrastructure	2.7	1.4	0.8	69	68	68	70	72	70	69	72	70	69	90		N	0
007a	Private	3.8	3.3	2.5	71	70	70	71	75	73	73	75	73	72	90	N	N	0
007b	Private	3.7	3.2	2.4	71	70	70	71	75	73	73	74	73	72	90	N	N	0
007c	Private	3.8	3.4	2.4	70	70	70	71	74	73	72	74	73	72	90	N	N	0
015a	Private	2.9	2.7	1.5	69	68	68	70	72	71	70	72	71	70	90	N	N	0
015b	Private	2.9	2.7	1.6	69	68	68	70	72	71	70	72	71	70	90	N	N	0
044a	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
044b	Private	0.3	0.2	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
056a	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
056b	Private	0.2	0.1	0.1	68	68	68	68	68	68	68	68	68	68	90	N	N	0
063a	Community Infrastructure	0.5	0.3	0.2	68	68	68	68	69	68	68	69	68	68	90		N	0
069a	Private	0.7	0.5	0.3	68	68	68	69	69	69	68	69	69	68	90	N	N	0

Notes:

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- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
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		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
102a	Private	2	1.6	1.1	71	70	70	70	72	72	71	72	72	71	90	N	N	0
102b	Private	1.9	1.5	1	71	70	70	70	73	72	71	73	72	71	90	N	N	0
127a	Private - Subject to Acq Rights	0.2	0.1	0.1	78	77	77	72	79	77	77	77	76	76	90	N	N	0
127b	Private - Subject to Acq Rights	0.3	0.1	0.1	80	76	76	74	81	76	76	80	76	76	90	N	N	0
127c	Private - Subject to Acq Rights	0.3	0.1	0.1	80	74	74	76	81	74	74	80	74	73	90	N	N	0
127d	Private - Subject to Acq Rights	0.4	0.1	0.1	81	75	74	76	81	75	75	80	74	74	90	N	N	0
144a	Private - Subject to Acq Rights	0.1	0	0	84	84	83	74	84	84	83	75	75	75	90	N	N	0
144b	Private - Subject to Acq Rights	0	0	0	74	73	72	72	74	73	72	73	73	72	90	N	N	0
144c	Private - Subject to Acq Rights	0	0	0	73	73	72	72	74	73	72	73	73	72	90	N	N	0
162a	Glencore - Vacant	3.1	2.4	1.3	69	68	68	71	72	71	70	72	71	70	90		N	0
162b	Private	0.5	0.4	0.2	68	68	68	69	69	68	68	69	68	68	90	N	N	0
17a	Private	2.5	2.2	1.2	69	68	68	70	71	70	69	71	70	69	90	N	N	0
17b	Private	2.7	2.3	1.3	69	68	68	70	71	71	70	71	71	70	90	N	N	0
292a	Private	0.9	0.4	0.3	71	71	70	70	72	71	71	72	71	71	90	N	N	0
292b	Private	0.9	0.4	0.3	71	71	70	70	72	71	71	72	71	71	90	N	N	0
297a	Private	0.3	0.1	0.1	72	71	71	70	72	72	71	72	71	71	90	N	N	0
297b	Private	0.3	0.1	0.1	72	71	71	70	72	72	71	72	71	71	90	N	N	0
297c	Private	0.3	0.1	0.1	72	71	71	70	72	72	71	72	71	71	90	N	N	0
297d	Private	0.4	0.1	0.1	71	71	70	70	72	71	71	71	71	70	90	N	N	0
349a	Private	0.2	0.1	0	71	71	70	69	71	71	71	71	70	70	90	N	N	0
349b	Private	0.2	0.1	0	71	71	70	69	71	71	71	71	70	70	90	N	N	0
-																		
Annual average dust deposition (g/m^2/month)																		
1	Other Mine - Vacant	0.4	0.3	0.2	3	2.9	2.9	2.3	3.4	3.2	3.1	3.4	3.2	3.1	4		N	0
2	Community Infrastructure	0.4	0.2	0.2	2.8	2.7	2.7	2.3	3.2	2.9	2.9	3.1	2.9	2.9	4		N	0
3	Other Mine	0.4	0.3	0.3	2.6	2.5	2.5	2.3	3	2.8	2.7	3	2.8	2.7	4		N	0
4	Private	0.5	0.4	0.4	2.4	2.2	2.2	2.4	2.9	2.7	2.6	2.9	2.7	2.6	4	N	N	0
5	Private - Subject to Acq Rights	0.4	0.3	0.3	2.5	2.4	2.3	2.4	2.9	2.7	2.6	2.9	2.7	2.6	4	N	N	0
6	Community Infrastructure	0.5	0.4	0.3	2.4	2.3	2.3	2.4	2.8	2.6	2.6	2.8	2.6	2.5	4		N	0
10	Private	0.7	0.7	0.5	2.2	2.1	2.1	2.5	2.8	2.8	2.6	2.8	2.8	2.6	4	N	N	0
11	Private	0.7	0.7	0.5	2.1	2.1	2.1	2.5	2.8	2.8	2.5	2.8	2.8	2.5	4	N	N	0
12	Private	0.7	0.8	0.5	2.1	2.1	2.1	2.5	2.9	2.8	2.6	2.9	2.8	2.6	4	N	N	0
13	Private	0.6	0.6	0.3	2.1	2	2	2.4	2.7	2.6	2.4	2.7	2.6	2.3	4	N	N	0
14	Private	0.5	0.4	0.3	2.1	2	2	2.4	2.6	2.5	2.3	2.6	2.5	2.3	4	N	N	0
19	Private	0.8	0.9	0.5	2.1	2.1	2.1	2.5	2.9	2.9	2.6	2.9	2.9	2.6	4	N	N	0
21	Private - Subject to Acq Rights	0.8	0.9	0.6	2.1	2.1	2.1	2.5	3	3	2.7	3	3	2.6	4	N	N	0
22	Glencore	0.8	0.9	0.6	2.2	2.1	2.1	2.5	3	2.9	2.6	3	2.9	2.6	4		N	0
23	Private - Subject to Acq Rights	0.9	1	0.6	2.2	2.1	2.1	2.5	3	3	2.7	3	3	2.7	4	N	N	0
24	Glencore	0.9	1	0.7	2.1	2.1	2.1	2.6	3.1	3.1	2.8	3.1	3.1	2.7	4		N	0
25	Glencore	1	1.1	0.7	2.1	2.1	2.1	2.6	3.1	3.2	2.8	3.1	3.2	2.8	4		N	0

Notes:

- [1] VLAMP 2018 assessment includes privately owned receptors only. It should be noted that VLAMP 2018 does not apply to the Proposed Modification due to no predicted increase in air quality impacts relative to the Approved Operations. Assessment of private vacant land provided in Table 2.
- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
26	Glencore	1	1.1	0.7	2.1	2.1	2.1	2.6	3.1	3.2	2.7	3.1	3.2	2.7	4		N	0
27	Glencore	1	1.1	0.8	2.2	2.1	2.1	2.6	3.1	3.2	2.9	3.1	3.2	2.8	4		N	0
28	Glencore	1.1	1.2	0.8	2.1	2.1	2.1	2.6	3.2	3.3	2.9	3.2	3.3	2.9	4		N	0
29	Glencore	1	1.2	0.9	2.2	2.1	2.1	2.6	3.2	3.3	3	3.2	3.3	2.9	4		N	0
30	Glencore	1.3	1.9	1.5	2.2	2.1	2.1	2.7	3.5	4	3.6	3.5	4	3.6	4		N	0
31	Glencore	1.5	2.2	1.6	2.2	2.1	2.1	2.8	3.7	4.3	3.7	3.7	4.3	3.6	4		Y	2.2
32	Glencore	1.3	1.4	0.8	2.1	2	2	2.8	3.4	3.5	2.8	3.4	3.5	2.8	4		N	0
33	Glencore	1	1	0.6	2.1	2	2	2.7	3.1	3.1	2.6	3.1	3.1	2.6	4		N	0
34	Glencore	0.9	0.8	0.4	2.1	2	2	2.7	3	2.9	2.5	3	2.9	2.5	4		N	0
35	Glencore - Vacant	0.9	0.8	0.4	2.1	2	2	2.6	3	2.8	2.4	2.9	2.8	2.4	4		N	0
36	Glencore	1.1	1	0.5	2.1	2	2	2.7	3.2	3.1	2.6	3.2	3.1	2.6	4		N	0
37	Glencore - Vacant	1.4	1.4	0.8	2.1	2	2	3	3.5	3.5	2.8	3.5	3.5	2.8	4		N	0
38	Glencore	2	2.4	1.4	2.1	2.1	2	3.1	4.1	4.4	3.4	4.1	4.4	3.4	4		Y	2.3
39	Glencore	1.7	2	1.1	2.1	2.1	2	3	3.8	4	3.2	3.8	4	3.1	4		N	0
40	Glencore	0.3	0.2	0.1	2.1	2	2	2.2	2.3	2.2	2.1	2.3	2.2	2.1	4		N	0
41	Private	0	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
42	Private	0.1	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
43	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
45	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
46	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
47	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
48	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
49	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
50	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
51	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
52	Private	0	0	0	2	2	2	2	2.1	2	2	2	2	2	4	N	N	0
53	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
54	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
55	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
57	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
58	Private	0	0	0	2	2	2	2	2.1	2	2	2.1	2	2	4	N	N	0
59	Private	0.1	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
60	Private	0	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
61	Private	0	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
62	Private	0.1	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4	N	N	0
73	Private	0.1	0.1	0.1	2	2	2	2.1	2.2	2.1	2.1	2.2	2.1	2.1	4	N	N	0
74	Private	0.3	0.2	0.1	2.1	2	2	2.2	2.3	2.2	2.1	2.3	2.2	2.1	4	N	N	0
83	Private	0.3	0.3	0.2	2.1	2	2	2.2	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0
85	Private	0.3	0.2	0.1	2.1	2	2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	4	N	N	0
86	Private	0.3	0.3	0.2	2.1	2	2	2.2	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0

Notes:

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- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
87	Private	0.3	0.3	0.2	2.1	2	2	2.2	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0
88	Private	0.4	0.3	0.2	2.1	2	2	2.3	2.5	2.4	2.2	2.5	2.4	2.2	4	N	N	0
89	Private	0.4	0.3	0.2	2.1	2.1	2	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
90	Other Mine	0.4	0.4	0.2	2.1	2.1	2	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4		N	0
91	Private	0.4	0.4	0.3	2.1	2.1	2.1	2.3	2.6	2.5	2.3	2.6	2.4	2.3	4	N	N	0
92	Private	0.5	0.4	0.3	2.2	2.1	2.1	2.4	2.6	2.5	2.4	2.6	2.5	2.4	4	N	N	0
93	Private	0.6	0.6	0.4	2.1	2.1	2.1	2.4	2.7	2.6	2.4	2.7	2.6	2.4	4	N	N	0
94	Private	0.5	0.4	0.3	2.1	2	2	2.3	2.6	2.5	2.3	2.6	2.5	2.3	4	N	N	0
95	Private	0.4	0.4	0.2	2.1	2	2	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
96	Private	0.3	0.2	0.2	2.1	2.1	2.1	2.2	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0
97	Private	0.3	0.3	0.2	2.1	2.1	2.1	2.3	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0
98	Private	0.3	0.3	0.2	2.1	2.1	2	2.3	2.4	2.3	2.2	2.4	2.3	2.2	4	N	N	0
99	Private	0.3	0.3	0.2	2.2	2.1	2.1	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
100	Private	0.3	0.3	0.2	2.2	2.1	2.1	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
101	Private	0.3	0.2	0.2	2.2	2.1	2.1	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
104	Other Mine	0.3	0.2	0.2	2.4	2.3	2.3	2.3	2.6	2.5	2.4	2.6	2.5	2.4	4		N	0
105	Private - Subject to Acq Rights	0.4	0.2	0.2	2.5	2.4	2.4	2.4	3	2.6	2.6	3	2.6	2.6	4	N	N	0
108	Glencore	0.1	0	0	3	2.6	2.6	2.7	3.1	2.7	2.6	3.1	2.6	2.6	4		N	0
109	Glencore	0.1	0	0	2.9	2.6	2.6	2.7	3	2.6	2.6	3	2.6	2.6	4		N	0
110	Other Mine - Vacant	0	0	0	3.3	2.9	2.9	2.6	3.3	2.9	2.9	3.3	2.9	2.9	4		N	0
111	Private - Subject to Acq Rights	0	0	0	3.8	3.4	3.4	2.6	3.8	3.4	3.4	3.8	3.4	3.4	4	Y (>25% land)	N	0
112	Private	0.7	0.7	0.5	2.2	2.1	2.1	2.5	2.9	2.8	2.7	2.9	2.8	2.7	4	N	N	0
114	Private - Subject to Acq Rights	0.6	0.5	0.4	2.3	2.2	2.2	2.4	3	2.7	2.7	2.9	2.7	2.7	4	N	N	0
115	Private - Subject to Acq Rights	0.6	0.5	0.5	2.3	2.2	2.2	2.4	3	2.7	2.7	3	2.7	2.7	4	N	N	0
116	Glencore	0.5	0.3	0.4	2.4	2.3	2.3	2.4	2.9	2.6	2.6	2.9	2.6	2.6	4		N	0
117	Glencore	0.5	0.3	0.3	2.4	2.3	2.3	2.4	3	2.6	2.6	3	2.6	2.6	4		N	0
120	Glencore - Vacant	0.4	0.1	0.1	2.6	2.5	2.5	2.4	3.1	2.6	2.6	3	2.5	2.6	4		N	0
121	Glencore - Vacant	0.3	0	0	2.7	2.5	2.5	2.6	3	2.5	2.5	3	2.5	2.5	4		N	0
122	Private - Subject to Acq Rights	0.3	0	0	2.7	2.5	2.4	2.6	3	2.5	2.5	3	2.5	2.5	4	N	N	0
123	Glencore - Vacant	0.3	0.1	0.1	2.7	2.5	2.5	2.5	3.1	2.6	2.6	3	2.6	2.6	4		N	0
124	Glencore	0.2	0	0	2.8	2.5	2.5	2.6	3	2.5	2.5	3	2.5	2.5	4		N	0
125	Glencore	0.2	0	0	2.8	2.5	2.5	2.6	3	2.5	2.5	3	2.5	2.5	4		N	0
126	Glencore	0.1	0	0	2.9	2.5	2.5	2.6	3	2.6	2.6	3	2.6	2.5	4		N	0
129	Glencore	0	0	0	3.7	2.7	2.6	3.3	3.8	2.7	2.6	3.7	2.6	2.6	4		N	0
130	Glencore	0	0	0	3.7	2.7	2.7	3.3	3.8	2.7	2.7	3.7	2.6	2.6	4		N	0
131	Glencore - Vacant	0.8	0.3	0.2	2.2	2	2	2.5	2.9	2.4	2.2	2.9	2.4	2.2	4		N	0
132	Glencore - Vacant	0.7	0.3	0.2	2.2	2	2	2.5	2.9	2.3	2.2	2.9	2.3	2.2	4		N	0
133	Private - Subject to Acq Rights	0.3	0.2	0.1	2.1	2	2	2.3	2.4	2.2	2.1	2.4	2.2	2.1	4	N	N	0
143	Private - Subject to Acq Rights	0	0	0	3.2	2.9	2.9	2.6	3.2	2.9	2.9	3.1	2.8	2.7	4	N	N	0
145	Private - Subject to Acq Rights	0	0	0	6.7	6.7	6.6	2.8	6.7	6.7	6.6	3	3	2.9	4	Y (>25% land)	Y	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
146	Other Mine	0	0	0	3.1	3	3	2.5	3.1	3.1	3	2.9	2.9	2.8	4		N	0
147	Private - Subject to Acq Rights	0	0	0	3.4	3.3	3.3	2.7	3.4	3.3	3.3	3	3	2.9	4	N	N	0
148	Other Mine	0	0	0	3.4	3.3	3.3	2.6	3.4	3.3	3.3	3.2	3.1	3.1	4		N	0
149	Community Infrastructure	0	0	0	3.2	3.2	3.1	2.6	3.3	3.2	3.1	2.8	2.7	2.7	4		N	0
150	Private - Subject to Acq Rights	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.8	2.7	2.7	4	N	N	0
151	Other Mine	0	0	0	3.2	3.1	3	2.6	3.2	3.1	3	2.8	2.7	2.7	4		N	0
152	Private - Subject to Acq Rights	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4	N	N	0
154	Private - Subject to Acq Rights	0	0	0	3.2	3	2.9	2.6	3.2	3	2.9	2.9	2.7	2.7	4	N	N	0
155	Private - Subject to Acq Rights	0	0	0	3.2	2.9	2.9	2.6	3.2	2.9	2.9	3	2.7	2.7	4	N	N	0
156	Private - Subject to Acq Rights	0	0	0	3.2	2.8	2.8	2.7	3.2	2.9	2.8	3.1	2.7	2.6	4	N	N	0
157	Glencore - Vacant	0.1	0	0	3.1	2.6	2.6	2.8	3.1	2.6	2.6	3.1	2.6	2.5	4		N	0
158	Other Mine - Vacant	0	0	0	44.2	44.2	44.1	2.7	44.2	44.2	44.1	3	2.9	2.9	4		Y	0
159	Other Mine - Vacant	0	0	0	3.4	3.4	3.3	2.6	3.4	3.4	3.3	2.9	2.9	2.8	4		N	0
160	Other Mine - Vacant	0	0	0	14.8	14.8	14.8	2.7	14.8	14.8	14.8	2.9	2.9	2.9	4		Y	0
161	Glencore - Vacant	2.5	0.6	0.3	2.2	2.1	2	2.8	4.7	2.6	2.4	4.7	2.6	2.4	4		Y	2.5
163	Other Mine	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4		N	0
164	Private - Subject to Acq Rights	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
165	Other Mine	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4		N	0
166	Other Mine - Vacant	0	0	0	3.3	3.1	3	2.8	3.4	3.1	3.1	2.9	2.6	2.6	4		N	0
178	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
210	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
211	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
212	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
213	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
259	Private	0.2	0.2	0.1	2	2	2	2.2	2.3	2.2	2.1	2.3	2.2	2.1	4	N	N	0
280	Private	0.2	0.1	0.1	2.5	2.4	2.4	2.3	2.7	2.5	2.5	2.7	2.5	2.5	4	N	N	0
281	Private	0.2	0.1	0.1	2.5	2.4	2.4	2.3	2.7	2.5	2.5	2.7	2.5	2.5	4	N	N	0
282	Private	0.1	0.1	0.1	2.6	2.4	2.4	2.3	2.7	2.5	2.5	2.7	2.5	2.5	4	N	N	0
289	Private	0.1	0.1	0.1	2.4	2.3	2.3	2.2	2.5	2.3	2.3	2.5	2.3	2.3	4	N	N	0
290	Private	0.1	0.1	0.1	2.5	2.3	2.3	2.2	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
291	Private	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
293	Private	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
294	Private	0.1	0	0	2.4	2.3	2.3	2.2	2.5	2.4	2.3	2.5	2.3	2.3	4	N	N	0
295	Private	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
296	Private	0.1	0	0	2.5	2.4	2.4	2.2	2.6	2.4	2.4	2.5	2.4	2.4	4	N	N	0
299	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
300	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
302	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
303	Private	0	0	0	2.3	2.3	2.3	2.2	2.4	2.3	2.3	2.3	2.3	2.3	4	N	N	0
305	Private	0	0	0	2.4	2.4	2.4	2.2	2.5	2.4	2.4	2.4	2.3	2.3	4	N	N	0

Notes:

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- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
306	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.4	4	N	N	0
307	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.4	4	N	N	0
308	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.4	4	N	N	0
309	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.4	4	N	N	0
310	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.5	2.4	2.5	2.4	2.4	4	N	N	0
311	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.4	4	N	N	0
312	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.5	2.4	2.5	2.4	2.4	4	N	N	0
314	Private	0	0	0	2.5	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
315	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.5	2.4	4	N	N	0
316	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.5	2.4	4	N	N	0
317	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
318	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
319	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
320	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
321	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.5	2.4	2.4	4	N	N	0
322	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
323	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.5	4	N	N	0
324	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.5	4	N	N	0
325	Private	0	0	0	2.6	2.6	2.5	2.3	2.7	2.6	2.5	2.6	2.5	2.5	4	N	N	0
326	Private	0	0	0	2.6	2.6	2.5	2.3	2.7	2.6	2.5	2.6	2.5	2.5	4	N	N	0
327	Private	0	0	0	2.6	2.6	2.5	2.3	2.6	2.6	2.5	2.6	2.5	2.5	4	N	N	0
328	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.6	2.5	2.6	2.5	2.5	4	N	N	0
329	Private	0	0	0	2.7	2.6	2.6	2.4	2.7	2.6	2.6	2.6	2.5	2.5	4	N	N	0
330	Private	0	0	0	2.6	2.6	2.5	2.3	2.6	2.6	2.5	2.6	2.5	2.5	4	N	N	0
337	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
342	Private Infrastructure	0	0	0	3.1	2.5	2.5	2.9	3.1	2.5	2.5	3	2.4	2.4	4		N	0
344	Other Mine	0.1	0	0	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4		N	0
351	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
352	Other Mine - Vacant	0	0	0	3.5	3.4	3.4	2.5	3.5	3.4	3.4	3.4	3.3	3.2	4		N	0
353	Other Mine	0	0	0	3.4	3.4	3.3	2.6	3.4	3.4	3.3	3.3	3.2	3.1	4		N	0
356	Glencore - Vacant	0.1	0	0	3.5	2.2	2.2	3.4	3.6	2.3	2.2	3.6	2.2	2.2	4		N	0
357	Glencore - Vacant	0.3	0.1	0	3	2.2	2.1	3.1	3.3	2.2	2.2	3.3	2.2	2.2	4		N	0
358	Glencore - Vacant	0.3	0.1	0.1	3.3	2.1	2.1	3.3	3.6	2.2	2.2	3.5	2.2	2.2	4		N	0
359	Glencore - Vacant	0	0	0	3	2.6	2.5	2.8	3.1	2.6	2.5	2.9	2.4	2.4	4		N	0
360	Glencore - Vacant	0.5	0.2	0.2	2.5	2.4	2.4	2.4	3	2.5	2.6	3	2.5	2.6	4		N	0
361	Glencore - Vacant	0.7	0.6	0.6	2.3	2.2	2.2	2.4	3	2.8	2.8	3	2.8	2.8	4		N	0
363	Glencore	0.5	0.2	0.2	2.5	2.4	2.3	2.4	3	2.6	2.6	3	2.6	2.6	4		N	0
364	Other Mine	0	0	0	3.9	3.9	3.9	2.6	3.9	3.9	3.9	2.9	2.8	2.8	4		N	0
365	Other Mine - Vacant	0	0	0	3.3	3.3	3.2	2.5	3.3	3.3	3.2	2.8	2.8	2.8	4		N	0
366	Other Mine - Vacant	0	0	0	3.4	3.3	3.3	2.6	3.4	3.4	3.3	2.8	2.8	2.8	4		N	0

Notes:

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ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
367	Other Mine	0	0	0	3.3	3.3	3.2	2.6	3.3	3.3	3.3	2.8	2.8	2.8	4		N	0
368	Other Mine - Vacant	0	0	0	3.3	3.2	3.2	2.5	3.3	3.2	3.2	2.8	2.8	2.8	4		N	0
369	Other Mine - Vacant	0	0	0	3.2	3.2	3.1	2.6	3.2	3.2	3.1	2.9	2.8	2.8	4		N	0
370	Other Mine	0	0	0	3.3	3.2	3.2	2.6	3.3	3.2	3.2	2.9	2.8	2.8	4		N	0
371	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
372	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
373	Other Mine - Vacant	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.7	4		N	0
374	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
375	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.7	4		N	0
376	Other Mine	0	0	0	3.2	3.1	3	2.6	3.2	3.1	3	2.8	2.7	2.7	4		N	0
377	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
378	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
379	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.8	2.7	2.7	4		N	0
380	Other Mine	0	0	0	3.2	3.1	3	2.6	3.2	3.1	3	2.8	2.7	2.7	4		N	0
381	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
382	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.8	2.7	4		N	0
383	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
384	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
385	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0
386	Other Mine	0	0	0	3.2	3	2.9	2.6	3.2	3	2.9	2.9	2.7	2.6	4		N	0
387	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.8	2.7	2.7	4		N	0
388	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3.1	3	2.8	2.7	2.6	4		N	0
389	Other Mine - Vacant	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.6	4		N	0
390	Other Mine	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.6	4		N	0
391	Other Mine	0	0	0	3.2	2.9	2.9	2.7	3.2	2.9	2.9	3	2.7	2.6	4		N	0
392	Other Mine - Vacant	0	0	0	3.2	2.9	2.9	2.6	3.2	2.9	2.9	3	2.7	2.7	4		N	0
394	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
395	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
396	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
397	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
398	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
399	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
400	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
401	Other Mine	0	0	0	3.2	3.1	3.1	2.6	3.2	3.1	3.1	2.9	2.8	2.8	4		N	0
402	Other Mine	0	0	0	3.1	3.1	3	2.6	3.1	3.1	3	2.9	2.8	2.8	4		N	0
403	Other Mine	0	0	0	3.1	3.1	3	2.6	3.2	3.1	3	2.9	2.8	2.8	4		N	0
404	Other Mine - Vacant	0	0	0	4.3	4.3	4.2	3.1	4.3	4.3	4.2	3.5	3.4	3.4	4		Y	0
405	Other Mine - Vacant	0	0	0	3.6	3.6	3.5	2.8	3.7	3.6	3.6	3	2.9	2.9	4		N	0
406	Other Mine - Vacant	0	0	0	4	4	3.9	2.6	4	4	3.9	2.9	2.9	2.8	4		N	0
407	Other Mine - Vacant	0	0	0	3.2	3	3	2.6	3.2	3	3	2.9	2.7	2.7	4		N	0

Notes:

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- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

ID	Status	Due to Mount Owen (Proposed Modification) in isolation			Cumulative (all sources but without Mount Owen Proposed Modification)			Cumulative (all sources)				Cumulative (all sources but without Ashton South East Open Cut)			EPA assessment criteria (2016)	Assessment of results for Cumulative all sources.		
		Y2	Y8	Y15	Y2	Y8	Y15	2014	Y2	Y8	Y15	Y2	Y8	Y15		Private and exceeds VLAMP (2018) criteria[1]	Exceeds EPA assessment criteria (2016)[2]	Contribution of Mount Owen (Proposed Modification) if the exceedances of EPA assessment criteria (2016) is influenced by Mount Owen[3]
408	Other Mine	0	0	0	3.2	3.1	3	2.6	3.2	3.1	3	2.9	2.7	2.7	4		N	0
409	Glencore - Vacant	0	0	0	3	2.5	2.5	2.8	3.1	2.6	2.5	2.9	2.4	2.4	4		N	0
410	Glencore - Vacant	0.6	0.4	0.2	2.1	2	2	2.5	2.6	2.4	2.2	2.6	2.4	2.2	4		N	0
411	Glencore - Vacant	0.7	0.4	0.2	2.1	2	2	2.6	2.7	2.4	2.3	2.7	2.4	2.2	4		N	0
412	Community Infrastructure	0.3	0.2	0.1	2.1	2	2	2.3	2.4	2.2	2.1	2.4	2.2	2.1	4		N	0
007a	Private	0.5	0.4	0.3	2.3	2.2	2.2	2.4	2.8	2.6	2.5	2.8	2.6	2.5	4	N	N	0
007b	Private	0.5	0.4	0.3	2.3	2.2	2.2	2.4	2.8	2.6	2.5	2.8	2.6	2.5	4	N	N	0
007c	Private	0.5	0.5	0.3	2.2	2.1	2.1	2.4	2.7	2.6	2.5	2.7	2.6	2.5	4	N	N	0
015a	Private	0.4	0.4	0.2	2.1	2	2	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
015b	Private	0.5	0.4	0.2	2.1	2	2	2.3	2.5	2.4	2.3	2.5	2.4	2.3	4	N	N	0
044a	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
044b	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
056a	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
056b	Private	0	0	0	2	2	2	2	2	2	2	2	2	2	4	N	N	0
063a	Community Infrastructure	0.1	0	0	2	2	2	2.1	2.1	2	2	2.1	2	2	4		N	0
069a	Private	0.1	0.1	0	2	2	2	2.1	2.1	2.1	2	2.1	2.1	2	4	N	N	0
102a	Private	0.3	0.2	0.2	2.3	2.2	2.2	2.3	2.6	2.4	2.4	2.6	2.4	2.4	4	N	N	0
102b	Private	0.3	0.2	0.1	2.4	2.3	2.3	2.3	2.6	2.5	2.4	2.6	2.5	2.4	4	N	N	0
127a	Private - Subject to Acq Rights	0	0	0	3.3	3.2	3.1	2.5	3.3	3.2	3.1	3.2	3	3	4	N	N	0
127b	Private - Subject to Acq Rights	0	0	0	3.5	3	2.9	2.8	3.6	3	2.9	3.5	2.9	2.9	4	N	N	0
127c	Private - Subject to Acq Rights	0	0	0	3.6	2.8	2.8	3.1	3.6	2.8	2.8	3.5	2.7	2.7	4	N	N	0
127d	Private - Subject to Acq Rights	0	0	0	3.6	2.8	2.8	3.1	3.6	2.8	2.8	3.6	2.7	2.7	4	N	N	0
144a	Private - Subject to Acq Rights	0	0	0	3.6	3.6	3.6	2.8	3.7	3.6	3.6	3	3	3	4	N	N	0
144b	Private - Subject to Acq Rights	0	0	0	2.7	2.7	2.5	2.5	2.7	2.7	2.5	2.7	2.6	2.5	4	N	N	0
144c	Private - Subject to Acq Rights	0	0	0	2.7	2.7	2.5	2.5	2.7	2.7	2.5	2.7	2.6	2.5	4	N	N	0
162a	Glencore - Vacant	0.4	0.3	0.1	2.1	2	2	2.4	2.5	2.3	2.2	2.5	2.3	2.2	4		N	0
162b	Private	0.1	0	0	2	2	2	2.1	2.1	2.1	2	2.1	2.1	2	4	N	N	0
17a	Private	0.4	0.3	0.2	2.1	2	2	2.3	2.5	2.4	2.2	2.5	2.4	2.2	4	N	N	0
17b	Private	0.4	0.3	0.2	2.1	2	2	2.3	2.5	2.4	2.2	2.5	2.4	2.2	4	N	N	0
292a	Private	0.1	0	0	2.5	2.3	2.3	2.2	2.6	2.4	2.4	2.5	2.4	2.4	4	N	N	0
292b	Private	0.1	0	0	2.5	2.3	2.3	2.2	2.6	2.4	2.4	2.5	2.4	2.3	4	N	N	0
297a	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
297b	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
297c	Private	0	0	0	2.6	2.5	2.5	2.3	2.6	2.5	2.5	2.6	2.5	2.4	4	N	N	0
297d	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.5	2.4	2.3	4	N	N	0
349a	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.4	2.4	2.3	4	N	N	0
349b	Private	0	0	0	2.5	2.4	2.4	2.2	2.5	2.4	2.4	2.4	2.4	2.3	4	N	N	0

Notes:

- [1] VLAMP 2018 assessment includes privately owned receptors only. It should be noted that VLAMP 2018 does not apply to the Proposed Modification due to no predicted increase in air quality impacts relative to the Approved Operations. Assessment of private vacant land provided in Table 2.
- [2] The predictions for receptors (private and mine owned) which exceed EPA assessment criteria (2016) have been highlighted.
- [3] Additional assessment of Mount Owen contribution against EPA assessment criteria (2016) has been carried out for receptors (private and mine owned).
- The Mount Owen Continued Operations (as modified) is referred to as the Proposed Modification.

Table 2 VLAMP – 25% Assessment for Vacant Land

Lot and DP	Year 2	Year 8	Year 15
Land where maximum 24-hour average PM_{10} exceeds VLAMP 2018 criteria			
No Exceedance			
Land where number of days above 24-hour average PM_{10} exceeds VLAMP 2018 criteria			
No Exceedance			
Land where annual average PM_{10} exceeds VLAMP 2018 criteria			
1//1136411, 1//121623, 3//251618, 100//1030908 (landholding)*			
3//1111313 *			
4//1166047 *			
5//1166047*			
106//855187*			
175//1002770*			
Land where annual average $PM_{2.5}$ exceeds VLAMP 2018 criteria			
1//1136411, 1//121623, 3//251618, 100//1030908 (landholding)*			
3//1111313 *			
4//1166047 *			
5//1166047*			
106//855187*			
175//1002770*			
Land where annual average TSP exceeds VLAMP 2018 criteria			
3//1111313 *			
Land where annual average dust deposition exceeds VLAMP 2018 criteria			
3//1111313 *			

**Subject to Acquisition*

Note: Shaded cells reflect the years where the model predictions indicate an exceedance of VLAMP (2018) criteria on >25% of the vacant land holding.

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